Safe Ways to School – The Role in Multimodal Planning

Prepared by

Ruth L. Steiner, Ph.D.
University of Florida
Principal Investigator

Linda B. Crider, Ph.D.
University of Florida
Co-Principal Investigator

Matthew Betancourt, MAURP
University of Florida
Graduate Research Assistant

With assistance from

Amanda K. Hall, MHSE
Tina Perrotta

For The Florida Department of Transportation Systems Planning Office
Contract Number #BD545
Project Work Order #32

May 2006

1. Report No.	2. Government Accession No.	3. Recipient's Catalog No.
4. Title and Subtitle Safe Ways to School: The Role in Multimodal Planning		5. Report Date May 22, 2006 6. Performing Organization Code
7. Author(s) Dr. Ruth Steiner, Dr. Linda Crider, Matthew Betancourt, Amanda Hall, and Tina Perrotta		8. Performing Organization Report No.
9. Performing Organization Name and Address University of Florida, Dept. of Urban and Regional Planning 431 ARCH Building PO Box 115706 Gainesville, FL 32611-5706		10. Work Unit No. (TRAIS) #32 11. Contract or Grant No. Contract #BD545
12. Sponsoring Agency Name and Address Florida Department of Transportation 605 Suwannee Street, MS 30 Tallahassee, FL 32399		13. Type of Report and Period Covered 14. Sponsoring Agency Code
15. Supplementary Notes		

16. Abstract

For the past three decades, the children in Florida and across the nation have experienced a decrease in routine daily physical activity as less and less children walk and bicycle to school. Parents choosing cars and buses over walking and bicycling has increased roadway traffic and negatively impacted the health of Florida's children. In response to this decrease and its related problems, such as increased school transportation costs, increase childhood obesity and diabetes, the federal and state government have passed recent legislation concerning multimodal planning, school siting, and the Safe Ways/Routes to School Program. The objective of this research is to determine how to implement recent this legislation in order to maximize the number of children walking and bicycling to school.

Parents' decisions about how to safely get their children to school are complex and dependent upon the travel options available. Multimodal planning and coordinated school planning at the state and local level can provide these options by supplying a safe and predictable built environment in which the Safe Routes to School Program – education, encouragement, enforcement and engineering - can be implemented to increase the opportunities for children to engage in routine physical activity while walking to school. The most critical aspect of the Safe Routes to School Program is the need for ongoing coordination between these diverse programs. The goal of this coordination should be the development of communities that balance the need for safe, continuous, and predictable environments for pedestrians, bicyclists, especially near schools, with the need for mobility within the community. Without attention to the creation of multimodal environments that encourage alternatives to the automobile throughout the community, the traffic near school zones is likely to remain an issue and our children are likely to continue to experience the negative consequences of a lack of physical activity. With improved attention to multimodal transportation planning, coordinated school planning and Safe Routes to School programs we may be able to halt the decline in the number of children walking and bicycling to school.

17. Key Word	18. Distribution Statement
Multimodal planning, school siting, Safe Ways to School, Safe Routes to School, school transportation, Safe Paths to School, SAFETEA-LU, children's travel, multimodal transportation districts	

19. Security Classif. (of this report)	20. Security Classif. (of this page)	21. No. of Pages	22. Price
Unclassified.	Unclassified.	184	

Form DOT F 1700.7 (8-72) Reproduction of completed page authorized

Acknowledgments

The project team would like to acknowledge the Florida Department of Transportation (FDOT) Systems Planning Office for their financial support of this research.

The project team would like to thank Martin Guttenplan, project manager, for his patience, willingness to discuss various aspects of the research, and his keen insights into the diversity of issues associated with getting our children safely to school. Several researchers from throughout the country assisted in providing their expertise on various aspects of multimodal school planning. Andy Clarke from the League of American Bicyclists, Charlie Zeeger from the University of North Carolina, Tami Sufi and Jennifer Toole of Toole Design Group, Marianne Fowler and Jeff Ciabotti of the Rails to Trails Conservancy, and Reid Ewing from the University of Maryland, and Chris Forinash of the Environmental Protection Agency, who all willingly answered our questions during telephone conversations and a discussion at the national meeting of the Transportation Research Board in Washington, DC in January, 2005. Dan Burden of Walkable Communities and Bill Wilkinson of the Bicycle Federation provided guidance on how to consider the issues and identified people to contact for information. Lauren Marchetti of the Highway Safety Research Center (HSRC) and Bruce Appleyard provided insightful comments on the draft of the document.

The research team would also like to thank the members of our statewide advisory panel for their participation in meetings, their willingness to review our recommendations, and for sharing information on their role in children's transportation safety. They include Jane Parker, Lisa Conti, Jennie Hefelfinger, Linda Greis, Ali Jaglowski, Daniel Parker, and Wes Payne from the Florida Department of Health; Charlie Hood, Herman Carter, Ronnie McCallister, Penny Detscher, Lillian Finn, and Antoinette Meeks of the Florida Department of Education; Diane Quigley, Anoch Lanh, and Jennifer Carver of the Florida Department of Community Affairs; Pat Pieratte and Dennis Scott of the Florida Department of Transportation; Gene Boles from the University of Florida, Dennis Foltz from Orange County Public Schools and Ken Bryan from the Rails to Trails Conservancy. Their contributions proved to be invaluable to our understanding of the complex connections between land development, school, and multimodal transportation planning.

From our local focus group in Broward County, the team would like to thank Barry Wall from the Community Traffic Safety Team; John Ramos from the Broward County MPO; Thuha Nguyen of Kittelson & Associates, Inc.; Mayor Richard Kaplan of Lauderhill, FL; Marcin Gadek from the Florida Department of

Transportation, District 4; Connie Wotton from Broward County Public Schools; Parent-Teacher Association member Bari Goldberg; and Staci Ritter. They helped us understand school transportation problems at the local scale.

From our local focus group in Palm Beach County, the team would like to thank Angela Usher and David DeYoung from the Palm Beach County School District; Lieutenants Joe Milkenkovich and Marc Woods from the City of Delray Beach Police Department; City of Delray Beach Engineer Randall Krejcarek, Janet Meeks from the Board of Education, and Scott Aronson for the City of Delray Beach. Your participation in the focus group provided insight into school siting in one of Florida's most populous counties.

Additionally, the project team would like to thank the following people for their continuous support, and for answering our various questions throughout our research, or assisting us in any number of ways: Eileen Roy from the Alachua County School Board; Jeff Tsai from the University of North Carolina; Howard Glassman of the MPOAC; Mighk Wilson from Metroplan Orlando; Marlie Sanderson of the MTPO; Vicki McGrath from Alachua County Schools; Leigh Matusick from the School Crossing Guard Training Program; Maria Abadal-Cahill, formerly of the Florida Department of Community Affairs for her advice on school districts; Whit Blanton of Renaissance Planning Group for his comments and information about multimodal districts; David Quigley and Nikki van Vonno for their insight into Martin County's school siting matrix; Spessard Boatright, Alex Carswell, and Charles Wooten of the Office of Educational Facilities for their guidance on school siting; Barbara Meyer of the Brevard County Metropolitan Planning Organization for her comments; and Matt Demers for his graphic designs.

The conclusions and opinions expressed in these reports are those of the subgrantee and do not necessarily represent those of the State of Florida, Department of Transportation, Systems Planning Office, the U.S. Department of Transportation, or any other agency of the State or Federal Government or the University of Florida.

Executive Summary

PROBLEM DEFINITION

Every day, Florida parents wake up and follow a pattern of routine activity that could ultimately determine the safety of their neighborhood, the commute times of thousands of other people, and the health of their own children. For many parents, distance or hazardous walking conditions will limit this decision to driving their children to school or sending their child on a school bus. For parents living near school in a neighborhood with a complete sidewalk network, direct access to school, and safe walking conditions, their decision will be based upon a variety of factors including their perception of safety, their child's knowledge of traffic conditions, and the relationship between their child's travel and other activities in the household. Nationally, the number of children walking or bicycling to school has declined steadily over the last four decades; in 1969, 48% of students walked or bicycled to school, but by 2001, that percentage had declined to 15 percent. In Florida in 1992, only one in six children walked to school daily (Starnes, Stein, Crider, Audirac, Pither *et al.,* 1992).

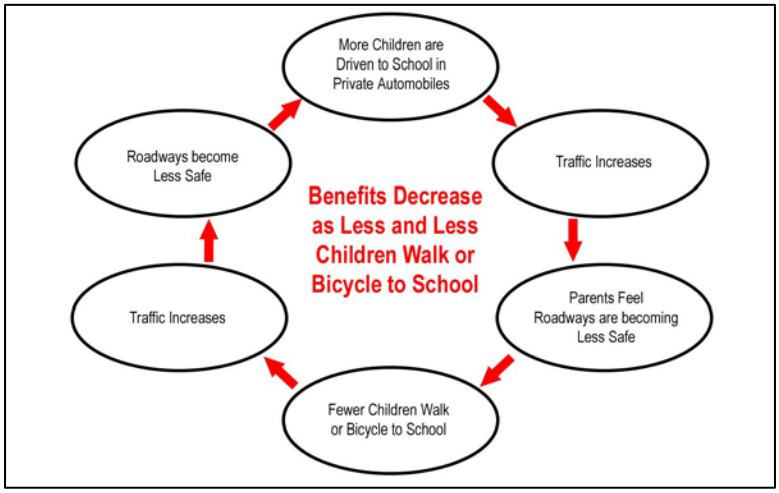
Escalating Costs to Communities and Children

Each parent's decisions to drive their child to school or send their child on the bus can be costly to the community in many ways. The decrease in children walking and bicycling to school has contributed to traffic congestion, air pollution (EPA 2003), the increased rate of childhood obesity (Ogden, Flegal, Carroll, and Johnson, 2002; Strauss and Pollack 2001), increased rates of adult-onset, or Type II diabetes (Flegal, 1999; Huang and Goran, 2003; Odgen *et al.* 2002; Sallis and Owens, 1999), and a decrease in children's independence (David and Weinstein, 1987; O'Brien, 2003; Proshansky and Fabian, 1987; Siegel, Kirasic, and Kail, 1978).

A major portion of the traffic results from the accumulation of decisions of individual parents to drive their child to school, creating congestion in the community during the morning and afternoon peak commute times. This pattern, termed the "traffic threat multiplier effect," produces a vicious cycle of parents creating additional traffic congestion in cars in order to protect their children from traffic (Appleyard, 2003). The greater the traffic congestion near schools, the more likely parents are to feel that the roadways near the school are unsafe, and the more likely they are to drive their child to school because walking and bicycling are not safe for their child.

While a parent's decision to send their child on a school bus has less impact on other drivers, the costs to communities throughout Florida are significant. Each year the State of Florida and the school districts combined spend approximately $750 million to bus children to school (FDOE, 2004).

The increases in childhood obesity and Type II diabetes can be attributed to several causes: (1) childhood nutrition; (2) lack of physical activity; and (3) longer periods of time in front of television and computer screens. The decrease in the number of children walking and bicycling to school and the reduction in the amount of time children spend in physical education classes both contribute to the reduction in physical activity of children.



Although parents make the final decision on how their children travel to school each day, their decision is often based on factors beyond their control. Contributing decisions made by transportation, land development, and school planners have not always been coordinated to create a community in which parents are offered reasonable choices about how their children get to school.

Traditionally, school districts have been given a great deal of discretion about where schools are located. The changing requirements for school sites have made renovation of existing schools more difficult. The shortage of new school sites in already developed areas and the difficulty of renovating existing schools has led school districts to locate schools at the edge of the community. In response to these decisions, parents must drive their children to school, or the school district—and all taxpayers must pay to bus children to the school. Developers have responded to the location of schools by proposing residential developments around the new school, and local governments have responded to public demand by approving the development even if the schools contribute to sprawl in the community.

Legislative Solutions in Florida

To address school transportation concerns and the need to provide safety for children on their way to school, the Florida Legislature has passed several pieces of legislation in the last few years. In 2002, the Legislature passed a bill entitled "Safe Paths to School" requesting the Florida Department of Transportation (FDOT) to establish a "Safe Paths" program and consideration for planning, construction, and funding that program. It further indicates that the FDOT may

adopt appropriate rules pursuant to §120.536 (1) F.S.A. and §120.54 F.S.A. for the administration of the "Safe Paths to Schools" Program.*

In 1999, the Legislature amended the Florida Statutes to allow local governments to establish Multimodal Transportation Districts (MMTDs) to promote development that favors pedestrian, bicycle, and transit modes over the automobile. The FDOT has developed tools for multimodal analysis and criteria for MMTDs (FDOT, 2003). A recent report on multimodal tradeoffs in traffic impact studies identified a need for defining the special needs of schools within MMTDs because of their significance as special trip generators (Steiner, Li, Shad, and Brown, 2003).

In 2002, legislation was passed that required local governments to enter into interlocal agreements with school districts to formally establish a process in which school plans are coordinated with local comprehensive plans. The 2005 Growth Management Reform Act (GMRA) reinforces the direction of the earlier legislation through several provisions:

(1) Enhancing the requirements for multimodal planning in Transportation Concurrency Exception Areas (TCEAs) by extending concurrency to schools;
(2) Increasing the importance of a "financially feasible" Capital Improvements Element (CIE) in the local Comprehensive Plan;
(3) Requiring local governments to establish a "proportionate share" component in the CIE that allows developers to meet school and transportation concurrency if they execute a legally binding commitment to provide mitigation proportionate to the demand for public schools and transportation facilities;
(4) Providing incentives for regions to plan and fund a network of regional transportation facilities, called the Transportation Regional Incentive Program (TRIP), which is similar to the Strategic Intermodal System (SIS) and the Florida Intrastate Highway System (FIHS); and
(5) Establishing several taskforces and funding programs to implement the provisions of the act.

In 2005, the U.S. Congress passed and the President signed the Safe, Accountable, Flexible, Efficient Transportation Equity Act-A Legacy for Users (SAFETEA-LU) legislation. This bill amends Titles 23 and 49 of the United States Code and authorizes the disbursement of $286.5 billion dollars over a five-year span, 2005 through 2009. This legislation launches a new Safe Routes

---

* For the purposes of this report, "Safe Routes to School," "Safe Paths to School," and "Safe Routes to School" will all be used to refer to programs that have the shared goal of increasing the number of children who walk or bicycle to school. There are only a few distinctions. "Safe Routes to School" is the national title for such programs and will be used generically to refer to this type of program. "Safe Ways to School" is the local, Florida version of the national Safe Routes to School initiative. "Safe Paths to School" refers to legislation passed in 2002 that assigns the Safe Routes to School program to the FDOT.

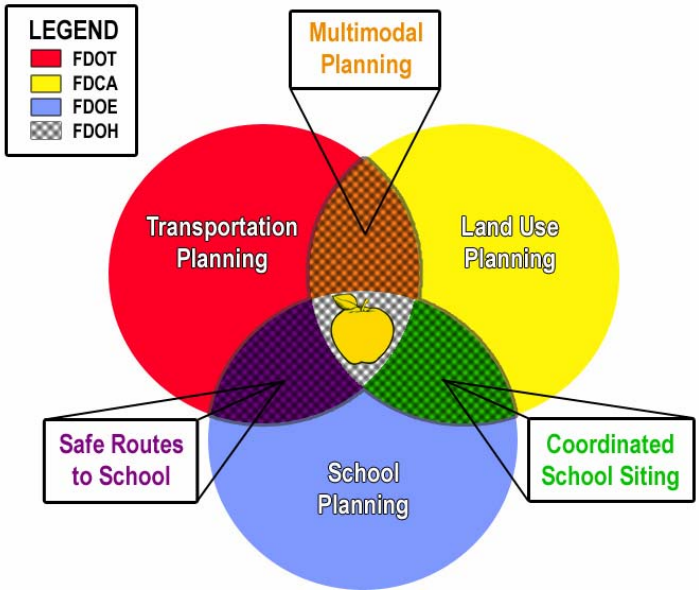
to School Program, and will aid in existing programs to make it safer for Americans to walk and bicycle.

SAFETEA-LU dedicates $3 million at the federal level for administration of the program, with the remainder of the funds distributed to States based on their relative shares of total enrollment at the primary and middle school levels, with no state receiving less than $1 million. Funds will then be administered at the State DOT level to assist other agencies meeting the requirements of the program. From 10% to 30% of the funds for each state must be used for non-infrastructure programs and the rest may be used for the planning, design, and construction of infrastructure improvements supporting the bicycle and pedestrian environment within two miles of a school.

OBJECTIVE OF THE RESEARCH

The objective of this report is to identify how the Florida DOT can best meet the requirements of the Florida's Safe Paths to School legislation. This report considers the existing practice of state agencies that affect transportation, land development, school planning, and best practices throughout Florida and the country to develop guidance for legislative and policy development in Florida. To understand the relationship between these three areas, the figure below was developed to characterize the relationships between these three types of planning in an ideal physical environment.

Figure 1: Conceptual Model of Influential Areas in School Transportation
Source: Authors



The initiatives of four state agencies – the FDOT, Department of Education (FDOE), the Department of Community Affairs (FDCA) and the Department of

Health (FDOH) – are directed towards local governments and school districts. The first three state agencies (FDOT, FDOE, and FDCA) directly affect the decisions made about children's safety to school, while the Department of Health is less directly involved through programs in communities that encourage public health and physical activities. With limited control over school siting and transportation infrastructure, the activities of the FDOH are also constrained by decisions that do not support walking and bicycling. The "golden apple" in the middle of the diagram represents the area of greatest potential mode shift to walking and bicycling.

When school location is coordinated with land use planning, and land development planning is coordinated with transportation planning to create a continuous bicycle and pedestrian network with the most direct connections between residences and schools, there is a greater opportunity for the safe movement of children to and from school. When land use planning, school planning, and transportation planning are not coordinated, the opportunities for walking and bicycling are less available.

FRAMEWORK FOR COORDINATING TRANSPORTATION, LAND DEVELOPMENT AND SCHOOL LOCATIONS

As shown in the above figure, the respective overlaps between and among these three types of planning – transportation, land use, and school - represent three areas of coordinated planning: (1) multimodal planning, (2) coordinated school planning, and (3) Safe Ways/Routes to School.[**] The first two of these are pre-emptive measures that can create the kind of physical environment that supports the education and encouragement activities of the local Safe Routes to School Program.

Multimodal planning reflects the inherent relationship between land use and transportation, with land uses representing destinations, and transportation routes representing the connection between destinations. Multimodal planning involves four guiding principals that create walkable and bikeable environments including a complementary mix of land uses developed at appropriate density and intensity with network connectivity and good urban design connecting complementary land uses.

Coordinated school planning is directed at making the connection between school and the residences where students will live. McMillan, Day, Boarnet, Alfonzo, and Anderson (2004) found that students in California living within a mile of a school are three times more likely to walk or bicycle than those living further

---

[**] The diagram shows the Safe Ways to School program because this has been the name of the program that has been implemented in the State of Florida since 1997. However, with the new federal legislation, it will be called the Safe Routes to School program. As such, additional references will refer to the federal program that is to be implemented in the State of Florida.

from the school. Coordinated school siting can be seen as an overlap between school planning and land use planning in that it seeks to locate schools near residential land uses where students will live. If we do not change the location of schools to ensure that more students live within walking and bicycling distance of the schools then we will either pay increasing amounts to bus or drive our children to school or we will continually be retrofitting the neighborhoods to ensure that children can walk and bicycle to school.

Finally, Safe Routes to School can be the most effective if residences are located close to the school and a complete, safe, and predictable environment is provided for bicyclists and pedestrians.

BEST PRACTICES

The report identifies best practices in each of these areas of coordination. Multimodal planning has been practiced in various forms since the 1920s when Clarence Stein and Clarence Wright, both members of the Regional Plan Association of America, recognized the benefits of multimodal planning, and in response, developed a new type of neighborhood design – the Radburn Plan – that would counteract the threat the automobile posed to the livability of America's neighborhoods. Since that time communities have developed a variety of designs to address the needs for multimodal planning.

One current design incorporates traditional neighborhood development (TND) into community practice. TND incorporates a connected street grid and mixed land uses with an overall higher density of development especially near the town center. The State of Florida has been on the forefront of multimodal planning in the development of multimodal transportation planning tools. However, many existing communities in Florida are built in a pattern of low-density, segregated land use pattern with limited connectivity that will not easily support multimodal transportation.

Best practices in coordinated school planning include: information sharing, strong regulatory review, objective approaches to select school sites, awareness of the impacts of school size and site selection, increasing participation of all affected parties in school siting, use of maintenance standards to prevent the need for new school construction, incentives for smart growth strategies, and co-location and joint-use strategies. State regulations require sharing information as a part of interlocal agreements, but the most important aspect of this sharing and adopting the same assumptions is to ensure that planning decisions are coordinated.

Coordinating Land Use and School Siting Decisions

In Orange County, strong regulatory review is used to say "no" to new development for which there is inadequate school capacity and to ensure that the

school district can negotiate for additional funding to build new school capacity. The use of an objective school site selection process, which is used in Martin County, helps avoid disputes between parties about the location of schools by involving all stakeholders in a pre-defined decision making process that is reflective of the community's goals.

Through community education on the advantages of small school and the importance of school siting, the state of Maine was able to overcome public resistance and gain acceptance of smaller, neighborhood schools. This education also helped the community to understand the tradeoffs between higher initial costs for building smaller schools with higher ongoing expenses, like school busing for larger schools. In Orange and Palm Beach Counties, local governments and developers actively participate in making decisions about where to locate schools; developers and local school districts hold each other accountable for the consequences of decisions made in their respective areas of control.

One way to make schools the center of communities is to prevent the destruction of existing neighborhood schools. Older schools that the public sees as "falling apart" make the decision to build a new school on a new site much easier. By investing smaller amounts of money to maintain existing buildings, Maryland and Palm Beach County have been able to avoid building expensive new school buildings.

North Carolina's incentives for schools that use Smart Growth strategies have allowed the state to provide positive regulation of school construction. By providing grants to schools that use these strategies, such as compact building design, increase school bus use over automobile use, reduce parking for students, provide ample sidewalks and bike paths that encourage pedestrian and bicycle modes, the state can get schools to look creatively at solving their own problems, and to take ownership of such innovations.

Co-location and joint use, as demonstrated by Duval County's interlocal agreement, represent two money-saving strategies that also provide additional opportunities for multimodal planning. Co-location helps create the complementary mix of land uses proposed for MMTDs and when combined with joint use agreements, works together to maximize the cost-effectiveness of public facilities such as schools and libraries and save money while providing the maximum benefit to the public.

The Four E's: Best Practices in Safe Routes to School

Best practices in Safe Routes to School include the use of all of the 4 E's – engineering, enforcement, education and encouragement – to ensure that a comprehensive program is developed to address the specific needs of the community. Best practice in these programs includes the following components:

(1) A variety of partners to become the local Safe Routes to School Team;
(2) A map of the physical environment including the location of hazardous areas;
(3) A commitment to make the infrastructure improvements, such as, sidewalks, pedestrian signals, raised crosswalks, and bike racks, to provide access to the school;
(4) Education and enforcement programs that inform children and the public of the program and ensure that the safety rules are followed;
(5) Media coverage and special events to ensure community awareness of the program; and
(6) Evaluation of the program on an ongoing basis to ensure that the program builds on its successes and identifies and remedies problems (Appleyard, 2003; Twadell, 2004).

Safe Routes to School programs are generally organized at each school and should involve a variety of actors who take a role in ensuring the success of Safe Routes to School programs. Bottom-up support for the program, through the participation of parents, children, teachers, school advisory committees, and advocates for children's safety, is necessary in ensuring participation in the program and being the champions for the program. Top-down support for the program – from principals, elected officials in the community, school administrators – ensures that the program remains a priority of the community and receives the funding and political support to ensure that the program will have sustained support. Finally, technical support needs to come from professionals in the community – law enforcement officials, Community Traffic Safety Teams, transportation planning professionals, school board planners, and land use planners – who ensure that the public agencies participate in the activities necessary to support the program.

Success Stories in Other States

Several examples of Safe Routes to School programs illustrate some of the components of successful programs. In Marin County, California the program is designed around education and encouragement components including an evaluation of the program, and identifying hazards in the area to develop a Safe Routes to School Improvement Plan and School Curriculum.

In Arlington and Boston, Massachusetts the program includes the town council in the planning process and the program encourages use of public transit, improvements to the public environment, and excitement through media coverage and special events to encourage participation. Parents, teachers and students in the Bronx, New York work together to identify and select schools for the program, make initial contact with schools, conduct outreach at school, distribute surveys to schools, tour school sites, make and install changes, and

follow-up. They also work with professionals in the community to identify, locate and map crashes and their cause.

In Chicago, Operation Safe Passage was organized though a coordinated effort between the schools and law enforcement officials. Through the efforts of law enforcement officials and 3,000 volunteers, Walking School Busses have been established to ensure safe walking for children on their way to school. The Center for Disease Control and Prevention (CDC) has developed a program targeting interested parents and children to assist them in starting a local program and organizing it at the neighborhood level.

In Portland, OR, the program involves the police department and includes a variety of educational programs. In Santa Ana, California the program is promoted through a Family Literacy program and community education and enforcement program called Drive 25, which puts additional speed limit signs near schools. The City of Phoenix uses a school-based safety task force and involves the city council and the engineering staff as leadership in the program administration. In Great Britain, the programs involve the entire neighborhood in the creation of “home zones.” In Toronto, children map the location of hazards as a part of a program that focuses on health and the environment.

HOW ARE WE DOING?

Over the last two decades, the state has passed legislation in each of our three related areas of planning: school siting, multimodal planning, and Safe Ways to School. The 1985 Local Government Comprehensive Planning and Land Development Act incorporated a requirement that local governments provide infrastructure, including transportation, concurrent with the impact of development. Since this incorporation, the legislation has been revised four times – in 1992, 1993, 1999, and 2005 – to enhance the concurrency system using TCEAs, TCMAs, and MMTDs.

Each of these areawide exceptions are intended to support community goals such as redevelopment, infill, and downtown revitalization while enhancing the multimodal characteristics of the coordinated land use–transportation system. Multimodal planning has been encouraged by the FDCA since the mid-1990s with the publication of Pedestrian and Transit Friendly Design (Ewing, n.d.) and Best Development Practices: A Primer for Smart Growth (Ewing and Hodder, n.d.). The requirement for true multimodal planning is relatively new with the publication of guidance on the development of MMTDs by the FDOT in 2003 and the incorporation of multimodal planning into TCEAs with the Growth Management Reform Act (GMRA) of 2005.

The Evolution of Coordinated School Planning

The requirements for coordinated school planning have been gradually enhanced. Initially, concurrency was not required for schools. In 1992, legislation was passed that allowed school concurrency as an optional element of local comprehensive plans. In 1995, the Educational Facilities Act required school districts to share the information related to school facilities and development with information used by local governments in the comprehensive planning process. Then in 1998, the Florida State legislature passed a law that lead to the use of coordinated planning data and analysis among school districts and planning agencies to ensure that adequate school capacity is provided to accommodate new development. In 2002, school boards and local governments were required to negotiate interlocal agreements that allowed both agencies to review school siting comprehensively. Finally, in 2005 school boards and local governments are required to have concurrency for schools.

In order for the requirements to be successful, local governments and school boards will need to coordinate their activities to ensure that schools are located close to residential neighborhoods and that safe and continuous sidewalk and bicycle paths are provided to schools. School sites need to be reduced in size to ensure that the size of the school site does not create an even greater distance for children to walk or bicycle to school. The size of school sites in Florida is smaller than the national averages recommended by the Council for Educational Facilities Planners (CEFPI) (Weihs, 2003).

Safe Ways in Florida

A Safe Ways to School program has been implemented on a voluntary basis in Florida since 1997 when the Florida Traffic and Bicycle Safety Education Program developed a toolkit and pilot tested the program in ten schools throughout the state. Since this program was developed other similar programs have been implemented all over the country and the world. The importance of these programs was reinforced in 2005 when the federal SAFETEA-LU was passed providing funding for state Safe Routes to School programs through 2009.

The FDOT, FDCA, and FDOE have taken a major role in these programs, and the FDOH could take a more significant role. However, the success of these programs will be measured by activities that have been completed in local communities throughout the state. Each of these programs is relatively new in the state so measuring their effectiveness can be difficult. For some local

governments, the requirements of recent legislation reflect existing planning practice. For others, they represent a radical change in practices that will take some time to implement.

Current state legislation is generally adequate to support Safe Routes to School. The multimodal planning legislation provides local governments with the tools to coordinate transportation with land development and with the potential to provide environments that support children walking and bicycling to school. However, the key elements of multimodal planning need to be expanded beyond their application in MMTDs and TCEAs to ensure that today's development does not become tomorrow's traffic problem.

The FDOE operates under state legislation that requires the coordination of planning between boards of education and local governing bodies to ensure that the construction and opening of public school facilities are coordinated with land development in the surrounding community. Until school siting is coordinated with land development, students will live too far from their schools to walk or bicycle. Unless sidewalks and bike paths are continuous, safe, and predictable along routes to school, children's active travel to school will be too dangerous for parents to allow. Children will not receive maximum opportunity to benefit from Safe Routes to School programs until their travel environment supports active travel.

There are many challenges and countervailing trends that will need to be addressed in order for Safe Routes to School programs to be successful. The issues that need to be addressed include the connection between the state agencies and the local implementation, and between the intent of the legislation and the actual implementation and the countervailing trends.

BARRIERS TO SUCCESSFUL IMPLEMENTATION OF SAFE ROUTES TO SCHOOL PROGRAMS

The State of Florida has been growing rapidly for four decades; in some school districts there is a significant backlog of school construction. This affords an opportunity to "do it right" and build schools in a manner that supports the building of schools in a healthy community. However, school districts sometimes face the challenge of competing with residential developers for the key sites for schools. The local land market may not afford the best locations for school sites but they may represent the "best" choices for the school board. Even when a developer dedicates a school location, it may not represent the best location for schools.

Competing Planning and Funding Interests

Within the state agencies, there may be competing interests in how various aspects of the transportation system are developed. For example, the State has a legitimate interest in maintaining a throughput on the State Highway system and, in particular, on the Strategic Intermodal System (SIS) and the Florida Intrastate Highway System (FIHS). However, local governments may choose to build schools near these facilities because they lack available lands. Similarly, local governments may respond to the stated preferences of citizens and not build an interconnected transportation system that would accommodate all modes of transportation.

Within the FDOT, the regulations to implement a Safe Routes to School Program are fragmented in a manner that may interfere with the success of the program. The federal legislation sends $4 to $9 million to the State of Florida each year for the next 5 years. This money needs to be spent on both infrastructural and non-infrastructural programs with a minimum of 10% going to non-infrastructural programs, such as education, encouragements, and technical assistance. However, if the two aspects of the non-infrastructural and infrastructural components of the program are not coordinated, they will likely not support the intended mode shift. The prioritization of the projects for the Safe Routes to School Program is a key element to its success. If the Safe Routes to School infrastructure project are included in the usual Transportation Improvement Plan (TIP) process, they will not be implemented on a timely basis because this process requires that they be phased in over a 5-year period.

Coordination of Government Agencies

The FDOT has several offices that are a part of Safe Routes to School but they are located in various offices throughout the agency. In the Central Office, the Policy Planning develops policies that affect how FDOT districts conduct their local planning, while the Systems Planning Office addresses concerns about the capacity on the SIS and FIHS, works on multimodal planning and reviews development projects addressing multimodal planning. The Environmental Management Office is responsible for the Livable Communities Initiative and the Safety Office is responsible for managing the Florida Traffic and Bicycle Safety Education Program, the Florida School Crossing Guard Training Program and the Safe Routes to School Program. Coordination across the FDOT is necessary to ensure that the federal funding for the Safe Routes to School programs is spent on infrastructure and educational initiatives that maximize the effective expenditure of scarce public resources.

Tables 1 and 2 below summarize the levels of responsibility that each state and local agency, respectively, have in each area of planning, with the letter “P” representing primary responsibility, and “I” representing agency interest. For example, in Table 1, the FDOT has primary responsibility in transportation

planning. Within the FDOT, the Systems Planning Office has primary responsibility in multimodal planning, and an interest in transportation planning, land development planning, and coordinated school siting as these areas of planning are all closely related to the office's primary responsibility of multimodal planning. Similarly, the State Routes to School program has primary responsibility for that program and an interest in transportation planning, multimodal planning, and coordinated school siting as it relates to the Safe Routes to School program.

In Table 2, the responsibilities of various state, regional, and local agencies with respect to the organizational missions related to successful Safe Routes to School programs are identified. For example, "Land Development" is the organizational mission of three main agencies: the Florida Department of Community Affairs, regional planning councils, and local governments. While each of these agencies has primary responsibility for land development, the role they take in other areas related to Safe Routes to School varies. Local governments have primary responsibilities for all areas except school siting, which is the responsibility of school boards while regional planning councils have primary (P) responsibility in land development, and an interest (I) in transportation and multimodal planning, and the FDCA has primary interest in both land development planning and coordinated school siting and an interest (I) in all other areas.

Table 1: State Agency Responsibilities for Planning Activities Associated with Safe Routes to School Programs						
Agency and Program	Transportation Planning	Multimodal Planning	Land Development Planning	Coordinated School Siting	School Planning	Safe Routes to School
FDOT	**P**					
Systems Planning Office	I	P	I	I		
Strategic Intermodal System	P	I				
Strategic Highway Safety Plan		P		I		
Transportation Concurrency	P	I	I	I		I
Environmental Management Office						
Livable Communities Initiative	I	P	I	I	I	
Safety Office						
FSCGTP Crossing Guard Training						P
FTBSEP Traffic and Bicycle Safety Education Program		I				P
Safe Routes to School Program	P	P		P	I	P
Funding for Transportation	P	I				I
Regional Transportation Planning	P	I	I		I	I
SAFETEA-LU – Safe Routes to School Program	I	I	I			P
FDCA			**P**			
Growth Management Implementation	I		P	I		I
FDOE					**P**	
School Facilities Planning				P	P	
Funding for Schools	I	I	I	P	P	I
FDOH						I
Coordinated School Health Program				I		P
Governor's Obesity Task Force		I	I	I	I	I
FDEP		I				
Office of Greenways and Trails		P	I	I		I
P- Agency has primary responsibility in this program or policy; I - Agency has interest in this area of policy						

Table 2: Organizational Mission and State, Regional and Local Agency Responsibilities for Planning Activities Associated with Safe Routes to School Programs

Organizational Mission and Acting Agencies	Transportation Planning	Multimodal Planning	Land Development Planning	Coordinated School Siting	School Planning	Safe Routes To School
Transportation Planning						
Policy Planning Office	P	P	I			
Environmental Management Office	P	I				
Systems Planning Office	P	P	I			I
Safety Office	I	P				P
DOT District Offices	P	P	I			P
Metropolitan Planning Organizations	P	P	I			I
FDEP Office of Greenways and Trails	I	I				I
Local Governments	P	P	P	I		I
Local Transit Agencies	P	P	I			I
Land Development						
Department of Community Affairs	I	I	P	P	I	I
Regional Planning Councils	I	I	P			
Local Governments	P	P	P	P		P
Education/Schools						
FDOE Office of Educational Facilities	P	P	P	P	P	P
FDOE Office of School Transportation	I	P	I	P	P	P
School Boards	I	P	I	P	P	P
Advocacy Groups for Children's Safety	P	P	P	P	P	P
Health and Safety						
Department of Health	I	P	I	P		P
County Health Departments	I	P	I	P		P
CTSTs, Enforcement, Xing guards	I			P	P	P
Office of Transit	P	P	I			I

P- Agency has primary responsibility for organizational mission; I - Agency has interest in this area of policy

The FDOT also needs to work with other state agencies to ensure that the public investments to improve school safety can be leveraged with other expenditures by state and local agencies. For example, schools should not continue to be built using state and local criteria that does not account for the tradeoffs between lower land costs for sites located away from existing populations and the higher ongoing costs of transportation to get children safely to the school. Thus, for example, the FDOE Office of Educational Facilities should begin to incorporate these tradeoffs between short-term location decisions with long-term ongoing costs of transportation. This can be accomplished by better coordination between local school boards and local governments, and at the state agency level for statewide policy decisions.

Citizen Preferences

The preferences of citizens of the State of Florida are also important. While it may be preferable from a planning standpoint to build schools inside a neighborhood, neighborhood residents may resist local school construction because they object to the congestion associated with schools. Similarly, the legitimate concerns of parents about the safety and security of their children on their way to school may undermine the effectiveness of Safe Routes to School. Ironically, as we learn from the successful “Walking School Bus” program in Chicago, the greater the number of children walking to school the greater the safety of all children near the school.

School choice and school-based management may undermine the ability of communities to build schools that support the safe and healthy movement of children from their homes to school. School choice, which includes charter schools, private schools, and choices for parents in non-performing schools, can remove the connection between the location of the school and the location of residences. Since distance is one of the most important factors in the choice to walk or bicycle to school, any policy that allows children to go to schools outside of their neighborhood will reduce the number of participants in Safe Routes to School programs. School-based management, which provides a great deal of discretion at the individual school site level, may undermine the effectiveness of school-based management if the leadership of the school does not support the goals of the Safe Routes to School Program.

Ultimately, many of the necessary components are in place, but the bottom-up approach needs to be reinforced with better coordination of all actors involved in the activities that affect the location of schools and the management of schools once they have been built. Advocates for children’s safety need to incorporate the risks associated with childhood obesity and other health concerns with the risks associated with other safety factors that keep children from walking and bicycling to school.

RECOMMENDATIONS

Based upon the review conducted as a part of this research, 27 recommendations to improve the implementation of Florida's Safe Routes to School Program were developed and subsequently refined and ranked by the statewide advisory panel for this research. The most critical aspect of the Safe Routes to School Program is the need for ongoing coordination between the state agencies, local governments, including cities, counties, school boards, and other private and public organizations. Recommendations were placed into four categories: (1) strategies and guiding principles (#1-4); (2) legislation (#5-10); (3) state agency action (#11-22); (4) actions by local governments and school boards (#23-27). In addition, recommendations for improvements to the Multimodal Transportation Districts and Areawide Quality of Service Handbook (FDOT, 2003) and the Florida Safe Ways to School Toolkit were made. The following actions are recommended to improve coordination between various actors in creating safe environments for children to walk and bicycle to schools:

Strategies and Guiding Principles

1. First and foremost, the State of Florida **Safe Routes to School Program should be administered by a single organization** connected with a research and training institution with an administrative center, staff, and statewide advisory board supported through FDOT and federal "Safe Routes to School" funds. This statewide advisory board should be responsible for awarding grants to schools according to criteria established by the board.

2. The State Safe Routes to School Center, with the advice and consent of the **State Safe Routes to School Advisory Board, should establish a statewide grant program** for infrastructural projects and educational programs associated with school traffic safety, and the promotion of Safe Routes to School programs. Highest priority schools would be those able to demonstrate potential for mode shift or a high numbers of students walking despite hazardous conditions. The criteria for grant awards should also include:

    - Schools with high numbers of children living within 2 mile walk distance, who are presently driven by private automobile
    - Schools that demonstrate a high level of interest in supporting walking and bicycling and are willing to fully participate in the project (This item is the most critical element. Unless the school administration, parents, and students are willing to support a Safe Routes to School Program, lots of time and money can be spent with no increase in the number of kids walking and bicycling to school.)

- Schools in with a high number of pedestrian and bicycle injuries/fatalities among children
- Schools with a significant walking population and poor pedestrian and bicycle facilities (no or incomplete sidewalk or side path network or major barriers to direct access) and a need for safety
- Schools requiring "courtesy busing" for Hazardous Walking conditions
- Schools that need safety improvements
- Schools that need financial assistance to complete feasible bikeway or pathway connections (via utility easements, Rails-to-Trails, greenways,) that connect to neighborhoods and parks
- Schools that incorporate safe school access in their School Improvement Plan, the county comprehensive plan, or as part of an interlocal agreement between the county and school board
- Schools exhibiting poor health indicators, such as elevated Body Mass Index levels.

3. The FDOT should continue to support the Safe Routes to School efforts in Florida through **partnerships** with the FDCA, FDOE, FDOH, Parent Teacher Associations, Department of Highway Safety and Motor Vehicles, FTBSEP, Metropolitan Planning Organizations, Rails to Trails Conservancy, Office of Greenways and Trails, CTST coalitions, and local planning staff and advisory boards, local county health departments, SAFE KIDS chapters, and others with the goal of ongoing coordination to ensure that the Safe Routes to School Program is successfully implemented.

4. The FDOT and FDCA should provide guidance to local governments and school districts for all new development and redevelopment, and based on **best practices in school siting** that reflects the multimodal planning concepts and ensures that walkable and bikeable roadways are available within residential areas proximal to elementary and middle schools

Proposed Legislation

5. **Formalize the funding process to receive federal funds** and set aside a minimum percentage (not less than the federal recommended formula) for each FDOT district to earmark for school safety projects that remove hazards and improve multimodal conditions quickly enough for Safe Routes to School programs to see results in communities.

6. **Hazardous Walking Conditions** as defined by the FDOE shall provide funding to districts under the current criteria for a **5-year period only**, after which the local jurisdiction must show reason why the hazard has not been addressed.

7. **Land Development Regulations** for all new or redevelopment initiatives that are within two miles of an existing or planned school shall be required to complete sidewalks (minimum 5 feet in width) along the corridor that directly serves the school, and provide direct access from adjacent neighborhoods to the school site.

8. Encourage and enhance the **Florida School Crossing Guard Training Program** by recommendations for administrative support, appropriate funding strategies, training, and legal status given to guards.

9. Within MMTDs, the **speed limit should be reduced to 25 mph** on all school routes and 15 mph in school zones. Local governments, in cooperation with school boards, would designate school zones.

10. Create a state requirement for all state accredited educational institutions K-12 to provide a minimum of **4 hours of traffic safety instruction** at each level (elementary, middle, high school) each year, with recommended curriculum units (pedestrian, bicycle, driver education) at each of the three levels.

State Agency Action

11. **Department of Education** should require local school districts to conduct and maintain an annual **Student Travel Mode count** at all elementary and middle schools, which should be available to city/county planning agencies, CTSTs, and other local agencies dealing with school transportation issues. The DOT should research similar efforts by the FDOE and the FDOH that may substitute for these travel mode counts.

12. The **FDOE** should require local school districts to incorporate **long-range student transportation costs in their decisions** regarding the selection of school sites.

13. The **DOT and FDCA** should work together to **provide guidance to local governments** and FDOT districts to ensure that the transportation network balances the need for regional mobility and community livability. In areas with SIS and TRIP facilities near schools, the FDOT should work with MPOs and local governments to develop a connected street grid that offers a safe and lower speed alternative to roadways designed for state and regional mobility.

14. A subcommittee of the **MPOAC or CTST Coalition** would also solicit and recommend project funding for Safe Routes to School, and even nominate schools for grants.

15. The **DOT** should develop **recommendations** through the multimodal district planning efforts for **encouraging mode shift for school trips** from auto to bike and walk, through improved connectivity, bicycle and pedestrian level of service (LOS) at "B" or better on all routes to adjoining existing schools, and traffic calming methods for speed reduction.

16. In MMTDs and TCEAs**, peak hour school trips must be minimized**, including trips to schools of choice or "charter" schools. In addition, the bicycle and pedestrian LOS along the routes to school should maintain a minimum of LOS of "B."

17. **School Zones** should be re-evaluated by local governments to consider safe crossing of children across major roadways. FDOE guidelines should be lengthened around the school site to incorporated adjoining intersections and roadway segments to the next nearest adjoining crossing.

18. FDOT and FDOE should include bicycling and walking incentive strategies for **multimodal districts and new schools**, respectively, including:

    a. Sidewalks (complete, unobstructed, continuous, minimum 5 ft. width) within 1 mile of elementary schools and 2 miles of middle schools within the multimodal district
    b. Connectivity plan utilizing trails, various right-of-way easements off of the major road system, and established as walk/bike trails to destinations including schools and parks, from adjoining neighborhoods.

19. The **FDOE, FDCA, and DOT** should adopt an **objective school siting process,** such as the Martin County Matrix, which reflects a commitment to walkable and bikeable schools.

20. The **FDOE, FDCA, and DOT** should research the **applicability of IPSAC (Integrated Planning for School and Community) in Florida** as an objective and comprehensive process for coordinating school siting decisions, land development patterns, transportation costs, and location efficiency.

21. The **FDCA, DOT and FDOE** should expand their **research** efforts on the connection between **school siting and concurrency practice**. The data collected in the annual Travel Mode Survey will provide the basis for understanding what factors are associated with siting schools in locations that support multiple modes of travel.

22. **Public schools** chosen by parents as alternatives to those assigned by the local school district **should be located within the same neighborhood** as the student's residence if possible.

Actions of Local Governments and School Boards

23. All approved MPO **Long Range Transportation Plans (LRTP**) shall 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 (private automobile or school bus).

24. **Speed limits in MMTDs** along school routes should be reduced to 25mph, and 15 mph in school zones. Highly emphasized crosswalks for pedestrian crossings should be encouraged with raised speed tables, overhead signs, and flashing lights.

25. Within **school zones**, an emphasis should be placed on enhanced crosswalks and other forms of traffic calming.

26. **The school siting process** should include better coordination in the preliminary stages of site planning.

27. 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 (SIP)**. This encouragement could be funded with an increase of $0.50 to $1.00 on every driver's license issued in the State of Florida and allocated for traffic safety education. This money is collected by the FDHSMV and distributed to FDOE for district level traffic safety education and instructors.

Priorities of State Advisory Council

The State Advisory Council met in December 2005 to review and prioritize the 27 recommendations of the research team. Each of the fifteen attendees received a total of eight votes to allocate to the recommendations they felt were most important. Of the 27 recommendations, recommendations number 27, 1, and 2 received ten or more total votes from the group. These top three recommendations are listed below:

1. **Recommendation #27:** 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 (SIP),** funded by driver's license fee increase distributed to the FDOE.

2. **Recommendation #1:** The State of Florida Safe Routes to School Program should be **administered by a single organization** connected with a research and training institution with an administrative center, staff, and statewide advisory board supported through FDOT or federal "Safe Routes to School" funds. This statewide advisory board should be responsible for awarding grants to schools according to criteria established by the board.

3. **Recommendation #2:** The State Safe Routes to School Center, with the advice and consent of the **State Safe Routes to School Advisory Board, should establish a statewide grant program** for infrastructural projects and educational programs associated with school traffic safety, and the promotion of Safe Routes to School programs. Highest priority schools would be those able to demonstrate potential for mode shift or a high numbers of students walking despite hazardous conditions.

SUMMARY AND CONCLUSIONS

Parents' decisions about how to safely get their children to school are complex and dependent upon the travel options available. For some children who live a long distance from school, the choice will be limited to taking the school bus or being driven to school by their parents. For other children, the physical environment surrounding the school may be a determining factor in the choice of transportation mode to school. State agencies, including the FDOT, FDCA, and FDOE, local governments and school boards, and other private and public organizations, all have a role in improving the coordination between transportation, land use and school planning and the overlapping areas of coordination: multimodal planning, coordinated school planning and Safe Ways to School. Multimodal planning and coordinated school planning can create a safe and predictable built environment in which the 4 E's of the Safe Routes to School Program – education, encouragement, enforcement and engineering - can be implemented to increase the opportunities for children to engage in routine physical activity while walking to school.

The most critical aspect of the Safe Routes to School Program is the need for ongoing coordination between these diverse programs. The goal of this coordination should be the development of communities that balance the need for safe, continuous, and predictable environments for pedestrians, bicyclists, especially near schools, with the need for mobility within the community. Without attention to the creation of multimodal environments that encourage alternatives to the automobile throughout the community, the traffic near school zones is likely to remain an issue and our children are likely to continue to experience the negative consequences of a lack of physical activity. With improved attention to multimodal transportation planning, coordinated school planning and Safe Routes to School programs we may be able to halt the decline in the number of children walking and bicycling to school.

Safe Ways to School the Role in Multimodal Planning

Prepared by

Ruth L. Steiner, Ph.D.
University of Florida
Principal Investigator

Linda B. Crider, Ph.D.
University of Florida
Co-Principal Investigator

Matthew Betancourt, MAURP
University of Florida
Graduate Research Assistant

With assistance from

Amanda K. Hall, MHSE
Tina Perrotta

For The Florida Department of Transportation Systems Planning Office
Contract Number #BD545
Project Work Order #32

May 2006

Table of Contents

I. INTRODUCTION 1
OTHER RELATED LEGISLATION 4
CONCEPTUAL FRAMEWORK 6
II. METHODOLOGY 8
III. BACKGROUND/LITERATURE REVIEW 11
CHILDREN'S TRAVEL 11
Research on Children's Travel to School 11
Children's Travel and Health 12
Parents Decision-Making Factors 14
OUR CURRENT SITUATION 15
Controllable Factors Influencing Parental Mode Choice for Children 17
UNDERSTANDING MULTIMODAL PLANNING 20
COORDINATING SCHOOL SITING WITH LOCAL COMPREHENSIVE PLANNING 26
School Size (both enrollment size and site size) 27
Attendance Configurations 28
A Case for Coordinated School Planning 29
Implications of School Siting for Children's School Travel 30
SAFE ROUTES TO SCHOOL 33
History of Safe Routes to School programs 34
Funding 36
School Zones 37
IV. RESULTS/FINDINGS 40
EXISTING PRACTICE IN FLORIDA 40
Existing Florida Legislation 41
Related State Agency Efforts 55
CASE STUDIES AND BEST PRACTICES 62
Multimodal Planning 63
School Siting 71
Safe Routes to School 80
V. DISCUSSION 92
GENERAL BARRIERS 92
MULTIMODAL PLANNING 99
SCHOOL SITING 100
SAFE ROUTES TO SCHOOL 103
CONVERSION OF SCHOOL TRIPS: PUSHING AND PULLING FOR CHANGE 104
VI. RECOMMENDATIONS 111
STRATEGIES AND GUIDING PRINCIPLES 111
LEGISLATION 113
STATE AGENCY ACTION 114

LOCAL GOVERNMENTS AND SCHOOL BOARDS 116
RECOMMENDATIONS MEETING RESULTS 117
ANALYSIS TOOLS 118
Multimodal Handbook 118
School Siting "Best Practices" Tools 120
Safe Ways to School Toolkit 120
VII. CONCLUSION 124
APPENDICES 125
WORKS CITED 141
ADDITIONAL REFERENCES 151

List of Tables & Figures

FIGURE 1: THE TRAFFIC THREAT MULTIPLIER EFFECT 2
FIGURE 2: CONCEPTUAL MODEL OF INFLUENTIAL AREAS IN SCHOOL TRANSPORTATION 7
FIGURE 3: BARRIERS TO CHILDREN WALKING AND BIKING TO SCHOOL 12
FIGURE 4: DIAGRAM OF CONCEPTUAL FRAMEWORK OF ELEMENTARY-AGED CHILD'S TRAVEL BEHAVIOR 15
FIGURE 5: CONCEPTUAL MODEL: SAFE WAYS TO SCHOOL, THE ROLE IN MULTIMODAL PLANNING 16
FIGURE 6: SCHOOL ROUTE DISTANCES IN TRADITIONAL VS. SUBURBAN STREET LAYOUTS 24
FIGURE 7: THE CYCLICAL CONNECTION BETWEEN NEW RESIDENTIAL DEVELOPMENT AND NEW SCHOOLS 29
FIGURE 8: CLARENCE PERRY'S NEIGHBORHOOD UNIT 31
FIGURE 9: AGENCY COORDINATION AREAS THAT SUPPORT SAFE ROUTES TO SCHOOL 41
TABLE 1: STATE AGENCIES AND PROGRAMS 55
FIGURE 10: LAND USES AND MULTIMODAL COMPATIBILITY 65
FIGURE 11: POTENTIAL MULTIMODAL TRANSPORTATION DISTRICT EXAMPLES 67
TABLE 2: COMPARISON OF SCHOOL SITE SIZE FORMULAS 76
FIGURE 12: COMPARISON OF ELEMENTARY SCHOOL SITE SIZES 76
FIGURE 13: COMPARISON OF MIDDLE SCHOOL SITE SIZES 77
TABLE 3: CURRENT STATE AGENCY RESPONSIBILITIES FOR PLANNING ACTIVITIES ASSOCIATED WITH SAFE ROUTES TO SCHOOL PROGRAMS 96
TABLE 4: ORGANIZATIONAL MISSION AND STATE, REGIONAL AND LOCAL AGENCY RESPONSIBILITIES FOR PLANNING ACTIVITIES TO IMPLEMENT SAFE ROUTES TO SCHOOL PROGRAMS 97
TABLE 5: IMPACT OF PLANNING DECISIONS ON PARENTS' SCHOOL TRANSPORTATION 105
TABLE 6: ENGINEERING MEASURES TO IMPROVE SAFETY ENCOURAGE WALKING AND BICYCLING 107
TABLE 7: PRINCIPLES OF SCHOOL TRAFFIC MANAGEMENT 108
TABLE 8: ENFORCEMENT TECHNIQUES FOR PEDESTRIAN SAFETY. 108
TABLE 9: TECHNIQUES TO ENCOURAGE WALKING AND BICYCLING TO SCHOOL 110
TABLE 10: STATE ADVISORY COUNCIL'S RECOMMENDATIONS RANKING 118
FIGURE 14: PRIMARILY RESIDENTIAL AREA OF MMTD. 119
FIGURE 15: MIXED-USE RESIDENTIAL SCHOOL AREA IN AN MMTD 119

I. INTRODUCTION

Every morning parents wake up and answer a single question that has broad implications; this decision will ultimately determine the safety of their neighborhood, the commute times of thousands of other people, and the health of their own children. The question is: "how will my children get to school today?" This decision is made five days a week before 9 a.m. and its impacts are felt throughout the community – by school boards, transportation planners, as well as city, county, and state governments. For parents living close to the school and in a neighborhood with a complete sidewalk network and direct access to the school, their decision is based on a variety of factors. For other parents, the choice may be limited to driving their children to school or sending their child on a school or city bus.

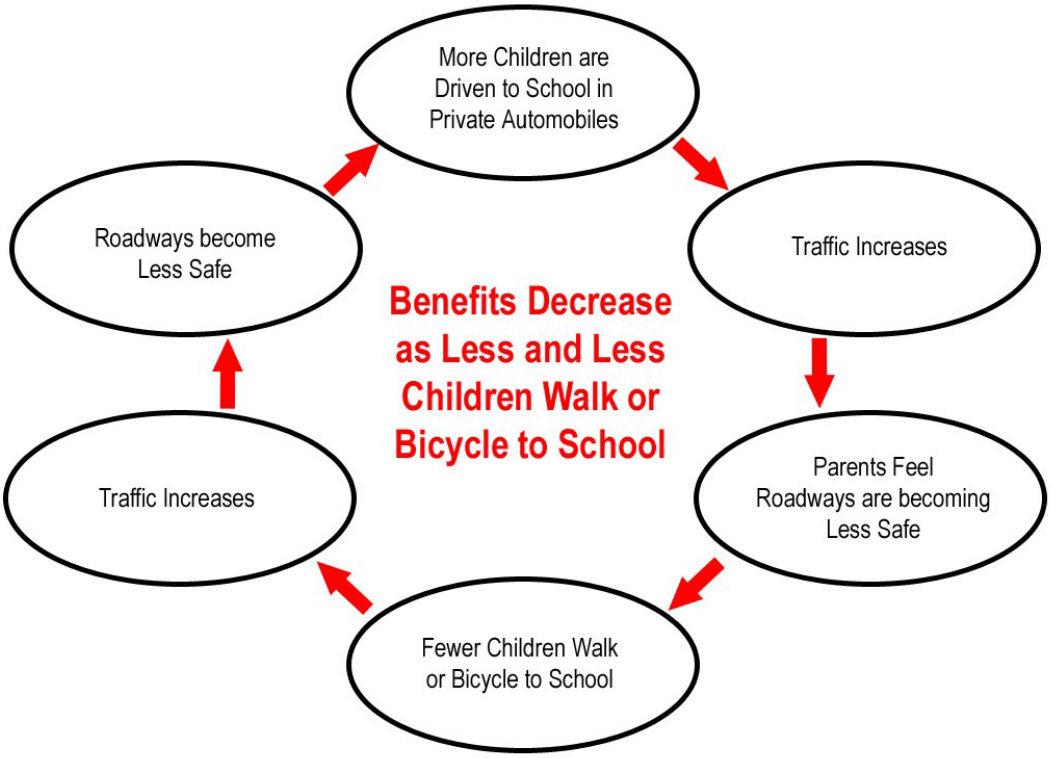
Each parent's decision to drive can contribute to an increase in automobile traffic on the road during peak commute times, reduction in air quality due to automobile emissions, and pressure to build more roads that reshape entire communities. A parent's decision to send their child via school bus has less impact on the community because more students are transported in a single vehicle. However, the cost of bus transportation is a significant cost that residents of Florida pay on an ongoing basis. Each year the State of Florida and local school districts spend over $750 million to transport students to school (FDOE, 2004).

In either case, many students are not given the opportunity to walk or bike to school due to the distance between their homes and schools and unsafe walking conditions. In any case, students experience a negative impact on their physical and emotional development. Overweight and obesity have reached epidemic proportions among American children (Strauss and Pollack, 2001; Ogden, Flegal, Carroll, Johnson, 2002) and the lack of physical activity is a factor in this epidemic. The decrease in children walking and bicycling to school has contributed to many problems in society including traffic congestion, air pollution (EPA, 2003), an increase in childhood obesity rates (Strauss and Pollack, 2001; Ogden *et al.*, 2002), increased rates of Type II diabetes (Flegal, 1999; Huang and Goran, 2003; Ogden *et al.*, 2002; Sallis and Owen, 1999), and a decrease in childhood independence (David and Weinstein, 1987; O'Brien, 2003; Proshansky and Fabian, 1987; Siegel, Kirasic, and Kail, 1978). Parents are making the decisions on how their children will get to school, but their decisions are not isolated to impacting their own families; everyone shares the consequences of their decisions.

Traffic congestion on once quiet neighborhood streets has led to safety concerns and restricted the opportunity for children to walk or bicycle to their schools, leading to more automobile congestion (close to 30% of peak hour traffic in some metropolitan areas) (Dubay, 2003; Salon, 2004). In response to automobile congestion, parents try to protect their children by keeping them off of

sidewalks by driving them to school in cars or sending them on buses. This pattern, termed the "Traffic Threat Multiplier Effect," produces a vicious cycle of parents creating additional traffic congestion in cars in order to protect their children from traffic (Appleyard, 2003). This cycle is illustrated in Figure 1 below:

Figure 1: The Traffic Threat Multiplier Effect
Source: Authors



Besides schools being located too far from residences for children to walk, there are many other reasons that children do not walk to school. Some of the reluctance is rooted in factors beyond governmental control, such as climate-related reasons (hot, cold, or wet weather), parent work schedules, and even parental attitudes to some extent (Steiner and Crider, 1999). Many parents are hesitant to allow their children to walk to school because they are concerned about crime and abduction (both real and perceived) as well as traffic issues (Steiner and Crider, 1999). The work schedules of two working parents and the start times for many schools, coupled with the darkness of the daylight savings schedule, adds to the reluctance of parents to allow their children to walk to school or even to the bus stop.

The growth of our cities in recent decades has contributed to the dramatic change in children's travel, including the home to school trip. Urban sprawl, lower density residential development, and segregated land uses have lead to fewer children living close enough to school to walk. The number and percentage of children walking and bicycling to school has steadily declined in the last two decades (Killingsworth and Lambing, 2001).

Parents are not completely responsible for their decision to drive their children to school; decisions made by transportation, land development, and school planners have not always been coordinated to create a community in which parents are offered a reasonable choice about how their children get to school. Traditionally, school districts have been given relatively free reign in the location of new schools; they have largely been able to make decisions with little government regulation. Simultaneously, developers have responded with proposals to build residential development around schools and local governments have responded to public demand by approving the development. Roads have been built to accommodate the location of new growth but infrastructure to support walking and bicycling, such as sidewalks and off-road bicycle and pedestrian facilities, have not always been built between residences and schools. School districts have located schools where land was available and affordable, without considering how many residences will be located near the school and how many children will be able to walk or bicycle to school. Changing requirements for school sites have made the renovation of existing schools more difficult. The shortage of new school sites in already developed areas and the difficulty of renovating existing schools have lead to schools being located at the edge of the community where parents must drive their children to school or the school district pays to bus children to the new school. School districts focus their attention on the circulation of bus and automobile traffic on the school site and the local government may not have requirements for sidewalks to be built in neighborhoods or may not coordinate its location with the facilities on the school site. In addition, funding for sidewalks, off-road paths, intersection crossings, and neighborhood traffic calming projects have been non-existent or inadequate to meet the demands for safe routes for children to access their schools by walking or bicycling.

The student population in Florida has almost doubled in the past three decades; this has resulted in the overcrowding of many school districts (Boles, 2005). Almost 40% of public schools in the state of Florida were between 90-100 percent of capacity in the year 2000. In 2001, 56 new schools were built to alleviate this pressure, which caused this figure to fall to 32% (Florida Department of Community Affairs). These large numbers of new students create additional challenges in transporting children to these schools. To address school transportation concerns, the Florida Legislature passed a bill in 2002 entitled “Safe Paths to Schools” requesting the Department of Transportation to establish a “Safe Paths” program and consideration for planning, construction, and funding. It further suggests in §335.066(3) F.S. that the Department may adopt appropriate rules pursuant to §120.536(1) F. S. and §120.54 F.S. for the administration of the “Safe Paths to Schools” Program.

An objective of this research project is to identify how the Florida Department of Transportation can best meet the requirements of the Safe Paths to School legislation. To accomplish this objective, it is necessary to consider transportation, land development and school planning and other legislation that

affect how decisions are made about transportation and land development around schools. Before beginning to explore these topics it is useful to understand other related legislation that has been passed in recent years and to develop a conceptual framework for understanding the complex relationships between these three areas of planning and their connection to the Safe Paths to School legislation.

Other Related Legislation

Three pieces of related legislation have passed in recent years. In 1999, the Florida Statutes were amended to allow local governments to establish Multimodal Transportation Districts (MMTDs) to promote development that favors pedestrian, bicycle, and transit modes over the automobile. The MMTDs and multimodal analysis have evolved since the late 1980s in response to a requirement in the 1985 Local Government Comprehensive Planning and Land Development Act, which required that local governments provide infrastructure, including transportation facilities, concurrent with the impact of development. By the early 1990s, local governments became concerned that this so-called "concurrency" requirement was encouraging sprawl because roadway capacity was available at the edge of the urban areas and not in downtowns and other developed areas where infill and urban revitalization was planned. The state responded by passing legislation in 1992 and 1993 allowing local governments to create Transportation Concurrency Management Areas (TCMAs), Transportation Concurrency Exception Areas (TCEAs), and Long-term Concurrency Management Systems (LTCMSs).

Since 1999, the Florida Department of Transportation (FDOT) has been developing guidelines for the development of MMTDs. In MMTDs, local governments apply professionally accepted techniques for measuring Level of Service (LOS) for automobiles, bicycles, pedestrians, transit, and trucks to an area of the city in which alternative modes of transportation are favored over the automobile. The MMTD can be used to promote the kind of places that provide safe routes for children to get to school because they contain mixed-use, interconnected, and dense land uses that are pedestrian- and transit-friendly in urban form and design. MMTDs can range in size from approximately two square mile town or village centers, to as much as 10 square miles in urban centers, and have populations ranging from 5,000 to over 50,000 people, depending on the area's ability to meet other established criteria. In addition, the tools and techniques developed as a part of MMTDs can also be applied to other areas to create multimodal planning environments that support safe walking and bicycling environments. A recent report on multimodal tradeoffs in traffic impact studies identified a need for defining the special needs of schools within MMTDs because of their significance as special trip generators (Steiner, Li, Shad, and Brown, 2003).

Another piece of legislation, passed in 2002, requires local governments to enter into interlocal agreements with school districts to formally establish a

process in which school plans and processes are coordinated. Several issues addressed in the interlocal agreement overlap with the need to provide safe paths to schools. These issues include: (1) coordination of the location of school sites with the location of areas for development and redevelopment; (2) a process for determination of the need for, and timing of, onsite and offsite improvements to support proposed expansion, or redevelopment of schools; and (3) identification of the party or parties responsible for the improvements. Under this 2002 legislation, a county, in conjunction with the municipalities within the county, could adopt an optional public educational facilities element in their comprehensive plan in cooperation with the applicable school district. The 2005 legislation discussed below mandates this element for all counties that are not eligible for an exception.

The third, most recent piece of legislation, known as the Growth Management Reform Act (GMRA) of 2005, is expected to drastically change school, transportation, and water planning[1] in Florida. The GMRA:

- Extends concurrency to schools,
- Increases the importance of a "financially feasible" Capital Improvements Element (CIE) of the local comprehensive plan,
- Enhances multimodal planning in TCEAS,
- Encourages local governments to develop community visions and designate urban services boundaries,
- Requires local governments to establish a "proportionate share" component in the CIE that allows developers to meet school and transportation concurrency if they execute a legally binding commitment to provide mitigation proportionate to the demand for public schools and transportation facilities;
- Provides incentives for regions to plan and fund a network of regional transportation facilities through the Transportation Regional Incentive Program (TRIP), and
- Establishes several taskforces and funding programs to implement the provisions of the act, including the following:
    - School Concurrency Task Force
    - Impact Fee Task Force
    - Century Commission for Sustainable Florida
    - Transportation Regional Incentive Program
    - Small County Outreach Program
    - County Incentive Grant Program for transportation
    - High Growth Capital Outlay Assistance Grants for school districts in high growth counties.

1 This paper only addresses the applicable changes to transportation and school planning contained in the GMRA.

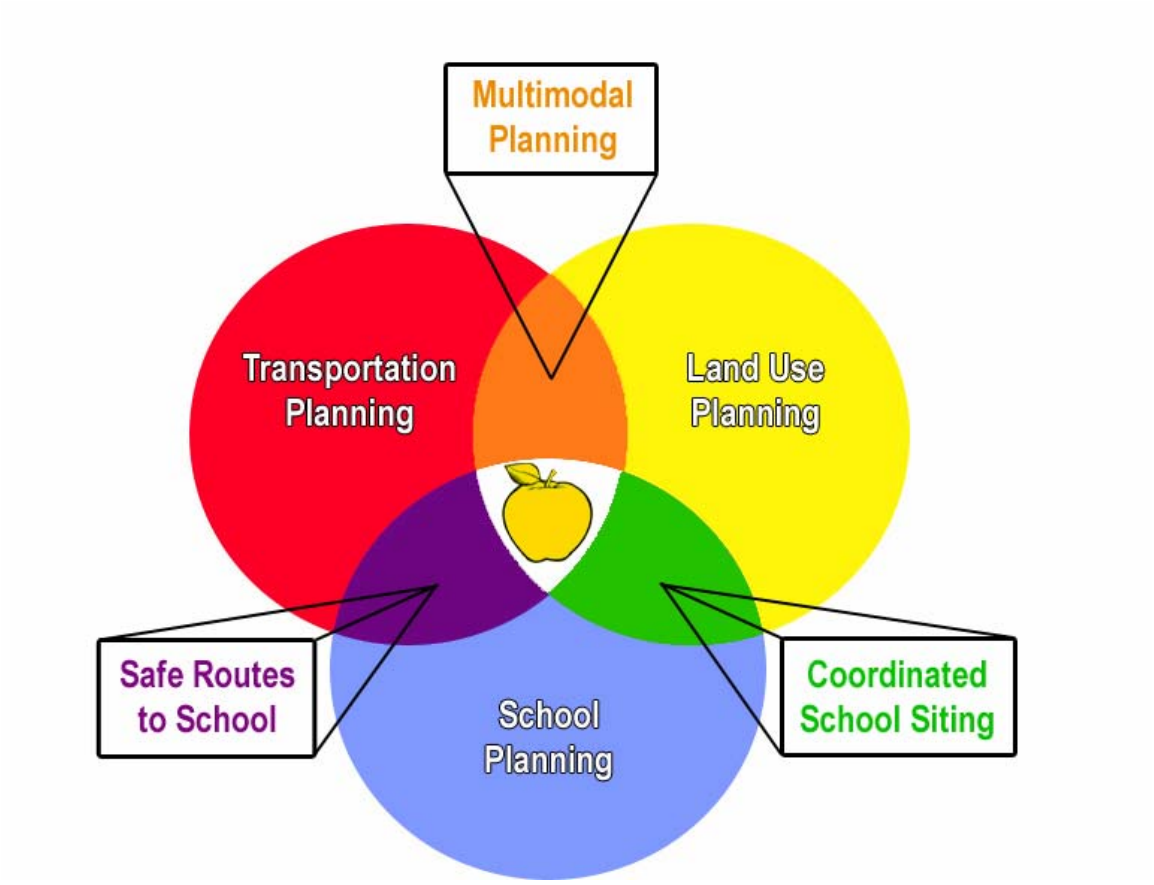
A history of previous Growth Management legislation, its connection to the 2005 GMRA, and its relationship to this study will be explored in greater detail in the Results and Findings section of the report.

Conceptual Framework

This research examines the various aspects of school transportation as they relate to the location of schools, the safe movement of children to and from school, the development of multimodal transportation systems, and provides guidance for legislative and policy development in Florida, based upon the "best practices" within the state of Florida and throughout the country. Initiatives of the FDOT, Florida Department of Education (FDOE), and Florida Department of Community Affairs (FDCA) are directed towards each of the cities, counties, and school districts, who may benefit from advice or direction on how to safely locate new schools to serve developing and redeveloping areas of the county, safely move children to those schools, and allow commuter traffic to move within the region. The Florida Department of Health (FDOH) has established an initiative directed at increasing the level of children's physical activity and the Florida Department of Environmental Protection's (FDEP) Office of Greenways and Trails has been working with communities to build multi-use trails and ecological corridors that can also be used for bicycle, pedestrian, and equestrian travel.

Recognizing the interconnection of the three areas of planning and their connection to the school transportation puzzle, and the roles that various agents play in changing the *status quo*, the researchers developed a conceptual model that shows the basic relationship between transportation, land development and school planning (see Figure 2).

Figure 2: Conceptual Model of Influential Areas in School Transportation
Source: Authors



This conceptual model reflects how these three areas relate to create a physical environment; the triangle in the middle of the diagram represents the area for potential mode shift to bicycling and walking. However, as has already been discussed, school planning has been conducted separately from, and not always coordinated with, transportation and land development planning. If these three areas of planning are coordinated with a goal of encouraging planning for all modes, the physical environment should be supportive for children to walk and bicycle to school. Between these specialty areas of planning (transportation, land use, and school) are three areas of coordination: coordinated school siting, multimodal planning, and the Safe Routes to School (SR2S) program.[2] From the

[2] For the purposes of this report, Safe Routes to School, Safe Paths to School, and Safe Ways to School will all be used to refer to programs that have the shared goal of increasing the number of children who walk or bicycle to school. There are only a few minor distinctions. The Florida Traffic and Bicycle Education Program established the Safe Ways to School Program in Florida in 1997. Other states developed programs shortly thereafter using different names, most commonly Safe Routes to School. The SAFETEA-LU legislation established a national Safe Routes to School Program in 2005. Safe Paths to School refers to Florida's 2002 legislation that assigned responsibility for the establishment of such a program within the Florida Department of

state and local government to private and non-profit community-based organizations, many organizations have a role to play as builders of the urban form through which the community decides where schools are located, whether they are located in a multimodal transportation environment, and ultimately whether our children can safely walk and bicycle to school. Each piece contributes to the dynamic relationship in a different way, and the surrounding agencies can make policy changes in various areas to change the current situation of auto and school bus dependence. In the sections that follow, each of the three overlapping areas is examined individually, then how these areas relate to one another, and finally how legislation, agency policy, and action can effectively change the current picture.

This research document will explore the relationship described above in the following sections: the first section will explain the methodology used to conduct the research. Then, the importance of the research is supported in the Background/Literature Review section, which explores research in children's travel, children's travel to school, and the parent's decision-making process for travel to school. This section also provides background information on multimodal planning, coordinated school planning, and Safe Ways to School. In the results section, existing practices in Florida, including legislation and agency efforts are explored, followed by case studies and best practices in each area. Next, these results and their relationship to the overlap areas of school siting, multimodal planning, and Safe Ways to School (SW2S) programs, are explained in the discussion section along with barriers to these initiatives. Finally, the recommendation section outlines steps to ameliorate the current situation through strategies, legislation, state agency action, and local agency action.

II. METHODOLOGY

To understand the connections between these three areas – transportation, land development and school planning – several steps were taken: (1) establishment of state and national advisory panels, (2) a review of existing documents, (3) interviews with knowledgeable professionals working in multimodal planning, school transportation, or related fields, and (4) development of recommendations for policy changes at the state and local level. The advisory panels and interviews were used to provide insight into the day-to-day, most recent problems related to school transportation issues. The document review provides a framework for understanding the issues, the history of legislation, best practices through case studies, and the necessary facts to use in formulating the recommendations. The recommendations are formulated based on the information gathered through the literature review, advisory panel meetings, and

---

Transportation. In the rest of the report, we generally refer to these programs as Safe Routes to School, reflecting the implementation of the federal Safe Routes to School legislation. However, when we are specifically discussing the 2002 Safe Paths legislation or the existing Florida Safe Ways to School Program, we will use the applicable terminology.

input from professionals working in school transportation or related fields. By compiling information in the manner described above, conclusions and recommendations are offered on a broad base of the best and most recent information available from across Florida, North America, and the rest of the world.[3]

Establishing national and state advisory panels was the first step in conducting this research. These panels were made up of professionals who are actively involved in the areas of school transportation, multimodal planning, Safe Routes to School programs, and city/county planning initiatives. At these panel meetings, project team members both presented and gathered information during meetings both at the state and national levels. Panel members include professionals from FDOT Systems Planning Office, FDOT Safety Office, Florida Department of Education (FDOE), Florida Department of Community Affairs (FDCA), the Florida Department of Health (FDOH), Metropolitan Planning Organizations, the Rails to Trails Conservancy, the University of Florida (UF), local school district members and staff (for the state advisory panel) and nationally recognized experts involved in Safe Routes to School initiatives (University of North Carolina Highway Safety Research Center, League of American Bicyclists, National Highway Traffic Safety Administration (NHTSA), and California Safe Routes project). The panels were created to provide the team with a variety of perspectives about issues related to the scope of the research. In January of 2005, the team conducted the National Advisory Panel Meeting in Washington, D.C. at the Annual Meeting of the Transportation Research Board. The principal investigators also participated in a Safe Routes to School Advisory Committee, which was funded by the FDOT Safety Office and managed by the Department of Urban and Regional Planning at Florida State University.

At the state level in Tallahassee, the research team held three meetings of the State Advisory Council, which tracked the progress of the final report and recommendations. The first meeting in January of 2005 introduced the council members to each other and the project. At second meeting, held in April of 2005, the advisory council received the preliminary recommendations of the report, discussed early findings, and provided comments and information to direct future research. At the final meeting in December of 2005, the Statewide Advisory Council discussed the final recommendations of the report, provided amendments, and ranked the recommendations in order of importance. The

---

[3] Two major pieces of legislation were passed during the completion of this project. First, the Growth Management Reform Act (GMRA) of 2005 was passed in the State of Florida in May of 2005. The second, the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU) was passed by the United States Congress and Senate during the summer of 2005 and signed by President Bush into law on August 10, 2005. We have attempted to define the importance of these pieces of legislation, but the many decisions on their implementation are ongoing. As such, we do not attempt to respond to the “issue of the week”.

amendments have been incorporated into the 'Recommendations' section of this report, as well as the results from the group ranking process.

The review of existing documents and policies related to multimodal planning, Safe Routes to School, and school siting was conducted in order to gain a better understanding of the relationship between these three main areas. As part of this review, the Multimodal Transportation District Areawide Quality of Service Handbook (FDOT, 2003), the Safe Ways to School Toolkit (Crider, 1998), 'Best Practices for Coordinated School Planning' (FDCA, 2005) and the Florida Statutes and Administrative Codes served as guides for a basic understanding. To supplement this understanding, a variety of additional works were reviewed in order to gain insight into related areas, including school siting and renovation policies, interlocal agreements, children's travel and health, multimodal planning, best practices nationwide, and Smart Growth solutions. Surveys, education and encouragement programs, assessment tools, and other programmatic elements of various Safe Routes to School programs were collected and compared to the existing tools in the Florida Safe Ways to School Toolkit. These included parent surveys, travel mode surveys, walk audits, and the education and encouragement methodologies from across North America. Selected examples are included in the "Analysis Tools" section of this report, and a list of additional resources is provided in Appendix E.

As research in the field of school-related travel grows, school siting, Safe Routes to School, and multimodal planning have all become topics of interest across the country. In order to respond to this growing interest and to garner valuable information, the project was presented to others working in the field of children's travel at a host of conferences and meetings across the country and state. Our team participated in the Safe Routes to School National Course in Tucson, sessions regarding school transportation at the Annual Meeting of the Transportation Research Board (TRB), and a team member made presentations at the national New Partners for Smart Growth Conference in Miami Beach. More locally, team members met with local planners in Broward County and Palm Beach County, and made presentations at the Florida ProWalk/ProBike Conference in Tampa, the Winter Meeting of the Florida Educational Facilities Planning Association (FEFPA) in Ponte Vedra Beach and the quarterly meeting of Florida's Metropolitan Planning Organization Advisory Council (MPOAC) in Tallahassee. At these events team members both discussed this research and learned from the experiences of experts in the field.

III. BACKGROUND/LITERATURE REVIEW

In this section, the previous literature in the areas related to this research are presented to provide the reader with a context for understanding the connection between the three diverse areas of inquiry and the background for understanding those connections. First, the literature on children's travel generally is reviewed. Next, previous research on children's travel to school is outlined. Then, we discuss the implications of changes in children's travel. Next, we outline a framework for understanding how parents make decisions about how their children will travel to school. This framework identifies factors involved in the three areas of planning necessary to result in a mode shift for children's travel to school. After this framework is developed, the existing research on each of these three areas is reviewed separately.

Children's Travel

Literature in the area of children's travel is relatively limited. Three main points highlighted in existing literature are: 1) how children's travel impacts the household travel patterns; 2) school travel as an opportunity to shift some automobile travel to pedestrian or bicycle travel; and 3) parent's attitudes toward allowing their children to actively to travel to school (McMillan *et al.*, 2004). The 1995 Nationwide Personal Transportation Survey (NPTS) indicates that a majority of children aged 5-9 are transported by automobile (74% of all trips). The same group made only 10% of its trips by walking (as quoted in McMillan *et al.*, 2004).

Research on Children's Travel to School

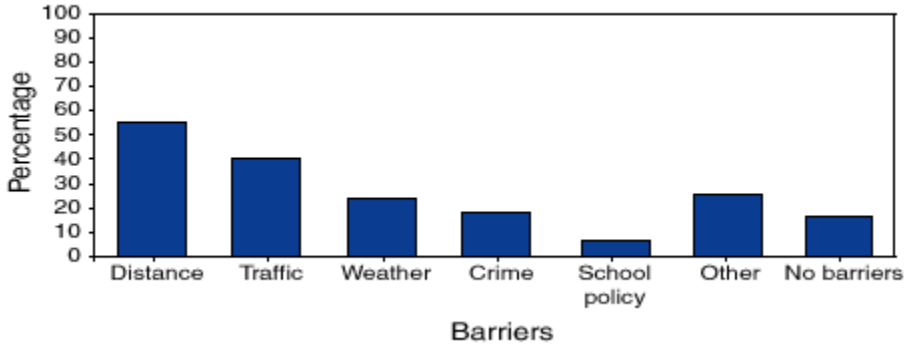
In 1969, when the first National Personal Transportation Survey (NPTS) was conducted, 48% of students walked or biked to school (EPA, 2003). By 2001, its successor, the National Household Transportation Survey (NHTS), reported that the percentage had fallen to 15 percent (Bureau of Transportation Statistics, 2003). Riding in a car or bus has replaced walking; half of children are driven to school in private vehicles, and one in three rides a bus (Dellinger and Staunton, 2002).

According to the home-to-school transportation study in Florida in 1992, only one in six children walk to school daily (Starnes et al, 1992). Over one-third of Florida's school children are driven to school by their parents, creating hazardous traffic conditions around schools at peak hours and increasing risks for children who walk or ride bicycles. Macmillan *et* al. (2004) found that students living within a mile of a school are almost three times more likely to walk or bike to school than children living further away. When looking at the driving habits of the child's escort (usually the parent) to school, 54% return home, 26%

continue to work, and 6% run errands or other passenger trips. Interestingly, 50% of the survey respondent's children lived within one mile of the school.

A National Safe Kids Campaign survey reported that nearly 60% of parents and children who walk or bicycle to school encounter at least one serious hazard along their route. A Center for Disease Control and Prevention (CDC) survey found that 40% of parents cited traffic as a major barrier to allowing children to walk to school. The United States Health Style Survey completed in 1999 found the most common barriers to children walking or bicycling to school. Not surprisingly, distance is the most important factor. It is noteworthy that approximately 20% indicate no barrier to walking or bicycling. These barriers are illustrated in Figure 3

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



The cost of busing children to school has increased over the past decade. In 1992, school districts reported paying between $200 and $600 per child for courtesy busing children who live within two miles of the school (Starnes *et al.*, 1992). In 2003, the State of Florida spent $423,087,042 on student transportation. Of that amount, 3.5%, or just over $26 million was spent to transport nearly 36,000 students who live within two miles of the school due to hazardous walking conditions (FDOE, 2004). This figure amounts to about $734 per child, spent by the state alone for hazardous walking conditions, which is a marked increase in comparable costs in 1992. In addition to the $423 million total spent by the state, local school districts collectively spend an additional $330 million to supplement student busing (FDOE, 2004). State and local expenditures combined show the total cost of student transportation in 2003 to be approximately $753 million (FDOE, 2004).

Children's Travel and Health

The mode shift away from bicycling and walking has other consequences. Children who are driven to school are deprived of the physical exercise that they would have if they were able to walk to school. Overweight and obesity have

reached epidemic proportions among American children (Strauss and Pollack, 2001; Ogden *et al.*, 2002). More than 15 percent of school age children are now overweights, a threefold increase in 25 years, and the numbers continue to rise. Childhood obesity has increased 63% in the past thirty years. This trend is evident in all ethnic and racial groups, but it is especially marked in black and Hispanic children; by the age of 12 nearly one in four of these children is overweight (Ogden *et al.*, 2002). Overweight children suffer a number of health problems, including hypertension, high cholesterol levels, and impaired glucose tolerance, a precursor of diabetes (Dietz, 1998). In addition, overweight children often suffer from low self-esteem and may be at increased risk of depression (Strauss *et al.*, 2001). Overweight children are likely to become overweight adults (Serdula *et al.*, 1993), with increased risks of cardiovascular disease, cancer, and other ailments.

Childhood obesity has been attributed to a number of factors related to diet, physical activity, and changes in the nature of their daily activities. Larger portions of calorie-rich foods are increasingly marketed to children, and form a substantial part of some children's diets. A wider variety of television shows and computer programs are available for children to watch and children are spending more "screen time" in front of computers and television. Finally, a decline in physical activity of all sorts – from less freedom to roam neighborhoods, phase-out of physical education programs in school, and a decline in children walking and bicycling to school – all contribute to the increase in childhood obesity (FDOH 2005; TRB/IOM 2005). In this setting, walking or bicycling to school could play a valuable part in keeping children physically active.

Many health concerns arise for children who are often in or around cars and busses, such as school drop off areas. According to the International Centre for Technology Assessment (2000) in-car pollutants can be much higher than those outside of the car.

> In-car benzene pollution concentrations sometimes exceed concentrations in the roadside air by up to four fold. Carbon monoxide concentrations may be more than ten times higher inside cars than on the side of the road. Elevated in-car pollutants particularly endanger children, the elderly, and people with asthma and other respiratory conditions. They receive little attention. Nevertheless, in-car pollution may be one of the greatest modern threats to human health (ICTA, 2000).

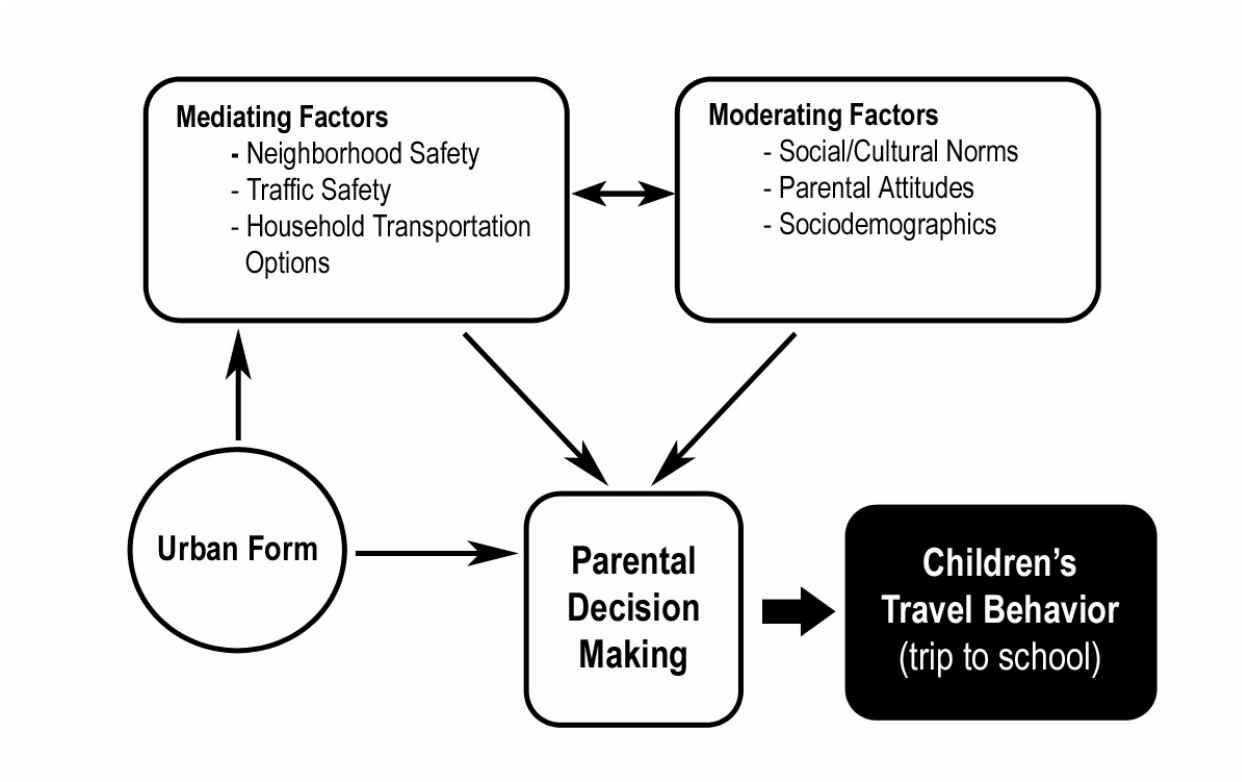
The negative effects of air pollution on children's health were illustrated during the 1996 Olympic Games in Atlanta as well. A 2001 study conducted by the CDC found that during the games, the number of acute asthma attacks in Atlanta's children fell sharply while automobile use in the city was severely limited (Friedman, Powell, Hutwagner. Graham, and Teague, 2001). Other health concerns related to air pollution include inhibited lung development and

decreased functioning that can place children at a higher risk for respiratory illness (CHRB, 2002). These issues are more of a concern for children than of adults because children breathe in twice the amount of air while resting, absorb three times as many chemicals through their skin, and take in three to four times as much food (Bearer, 1995). Organizations in both the United States and in Canada have declared this an area of concern for further research and action.

Parents Decision-Making Factors

A parent's decision to allow their child to walk or bicycle to school is based on many factors, including neighborhood safety, traffic safety, household transportation options, social/cultural norms, attitudes, socio-demographics, and policies in place. One Oregon study found that cumbersome backpacks and the fear of back problems were a significant deterrent to walking and bicycling to school (Schlossberg, M., Philips, P., Johnson, B., and Parker, R., 2005). Another study found that children who have to travel on roads where motorists drive greater than 30 mph, were less likely to be permitted to walk or bike to school by their parents. Also, the higher the number of drivers in a household, the more likely the child would be driven (McMillan, 2003). McMillan found that urban form is important in deciding whether or not a child would walk to school; it is not, however, the only factor. Factors that were rarely considered before her research, such as difference in parental attitudes towards mode choice that differ by region of the country, had strong influences on the decision of whether or not a child will be permitted to walk or bicycle to school. This report also found that urban form factors such as mixed use development that may encourage an adult to walk may not have the same affect on their decision as a parent to allow their child to walk to school (McMillan, 2003). Gender also plays a role in whether or not a parent will allow their child to walk or bike to school. Males are more likely to be allowed to walk or bike to school than are females (McMillan *et al.*, 2004). Figure 4 below is a conceptual model that identifies factors a parent uses in deciding whether or not to allow their child to walk or bicycle to school. This figure, adapted from McMillan's research, shows that a parent forms opinions about the ability of the physical environment to support different modes of transportation, and these opinions dictate how the parents will allow their children to travel to school (McMillan, 2005).

Figure 4: Diagram of Conceptual Framework of Elementary-Aged Child's Travel Behavior
Source: Adapted from McMillan, 2005

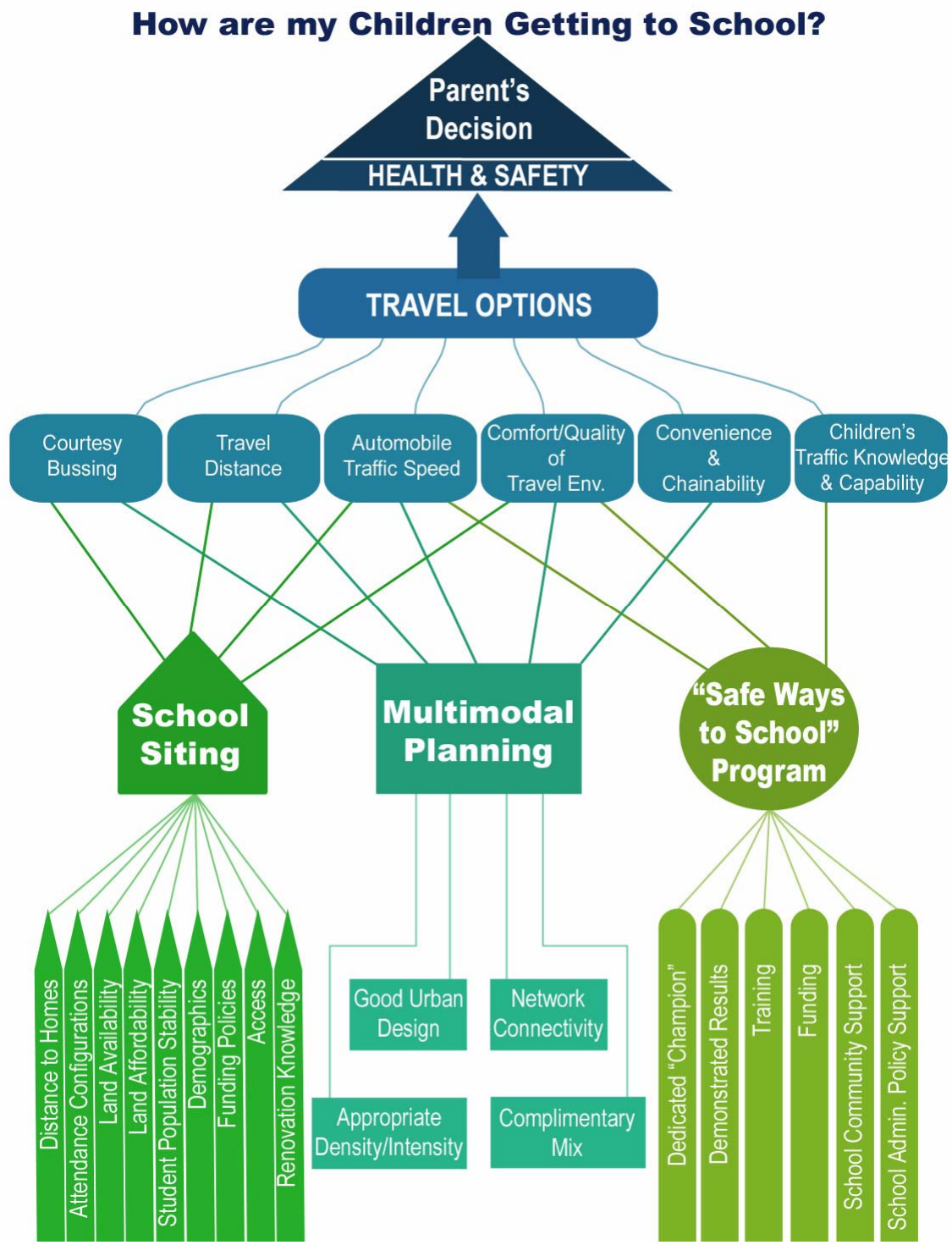


Now that the basic problem has been outlined, we can begin to apply it to what we know about children's travel and explore how it relates to multimodal planning, school siting, and Safe Routes to School programs in order to provide a framework for understanding how to generate mode shift. We now focus on those mode-determining factors that relate to multimodal planning, school siting, and Safe Routes to School programs. In light of those factors, we then provide background information about each of those three areas of our puzzle individually before bringing them back together to understand the connection between them and how they impact parents' decisions about children's travel.

Our Current Situation

In order to understand the current picture of school transportation, the research team developed a conceptual model to understand the relationship between multimodal planning, school siting, and Safe Routes to School, and how that relationship impacts a parent's mode choice for their child. This conceptual model expands upon the previously mentioned model developed by McMillan, and will form the basis of our understanding on this topic. The conceptual model is illustrated as Figure 5 immediately below, with a more in-depth explanation to follow.

Figure 5: Conceptual Model: Safe Ways to School, the Role in Multimodal Planning
Source: Authors



Despite the range of consequences and reasons to choose walking and bicycling, current research shows that parents are still choosing cars and buses over pedestrian and bicycle modes (Dellinger and Staunton, 2002). In order to understand why, we must look at the decision making process when and where it happens—in their home each morning. As with any decision, parents consider the available choices in light of multiple factors. For many parents, the decision is severely constrained – their child will either be driven to school or put on a school bus. For others, the decision will be made based upon habits developed from when their child entered school for the first time, or when they moved to their current place of residence. Let's consider the daily morning decision, and four major mode options parents could consider for transporting their children to school: walking, bicycling, driving, or taking the school bus. Although important to a parent's decisions for their children's home-to-school travel, some of the moderating factors identified in McMillan's diagram above such as socio-cultural norms, and sociodemographics, are not the focuses of this study and will not be covered in depth. The same is true for car ownership and a parent's desire to spend time with their children. Although these factors are important in a parent's decision, this research only focuses on the factors explored above as they relate to multimodal planning, school siting, and Safe Ways to School programming. The factors under consideration are "controllable" factors, or the mediating factors, identified by McMillan, such as environmental safety – like neighborhood and traffic safety conditions, distance to the school site, urban design, and household transportation options. Based on our research and the input of our panelists, we have grouped these controllable factors into the following six areas to help simplify the parental decision about children's home to school mode choice. These factors respond to the following sample questions that parents might ask themselves when making such a decision: (1) how far do we have to travel to school? (2) Do my children know enough about traffic and safety to be safe on their way to school? (3) Do I need to travel anywhere after we travel to school? (4) Are there adequate sidewalks, crosswalks, and crossing guards to keep my children safe from traffic? (5) How much are we going to enjoy this trip to school? (6) Are there other, more convenient ways to transport my child to school? Previous research that considers how parents might respond to these questions is explored below.

Controllable Factors Influencing Parental Mode Choice for Children

Travel distance is one of the most common concerns facing parental mode choice for children's school travel. According to the Environmental Protection Agency's (EPA) 2003 study, "proximity to students matters" when determining mode choice. The study found that students with shorter walk and bike times to or from school are more likely to walk and bike. Distance is commonly cited as one of the main reasons parents don't allow their children to walk or bike to school (US Health Survey, 1999).

Research shows that concerns surrounding **traffic and safety** are also key determinants in parents' decisions about how their children will travel to and from

school. According to the Florida 1992 study, the reasons parents gave for driving their children to school included safety related to the personal security of the child traveling alone and safety related to street traffic (Starnes *et al.*, 1992). As noted previously, children who have to travel on roads where motorists drive greater than 30 mph were less likely to be permitted to walk or bike to school by their parents (McMillan, 2003). Children's traffic and safety knowledge and capability is another key factor parents consider.

Trip convenience and chainability is another factor parents consider in making decisions on the mode of travel to school. Although closely related to proximity, convenience as used here refers to the convenience of trip chainability. McMillan (2003) found that although urban form factors, such as mixed land uses, may encourage an adult to walk, such factors may not have the same effect on their willingness to allow their child to walk to school. This factor is included for consideration in situations where parents may want to accompany their child to school, and link the trip with other purposes, such as traveling to work or running household errands. Parents joining their children on a walk or bicycle ride to school benefits both the parent and the child by increasing routine daily physical activity. Although Steiner (1996) found that people who walked from home to shopping were much less likely to chain their trips, other research on trip chaining supports the idea that trip chaining using automobiles occurs more frequently for certain types of trips including serving children as passengers (McGuckin and Murakami 1997). What is not known is whether school walking trips are likely to be chained or made as a single-purpose trip.

Parents also consider the **comfort and quality of infrastructure** in choosing the mode of their children's travel to school. According to recent research, a parent forms opinions about the ability of the physical environment to support different modes of transportation, and these opinions dictate how the parents will allow their children to travel to school (McMillan, 2005). As a result, more students are likely to bicycle and walk in a higher-quality built environment (EPA, 2003). Generally, a high-quality environment for bicycle and pedestrian use refers to a network of sidewalks or bike paths that are continuous, safe, and convenient (McMillan, 2005).

Overall trip enjoyment should also be considered an important factor. A 2005 survey conducted in Oregon by Schlossberg and others found that backpack weight was the most common individual reason cited for children not walking or bicycling to and from school (Schlossberg *et al.*, 2005). Overall trip enjoyment can be viewed as an amalgam of the other factors as well, with one additional component. Whereas the other factors are more directly influenced, trip enjoyment refers to the attitude parents and their children have about their decision about how to get to school. For example, parents may enjoy walking their child to school because that trip may provide better quality time between the parent and their children than driving to school with the children sitting in the back of a car. Parents' perceived enjoyment of the school related trip might also

influence their child's mode of travel to school. The researchers view this attitude as a factor that can be manipulated just like the other variables considered as part of this research.

A parent's decision may also be influenced by the **availability of alternative "high-convenience" options** that may displace other modes. Evidence shows that the higher the number of drivers in a household, the more likely the child would be driven to school (McMillan, 2003). Additionally, alternative high convenience options would include access to courtesy busing as a potential mode for children to travel to school. Similarly, walking to school could be considered a high convenience option if a child lives close to school and has a safe and direct route to access the school. Such options may vary what a parent considers convenient.

As noted earlier, the researchers have identified these factors as "controllable" or mediating factors considered by parents in the school transportation decision because they can be changed through a variety of actions taken by local school districts, local governments or by parents themselves. These factors are constrained by decisions made in three main areas of school transportation: 1) school siting, 2) multimodal planning, and 3) Safe Ways to School Programs. Decisions about where schools will be sited will impact factors such as the proximity of the schools to the parents and students, which affects travel distances and the convenience of trips made to schools or their surrounding land uses. Multimodal planning decisions affect the location and quality of infrastructure, the surrounding land uses and opportunities for trip chaining. Safe Ways to School programs can impact the knowledge and traffic capability of students attending the school, which may elevate a parent's confidence in allowing their child to travel to school on foot or on a bicycle. By examining these three areas generally at first, we can begin to see how important they are in influencing the various factors parents use to make daily decisions about their child's travel modes.

The decisions made in the areas of school siting, multimodal planning, and Safe Ways to School programs are not made in a vacuum. Decisions made in these three areas are extremely complex because they fall at the intersection of three sometimes-distinct aspects of planning: school planning, transportation planning, and land development planning. School boards and local governments decide where schools will be built; local government planners and developers decide how street and sidewalk networks will be designed and configured, and school administrators deciding whether or not to include the Safe Ways to School program as a part of their curriculum. All actors in the development process are operating under their own constraints and variables. Each of these areas are regulated by a variety of factors that impact their decisions much in the same way as parents' decisions are controlled by the variables they are considering. From our research, we were able to identify the multiple key factors that agents in school siting, multimodal planning, and Safe Ways to School use to make the

decisions that shape the urban environment. In the next section, we will examine school siting, multimodal planning, and Safe Routes to School programs individually in order to illustrate how decisions are made in each these areas, including the types of factors and conditions considered by decision makers in each area.

Understanding Multimodal Planning

Development over the past 60 years has been dominated by accommodation to the automobile (Fulton and Calthorpe, 2001). This primary reliance on the automobile due to low density settlement patterns has resulted in deteriorating or inefficient mass transit, air pollution, increased oil dependence, traffic congestion, the spread of commercial strips surrounded by vast areas of asphalt dedicated to parkways and roadways, the destruction of the intimate fabric of old neighborhoods and creation of unitary subdivisions, and most of all the disappearance of the pedestrian from America's landscape (Holtz Kay, 1998).

Multimodal planning involves making changes in the physical environment or setting in which transportation is to occur, and it involves more than just an arrangement of streets. Multimodal planning reflects the inherent relationship between land use and transportation, with land use representing destinations, and transportation routes representing the connection between destinations. Multimodal planning uses this relationship to create safe and efficient choices of all modes of transportation, not just the automobile.

The need for multimodal planning can be traced back to traffic and safety problems faced in early 20th century American cities. When Henry Ford revolutionized automobile production with the assembly line, automobiles were made much more affordable for Americans. From 1895 to 1928, the number of automobiles registered in the United States jumped from 4 to 26,501,443 (National Automobile Chamber of Commerce, Inc., 1930). This dramatic increase in the number of automobiles significantly shaped the development of American cities. Automobile-oriented development dominated both the urban real estate market and the urban street network—and this intermingling of cars and residences created a dangerous situation for people, with "more Americans killed or injured in automobile accidents than the total number of American war casualties in any year" (Stein, 1965: 41). Stein (1965; 41) explains that "[p]edestrians risked a dangerous motor street crossing 20 times a mile," and "[t]he roadbed was the children's main play space" in many urban areas. Then, as now, automobile-oriented design presented significant traffic and safety problems that threatened the quality of life in American cities.

Planning for multiple modes is not a new idea. Urban planners took action soon after the explosion of the automobiles on the urban landscape in response to the safety concerns presented by the automobile. In the late 19th century, Frederick Law Olmsted and Calvert Vaux recognized the inherent safety

problems with mixing multiple modes of transportation. They recognized that carriages, horsemen, footmen, and through traffic needed to be separated to keep everyone safe. This belief is reflected in their design of Central Park in New York City. Olmsted and Vaux designed a “system of independent ways” in Central Park that would separate the modes of their day, and “by these means it was made possible…to go on foot to any district of the Park…without crossing a line of wheels on the same level” (Stein, 1965: 42). Separating travel modes was an important way to keep travelers safe by minimizing opportunities for collisions. Although the separation of modes is an old idea, its importance was reflected in the work of later planners.

Clarence Stein, an American architect, recognized the threat the automobile posed to the livability of America’s neighborhoods, and in response, developed a new type of neighborhood design that would mitigate the impact of the automobile. Stein and his partner, architect Henry Wright, designed the residential community of Radburn, New Jersey in part to address concerns about the safety issues associated with the automobile. Stein (1965) identified the principles integrated into the community plan the "Radburn Idea". These principles, which will be discussed later, included: superblocks, specialization of roads, complete separation of modes, houses turned around, and parks as the backbones of neighborhoods. Several of these principles serve as a model for concepts found in multimodal planning today. The Radburn Idea was developed to increase the overall livability of communities, and was based on the concept of the neighborhood as a unit. This neighborhood unit was centered on an elementary school and had its own shopping center and community playgrounds and parks located in close proximity to residential homes. Multiple neighborhood units comprised the town, which had its own commercial center that was connected to the neighborhoods and the region by larger regional roadways (Stein, 1965). Stein’s neighborhood design was intended to produce a more livable community that sought to lessen the automobile’s negative impact on the suburban fabric.

Within the neighborhood unit, the five main elements mentioned previously characterized the Radburn Idea of neighborhood design. These elements were not new individually, but in combination, represented a markedly different approach to neighborhood design. The elements are listed below as taken from Clarence Stein’s *Toward New Towns for America*:

1. THE SUPERBLOCK: Intended to replace the narrow, rectangular block, the superblock was larger (30 to 50 acres) than the customary size, and provided open recreational space within its borders (Stein and Mumford, 1965: 41)
2. SPECIALIZED ROADS: Roads in Radburn were planned and built for one use, including service lanes for access to homes, secondary roads surrounding the superblocks, main roads for inter-neighborhood traffic,

and highways for more regional travel. Access roads were cul-de-sacs, and kept out through traffic (Stein and Mumford, 1965: 41).

3. COMPLETE SEPARATION OF MODES: Just as Wright and Vaux had incorporated into their plans for Central Park, Stein called for separation "as complete…as possible". He believed that walks and paths should take different routes, and be built at different levels through underpasses and overpasses whenever they did cross roadways (Stein and Mumford, 1965: 41, 44).
4. HOUSES TURNED AROUND: Stein situated "living rooms" like bedrooms toward the interior of the superblock, and "service rooms" such as the kitchen, toward the access roads (Stein and Mumford, 1965: 44).
5. PARKS AS THE BACKBONE: The centers of the superblocks were recreational open spaces that connected to form a large park shared by the neighborhood residents (Stein and Mumford, 1965: 44).

Stein's Radburn Idea combined these elements to produce a livable neighborhood that minimized the negative impacts of the automobile, while still preserving mobility. Despite the use of cul-de-sacs on the roadways, network connectivity was provided for bicyclist and pedestrians on separate and continuous pathways. The separation of modes, in particular, kept any travelers using these alternate modes safe, while still providing convenient access to daily destinations, including schools and community centers (Stein and Mumford, 1965). It is worth noting that Stein also envisioned public transit as part of the Radburn Idea in the form of a railroad line that would run along the western edge of the community.

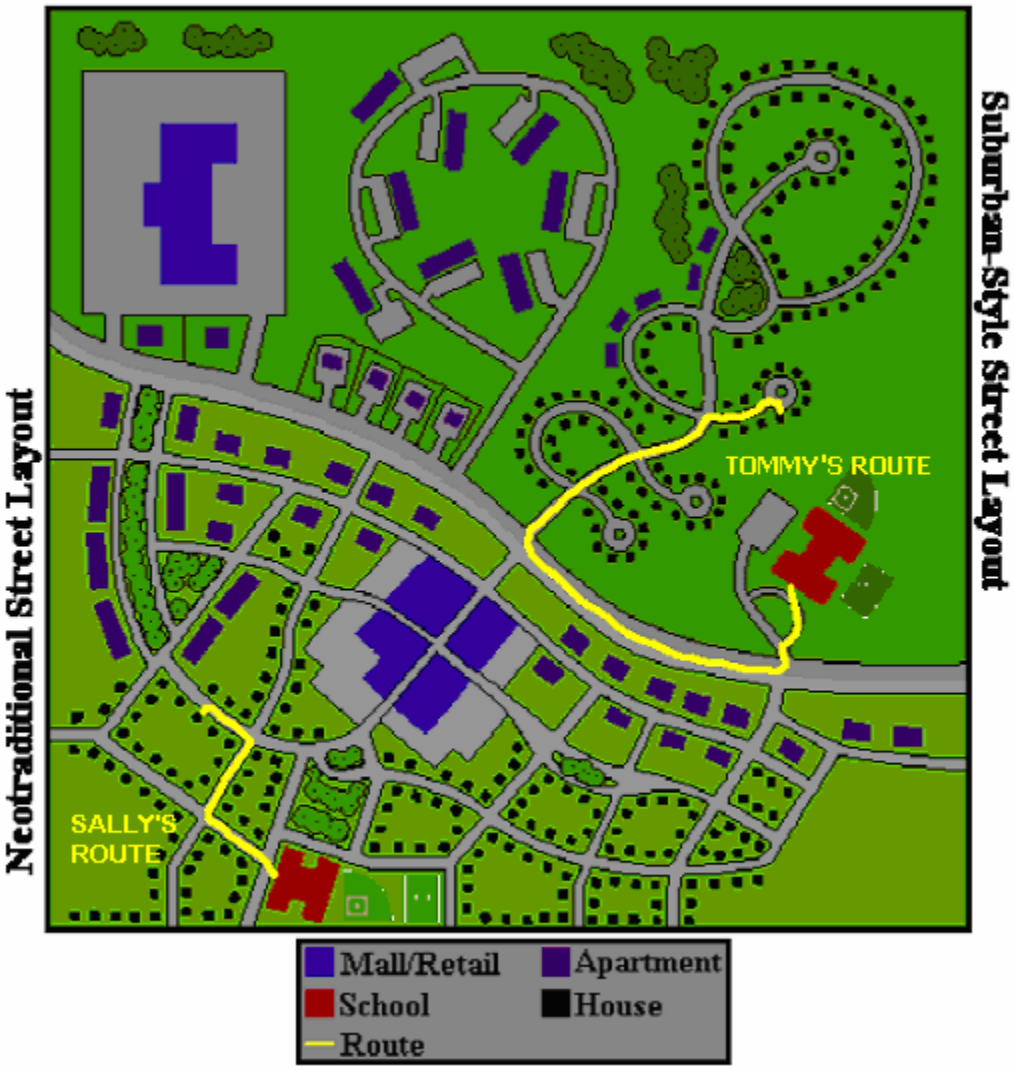
Although Radburn, New Jersey, was never completed as it was planned, many of the key elements of Stein's neighborhood design have found favor with contemporary designers of neighborhoods. Stein stressed, in his work, that his neighborhood design was centered the combination of the elements described above. Individually, none of the elements were entirely new – each had been used previously in Europe or elsewhere. Stein's work recognizes the connection between land use and transportation in order to practice sound planning. Today, several decades later, that relationship is as important as it was when Stein and Wright designed, planned, and developed Radburn between 1920 and 1930. Although not all of the elements exist, such as "superblocks" and "houses turned around", the idea of separating the automobile from other modes remains today.

The elements of some of Stein's Radburn principles are further examined in an FDOT-funded study on the multimodal tradeoff local governments make in understanding traffic impacts (see Steiner *et al.*, 2003). This study reaches a similar conclusion that "specific land-use variables will not necessarily reduce vehicular traffic when measured separately" and that "it is the overall combination that will ultimately work to reduce automobile usage" (Steiner *et al.*, 2003: 9). The study, building upon the work of others (Congress for New Urbanism, 1999; ODOT), characterizes two types of neighborhood design: (1) conventional

suburban style neighborhood design, and (2) traditional neighborhood design (TND). Each design incorporates some of the same principles Stein used in his design of Radburn, New Jersey, to maximize quality of life.

Suburban style neighborhood design and (TND) incorporate different combinations of principles rooted in the Radburn Plan, with some additional design differences incorporated as well. Suburban style development is characterized by low-density land uses that are separated by a system of roadways—a design style that favors the automobile. Suburban style development often uses cul-de-sacs to keep through traffic off of neighborhood streets, much as Stein proposed in the early half of the century. Although Stein supported the idea of building specialized roads found in suburban style development, he also believed in connecting destinations through pedestrian and bicycle pathways that were routed separately from roadways. Suburban style development generally differs from the Radburn Plan because it does not usually provide facilities for pedestrians—or even bicycles or transit. Suburban style development values specialized roads that concentrate traffic onto arterial roadways, and discourages through traffic on neighborhood streets. TND, on the other hand, has a more connected grid of streets, mixed land uses, and an overall higher density of development. These TND land uses are similar to those proposed by Clarence Stein in designing Radburn, and have been supported by New Urbanists for their potential to reduce the impact on the existing transportation system. Even though Stein's Radburn Plan was developed over 50 years ago, many of the same principles applied in combination form the basis for today's traditional and suburban style neighborhood designs. Suburban and traditional neighborhood designs encourage different transportation modes by varying trip lengths and providing amenities. The less connected cul-de-sac street pattern favors the automobile and does not support other modes because it increases the distance necessary to travel between two points. The absence of pedestrian and bicycle facilities also associated with suburban neighborhood design undermines the possibility that travelers will use these modes. The grid pattern of streets and small blocks associated with TND, and the provision of bicycle and pedestrian pathways, make this design more conducive to non-motorized modes. Examine Figure 6 below and consider the home to school route of two 6 year-old children, Tommy and Sally, who both live a linear distance of approximately ¼ of a mile from school.

Figure 6: School Route Distances in Traditional vs. Suburban Street Layouts
Source: Adapted from Oregon Department of Land Conservation and Development. 2001.



If Tommy lives in a suburban style development, which does not exhibit the grid street network with pedestrian and bicycle pathways, as shown on the right hand side of Figure 6, his mother is forced to drive him to school because the walk route would be too far and/or too dangerous. Her car would have to travel out to a major arterial to reach the school; a choice that would add to the traffic on that arterial roadway and could pose an additional threat to anyone who may want to walk or bicycle. If Sally lives in a TND, as shown on the lower left of Figure 6, her route is both safer and more direct if she walks, bikes, or rides in a car with a parent. The provision of bicycle and pedestrian facilities provides Sally with multiple mode opportunities. The preceding figure shows the routes of the two children, each living a linear distance of ¼ mile from school. In this situation, Tommy's route to school could be much shorter with a pathway from

his cul-de-sac that would grant him and other students on his street direct access to the school site.

According to the FDOT, single land uses, a poor transportation network (a large number of cul-de-sacs, for example), and few accommodations for pedestrians and bicyclists are all characteristics of areas that do not promote multimodal transportation (FDOT, 2003). Conventional suburban neighborhood developments, which are common today, exhibit many of these qualities, which make the residential environment more conducive to automobile travel than alternate modes. As such, current development patterns favor motorized travel over non-motorized modes.

Multimodal transportation planning is aimed at using the relationship between transportation, land use, and urban design in order to create environments that encourage multiple modes of transportation—alternatives to the automobile. According to a study by the Transportation Research Board (TRB) and the Institute of Medicine (IOM) (2005) a series of studies conclude that "sidewalks and mixed-use development are likely to be more important [than other factors] to encourage walking for local shopping and other utilitarian purposes" (6). One can easily argue that school travel is such a purpose. The main goal in multimodal planning is to use the transportation-land use-urban design relationship to reduce automobile usage and vehicle miles traveled. The FDOT has developed four main guiding principles that create walkable and bikeable environments, and a means to use these governing factors to develop special districts called Multimodal Transportation Districts (MMTDs) that favor non-motorized travel over motorized travel (FDOT, 2003). These districts are explored below with an emphasis on the extent to which they relate to creating the kind of environment that favors children's non-motorized, home-to-school travel.

The emphasis on creating multimodal environments has evolved over the last two decades in Florida as a part of growth management legislation, generally, and its concurrency requirement, in particular. As will be discussed in greater detail below, the transportation concurrency requirement of the Local Government Comprehensive Planning and Land Development Act has evolved from an emphasis on highway capacity to meet the requirement to provide "public facilities and facilities" concurrent with the impact of development to multimodal planning. This evolution has occurred through a series of exceptions – TCMAs, TCEAs, LTCMS and MMTDs – which amended the Growth Management legislation between 1992 and 1999. The 2005 Growth Management Reform Act further enhances multimodal planning by requiring local governments using TCEAs to address, support, and fund mobility within the designated area, and to address the following aspects of multimodal planning: urban design, appropriate land use mixes, including intensity and density; and network connectivity.

Thus, multimodal planning has evolved with the legislation in the state of Florida. Beyond the studies the FDOT conducted to develop the rules for MMTDs, little research has been conducted that specifically addresses the question of multimodal planning for school environments. Most of the previous research considers the connection between residences and employment (see the Multimodal Areawide QOS Handbook) or between shopping and residences. Advocates of New Urbanism cite this literature to support the need to develop more walkable and bikeable neighborhoods, generally (see Ewing and Cervero, 2001; IOM/TRB, 2005). Research in Orlando showed the potential for walking and bicycling for non-work trips, including school trips, may be greater than for work trips because of the complications of walking or bicycling to work (Steiner *et al.,* 2000).

Similarly, research on how to achieve a mode shift to non-automobile modes of travel for school trips has seldom been researched (Litman, 2005). One major component of the mode shift is the use of Transportation Demand Management (TDM). TDM "implies that the focus is not the demand for travel rather than the supply of transportation facilities (Ferguson, 1993)." By its nature TDM is concerned with the efficient use of existing transportation infrastructure (Ferguson, 1999).

The use of TDM to encourage walking and bicycling to school is strongly dependent upon the location of a school with respect to the adjacent residential neighborhood. If large numbers of students live within close proximity to a school, the potential for shifting the mode of travel is greater. In the next section we explore how school siting can be coordinated with the location of residences and other community activities.

Coordinating School Siting with Local Comprehensive Planning

School siting is a generally complicated process that involves compromising and balancing a variety of factors. Tsai and Miller (2005) outline nine main factors school districts commonly consider in deciding where new schools will be, or in deciding who will attend them:

1. **Affordability** – property already owned by the local government will be top priority for consideration, and donated properties will also be high priority
2. **Access to Amenities** – property must have access to water, sewer, and power
3. **Site Size** – property must be able to meet size recommendations, requirements, or guidelines
4. **Attendance configuration** – location of the school must minimize the impact of enrollments on existing schools
5. **Stability of student populations** – attendance must be stable enough to ensure students will not be reassigned to a new school in the near future

6. **School size** – school must be large enough to offer variety of academic opportunities, but small enough to offer quality education
7. **Demographics** – school population must be balanced demographically
8. **Attendance boundaries** – boundaries should be set in such a way that students travel routes would reduce the need for school buses and private vehicles to cross major arterials
9. **Travel Distance** – must be minimized.

Certain policies and practices in particular are contributing to school siting trends that are not favorable to bicycle and pedestrian modes of travel. These policies favor larger school sites with higher student enrollment, funding formulas that encourage new school construction over renovation, and discord between school location and new development (National Trust for Historic Preservation, 2005). For the purposes of this study, only the factors most directly related to mode choice for school will be explored in depth. These factors include school size and attendance configuration. For the purpose of this study, school size will include both enrollment size and site size, and attendance configuration will include both attendance boundaries and demographics.

School Size (both enrollment size and site size)

In the last 40 years, our nation as a whole has been experiencing a trend toward larger school buildings with larger school enrollments. The number of public schools in the United States has decreased from 238,000 in 1930 to 93,000 in 2001, according to the National Center for Educational Statistics (2002). Meanwhile, the number of students has risen from 28 million to 53.5 million during that same time period. With the number of schools shrinking and the number of students growing, the average size of schools has been increasing. These larger schools have proven difficult to fit into existing neighborhoods, and so over the past few years there has been a trend to place schools on large isolated properties. In many states, a minimum size for a school site is established (Weihs, 2003). As land grows scarce in urban areas, more and more schools have been developed on the outskirts of communities, where land is available, less expensive, and sometimes on land donated by developers. Larger schools require more land to support more students and a larger geographic area. The result of this movement away from neighborhood schools is fewer children living within a convenient travel distance to schools and far fewer children walking and bicycling to school.

This large school trend has been generally perpetuated for a number of reasons that have been traced as far back as the space race of the late 1950's (Mitchell, 2000). As the United States and the Soviet Union competed to be the first to explore outer space, large schools were believed to offer better opportunities in math and science to more students. Then in 1959, the president of Harvard University, James Bryant Conant, perpetuated the trend towards larger schools with a book entitled *The American High School Today.* The book

promoted the idea that "larger schools can offer more comprehensive instructional programs of greater quality at lower costs than smaller schools (*as quoted in* Irmsher, 1997)." Since the late 1950's, larger schools have continually been perceived as more cost effective than smaller schools, based on the argument that larger schools can provide a better education at a lower cost and more varied curriculum by sharing common spaces like auditoriums, and expensive equipment like computers. For these main reasons, large school construction had persisted across the United States, with Florida's schools in particular among the largest in the nation as of 2000 (Florida Department of Education, 2000).

Legislative action limiting enrollments can provide opportunities for smaller schools, but existing practices do not always support smaller schools. Currently across the Unites States, each state decides how much land each school will need. These site sizes may be dictated in the form of recommendations, requirements, or guidelines. These school site sizes are usually rooted in guidelines from the Council of Educational Facility Planners, International (Weihs, 2003). Although allowing for some flexibility, many states generally follow the following formula to determine school site size:

Elementary Schools = 10 acres[4] + 1 acre for every 100 students
Junior High/Middle Schools = 20 acres + 1 acre for every 100 students
Senior High Schools = 30 acres + 1 acre for every 100 students

Currently, Florida's acreage minimums are somewhat smaller than the national guidelines suggest. These guidelines are discussed in greater detail in the "Existing Florida Legislation" section.

Attendance Configurations

Attendance boundaries for schools are often set with the intention of establishing a demographically and socio-economically balanced student body. In contrast, residential development patterns often produce neighborhoods that are not so evenly balanced. With racially and economically stratified neighborhoods, selecting school sites that keep a diversified student population poses inherent transportation problems (Roy, 2005). The result is a set of attendance boundaries that varies considerably in shape and size. The school bus is often viewed as the solution to the problem, with one demographic or socio-economic group being transported to a school located in a neighborhood with a dissimilar student population (Tsai, 2005).

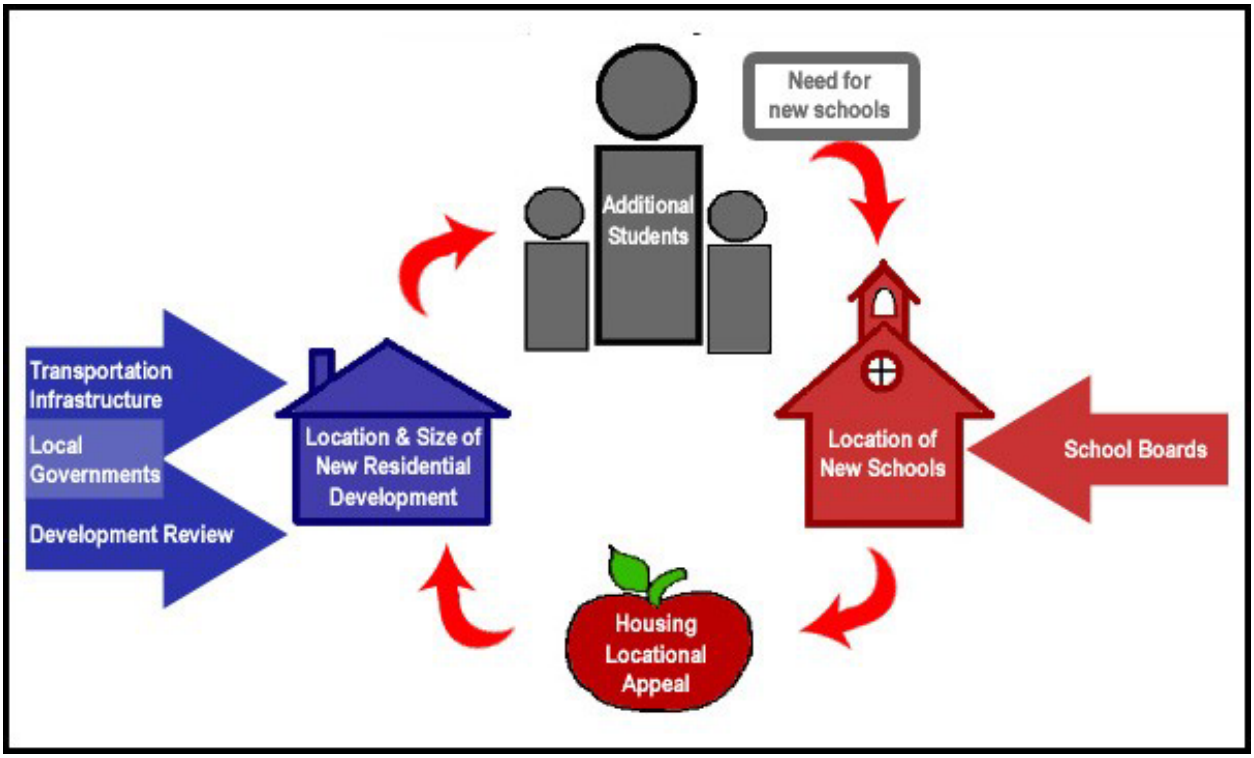
---

[4] 1 acre = 43,560 square feet
1 square mile = 640 acres
1 city block = approximately 4 acres

A Case for Coordinated School Planning

Local governments and school boards have the extraordinary power to spur and direct growth through land development regulation and school siting, respectively. Local comprehensive planning directs growth with the transportation infrastructure it constructs, and the new developments it approves. School boards can plant seeds for growth or control its direction through their decisions about where to locate schools; with home values in districts with highly-rated schools boasting home sale prices 10% higher than just across their district lines (APA, 2000). New schools can attract growth when residential development follows new school construction (EPA, 2005). The resulting relationship is a cycle in which the decisions made by each party can strongly affect growth patterns, which often requires a response from the other. This cycle is illustrated in Figure 7 below. Local governments and school boards have a common goal of providing children with quality schools at an efficient cost. Through coordination, they can reach this common goal.

Figure 7: The Cyclical Connection between New Residential Development and New Schools
Source: Authors



With both parties influencing and being influenced by the actions of the other, it makes sense that their efforts be coordinated. Local planning agencies are reviewing and approving new developments, and planning the construction of new transportation infrastructure, and so they know where the greatest need for new schools will be. Likewise, school boards are making decisions about where

new schools will be located, which, in turn, influences the demand for new residential development. There is no need for either side to be reacting to the other; a coordination effort between school boards and local governments would be mutually beneficial. Ideally, school boards would keep local governments informed about school enrollment levels and relative capacities of existing schools so that local governments could have a working knowledge of areas with enough school capacity to accommodate new development. On the other hand, local governments would keep school boards abreast of the latest approved development proposals so they may be prepared to purchase new school sites, approach developers for donated land, or even require land as a condition of development approval. Coordinated school siting and local comprehensive planning benefit both school boards and local governments through shared information.

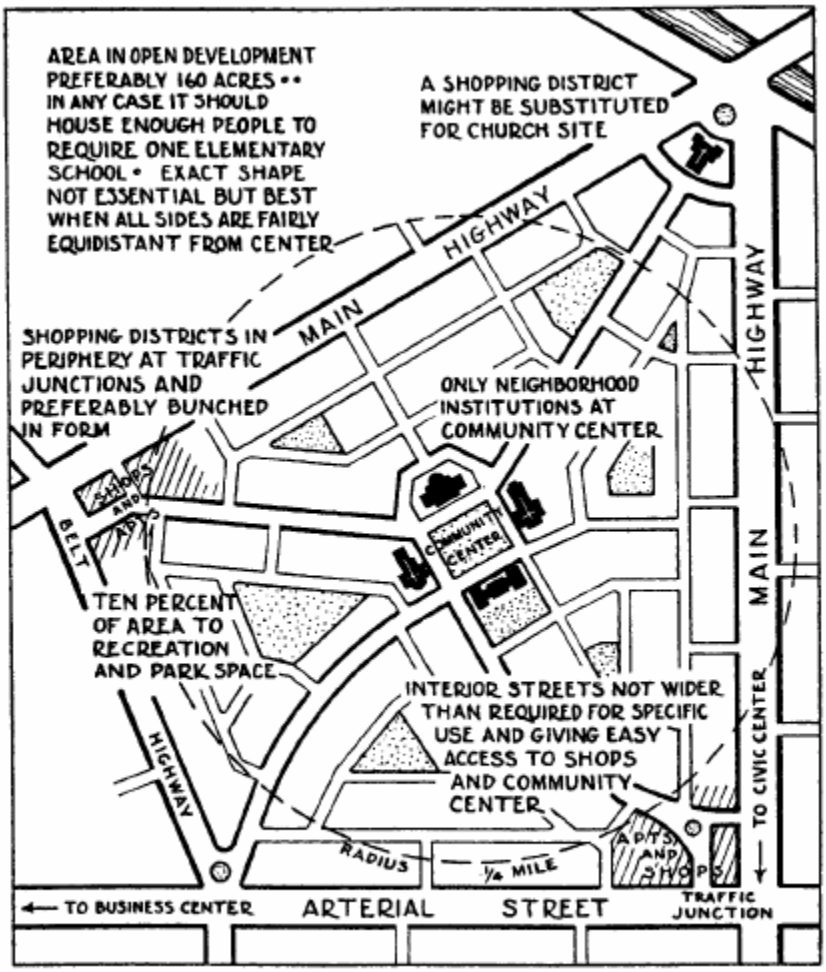
Implications of School Siting for Children's School Travel

The decisions local governments make about the location of new development and the school board's decisions about new school locations both impact how children travel from home to school. Newly built schools in remote locations require that students travel by bus or automobile. If a school is located within a mile of a child's home, and (less importantly) if the neighborhood features trees on the streets, short block lengths, and mixed land uses, then children are more likely to walk (McMillan, 2003). An EPA (2003) study in Gainesville, Florida suggested that living closer to school and having plenty of sidewalks on the route to school predicted walking. A study in Norway found that teenagers in urban areas walked three times farther than their rural counterparts on the way to school, presumably due to the presence of sidewalks (Sjolie and Thuen, 2002). Therefore, siting schools in walkable, residential neighborhoods appears to be an effective way of promoting walking and bicycling to school. With Florida school bus transportation costs topping $753 million dollars a year (FDOE, 2003), the coordination of residential development with school siting holds the potential to free funds from already tight state and local government transportation budgets. This finding has the potential to factor more heavily into decisions about whether to renovate an existing neighborhood school, and into decisions about where to site new schools.

School Boards and local governments may have difficulty obtaining complete coordination. Part of this difficulty may be due to the structure of special jurisdictions with semi-governmental functions. The special jurisdictions often have a limited scope and therefore may not consider all of the possible consequences of their actions. In many states, including Florida, the school board is financially independent of the local government; they have the powers of taxation, eminent domain, and condemnation. They can purchase school sites, as well as create policies and regulations without the input or permission from local governments (Boles, 2005).

Schools are often built without local government input. Schools are built in response to the growth rate of the student population, and because of the aging of current school buildings. Different factors determine the location of a new school; the cost of land is often a larger factor than community inclusion. For example, if cheaper land for a new school can be purchased on the outskirts of an existing neighborhood, then why pay the higher price for land in the center of the neighborhood? Unless including a school as an important cornerstone of the community is held as an important value, investing in cheaper land further away becomes a more viable option. In addition to the lack of communication from the school board to the local government, the local government often does not discuss its development plans with the school board. Some results of this lack of communication include overcrowded schools, underutilized schools, schools causing sprawl, and longer distances for children to travel to school. Other difficulties in coordinating school boards and local governments include differences in budget cycles, different planning models and data used in planning, differences in purposes and mission of the governmental entities, and the competition for valuable community resources (Boles, 2005).

Figure 8: Clarence Perry's Neighborhood Unit



Source: Neighborhood Unit Principle, Clarence Perry, 1929

The result of a coordinated school planning effort can yield schools that serve as the center of the neighborhood, with a number of inherent benefits. Figure 8 shows Clarence Perry's diagram of a neighborhood unit that shows how the school fits as the neighborhood center. Perry worked to define the neighborhood unit that would be part of a town and regional city. These "neighborhood schools" are often known as Smart Growth Schools because they are small in size, located within the neighborhoods they serve, and act as community anchors. They are generally the result of community involvement in school facility planning, and efficient uses of existing resources like historic school buildings (National Trust for Historic Preservation, 2005). The National Trust for Historic Preservation claims neighborhood schools are associated with improvements in the following five areas: community involvement, academic achievement, cost, health benefits, and environmental benefits. The importance of each of these areas is discussed below.

- **Community Involvement**

Neighborhood schools are the result of community involvement and serve to anchor the community they serve by bringing neighbors together for community events. They provide an opportunity for shared use of the facilities and grounds as parks, libraries, and classrooms that can be used by local adults and children alike. Schools can serve as a community center to maximize their potential as more than just a children's education facility.

- **Academic Achievement**

Multiple sources argue that smaller neighborhood schools improve academic performance in certain populations. Lee and Smith (1996) found that small size benefits minority and low-income students more than middle- and upper-class students. A higher percentage of all students benefit from a smaller, more intimate, learning environment regardless of socioeconomic level, gender, handicap, or race. Such schools report less violence, drug problems, and security issues, while boasting elevated attendance, grade point averages, and test scores (Irmsher, 1997). Klonsky (1995) and Raywid (1995) found that large school size impedes attendance and lessens enthusiasm for school activities. Large schools have lower grade averages, test scores, higher dropout rates, and a host of other problems including those involving violence, drugs, and security (Irmsher, 1997).

- **Cost**

Recent research shows that smaller neighborhood schools are more cost-effective than larger schools built on the outskirts of their communities. Traditionally, the large school movement was based on economies of scale,

however, Lee and Smith (1996) found the reverse to be true. They found that large schools required more layers of support and administrative staff, which made those schools less cost effective and more expensive on an ongoing basis. When examining how cost is calculated, large schools appear to be more or less effective depending on how cost is calculated. By dividing the total amount spent on the school by the number of students enrolled, large schools appear to be more effective. By dividing the total amount spent by the number of students graduating, small schools are more cost effective. This difference in the consideration of the high dropout rates in larger schools is the distinguishing factor that illustrates why smaller schools are more cost effective than larger schools. Additionally, large schools require more land, and to find larger tracts, schools must often be sited where land is available and affordable—on the edge of the communities they serve. These locations have higher ongoing transportation costs as more students live further from the school they attend.

- **Health Benefits**

The EPA's sample of existing schools showed that locating schools in neighborhoods would increase walking and bicycling by 13% (2003). There are two main health benefits associated with this important mode shift. First, walking and bicycling to school is an opportunity for regular physical activity, which is an important element in the fight against childhood obesity. Second, walking and bicycling to school would reduce traffic, which would reduce harmful motor vehicle emissions by 15% (EPA, 2003). Such emissions and the poor air quality associated with them are blamed for increasing risk for cancer, causing asthma in schoolchildren, and aggravating the condition in others (National Trust for Historic Preservation, 2005).

- **Environmental Benefits**

Besides its major impacts on air quality mentioned above, coordinated school planning can ultimately yield a reduced need for parking, which reduces the impervious surfaces created by parking lots. Impervious surfaces cause an increase in storm water runoff, which causes additional water pollution problems. According to the National Trust for Historic Preservation, "studies have shown that sediment washed into source waters during storms impairs the effectiveness of drinking water treatment systems, and that the resulting increase in the turbidity of treated drinking water makes children up to two times more likely to become sick with acute gastrointestinal illnesses (National Trust for Historic Preservation, 2005, p.2)."

Safe Routes to School

Safe Routes to School programs are initiatives designed to make it safer for children to walk and bicycle to school. To this end, these programs provide a set of tools to help improve hazardous conditions around schools and the

surrounding neighborhood through traffic calming, education, and awareness programs. These programs are committed to help reduce the number of motor vehicles, traffic speed and congestion around schools and increase the number of children walking and bicycling to and from school. School-based safety teams comprised of parents, students, school administrators, and safety officials are united with a common goal of safe transportation to and from the school. The teams conduct assessments, surveys, and safety education, and recommend projects for sidewalks, signage, and crossing improvements.

The overall goal of SR2S programs is to reduce congestion, create a safer environment for walking and bicycling, and initiate progressive development of children's traffic safety skills, thereby giving children back a degree of independent mobility and providing opportunities for daily physical activity. The Safe Routes to School Program aims to improve hazardous walking conditions and slow traffic near schools, for children walking and bicycling to and from school, through four main components known as the "4 E's":

- Engineering – improvements made to the physical environment, including infrastructural projects such as sidewalk construction, traffic calming construction, and the installation of signage.
- Enforcement – includes efforts to enforce existing or new rules that protect traveling children, such as police officers issuing tickets to motorists who speed in school zones.
- Encouragement – includes efforts to raise awareness and create excitement, such as special events, media coverage, or reward programs for children who walk or bike to school.
- Education – instruction for parents and students designed to teach them how to operate safely in the physical environment.

Each program has a different approach to emphasizing one or more of the components (Transportation Alternatives, 2002).

History of Safe Routes to School programs

Some of the first Safe Routes to School programs arose in Denmark in the mid-1970s, when that country had Western Europe's highest rate of traffic-related fatalities among children. Odense, Denmark began a pilot program where a network of pedestrian and bicycle paths, narrowed roads, and other traffic calming features were added to the current infrastructure. Within 10 years of the beginning of the program, child pedestrian and bicyclist casualties fell by more than 80% (Appleyard, 2003).

Traffic safety programs oriented to children appeared in Great Britain, emphasizing government policy for road safety (U.K. Department of Transport, 1990). A British organization known as Sustrans—a "sustainable transport charity"—initiated ten Safe Routes to School projects in 1995, focusing on bicycle

lanes, traffic calming, and raised pedestrian crossings; within two years, in the project areas, bicycle use had tripled, child pedestrian injuries declined by 77 percent, and bicycle injuries fell by 28 percent (Appleyard, 2003).

Safe Routes to School began in 1993 in Canada as a program entitled "Lets Walk Queen Mary" and involved Queen Mary Elementary School of Vancouver, Canada. In 1994, "Go for the Green" provided funding for Transportation Options to begin work on a Safe Routes to School project. During this time the tool "Blazing Trails through the Urban Jungle" was created. Using the tools developed, in 1996, "Greenest City" of Toronto (Ontario) launched a program that consisted of three components Walking School Bus, No Idling Zones, and Classroom Mapping (Go for Green, see Works Cited for website). This program is discussed in further detail in the Best Practices Case Studies section of this report.

In the United States, safety patrols and crossing guards became common in the 1960s and 1970s. There were attempts to teach pedestrian safety to children, such as the 1979 AAA brochure "The Safest Route to School." However, it was not until the 1990s that dedicated programs began to address school travel, both to improve safety and to promote walking and bicycling. The first Safe Routes to School program in the United States began in the New York borough of the Bronx in 1997 (Appleyard, 2003).

Beginning in 1997, Florida conducted a pilot research project with ten schools called "Safe Ways to School." This project was a joint effort between the FDOT, the FDOE, Community Traffic Safety Teams (CTSTs) and other members of school safety teams. This pilot program was based on the award-winning safe routes to school program in Melville, Australia, "Safe School Routes". This program includes the involvement of parents and children in designating safe routes and painting footprints along them, and creating other physical features, such as raised crosswalks, striped crossing posts, and other traffic calming techniques (Crider and Hall, in press). Also in 1997, the Partnership for a Walkable America sponsored the first National Walk Our Children to School Day in Chicago.

At the same time as the Florida project was beginning, the CDC was developing a set of survey instruments on the subject. Within two years, the NHTSA had funded pilot programs in Arlington, Massachusetts and Marin County, California. Participating public schools in the Marin County program, called "Safe Routes to School," reported increases in school trips made by walking (64 percent), bicycling (114 percent), and carpooling (91 percent) and a 39 percent decrease in trips by private vehicles carrying only one student (Staunton et. al., 2003).

These pilot programs inspired an upsurge of programs and legislation across the U.S. and internationally. In 2000, the United Kingdom and Canada

approached the US about establishing an International Walk to School Day. By 2003, Federal legislative initiatives included a proposed Pedestrian and Cyclist Equity Act and proposals to include Safe Routes to Schools support in the nation's re-authorized transportation funding bill (Crider and Hall, in press). In 2004, fourteen states had "Safe Routes to School" legislation and several more were considering it. Many of these initiatives are showcased on the NHTSA, Safe Routes to School website (NHTSA, 2005). NHTSA also coordinates a network of professionals, engineers, administrators, educators, law enforcement personnel, legislators, and activists who provide guidance and support for this growing movement.

Funding

Two types of funding have been available to implement a comprehensive Safe Routes to School effort: capital funds or program funds. Federal law has only recently reflected support for the Safe Routes to School Programs, but other existing safety-related funds can be used to support program initiatives. Some eligible Federal Aid Highway Programs include Transportation Enhancements Funds, Hazard Elimination (safety) funds, 402 program funds, and Congestion Mitigation and Air Quality (CMAQ) (Pedestrian and Bicycle Information Center, 2005).

In some programs, a dedicated source of funding is available from grant sources, which focuses on a policy mandate to fund local Safe Routes to School programs. The best example of this type of model exists in California. The state's legislation set aside one-third of the federal Surface Transportation Safety funds for the Safe Routes to School program (Transportation Alternatives, 2002). In order to secure federal or state funds, local governments often are required to match funds. In California, local governments are required to match 10 percent of the state's contribution; the state will only match a maximum or $450,000 for any single project. This funding often translates to between $25-40 million annually for local programs (Pedestrian and Bicycle Education Center, 2005).

Other examples of funding include:

- Local School Board Capital Improvement Funds
- School Board Maintenance Funds
- City/County Public Works Department or FDOT
- City/County Traffic Engineering/Traffic Calming and sidewalk improvement programs
- Safe Communities/ CTST

New Federal Legislation for 2005 just passed the SAFETEA-LU (the Safe, Accountable, Flexible, Efficient Transportation Equity Act-A Legacy for Users) bill. This bill amends Titles 23 and 49 of the United States Code and authorizes the disbursement of $286.5 billion dollars from 2005 through 2009. This new federal transportation bill (2005) will launch a new Safe Routes to School

program, and will aid in existing programs to make it safer for Americans to walk and bike (America Bikes Team, 2005). SAFETEA-LU dedicates $3 million at the federal level for administration of the program, with the remainder of the funds distributed to States based on their relative shares of total enrollment at the primary and middles school levels, with no state receiving less than $1 million. Funds will then be administered at the State DOT level to assist other agencies meeting the requirements of the program. From 10% to 30% of the funds for each state must be used for non-infrastructure programs, and the rest may be used for the planning, design, and construction of infrastructure improvements supporting the bicycle and pedestrian environment within two miles of a school. Florida is expected to receive approximately $4.5 million in 2006, and $4 to $9 million each year through 2009 (FDOT, 2005).

School Zones

A component of getting children safety to school is school zones. Speed and the amount of traffic on a road leading to a school can influence the number of crashes as well as the seriousness of the injury. In one study, researchers found that roads with traffic volumes greater than 750 vehicles per hour were found to have a 14-fold increase in the risk of childhood pedestrian accidents than roads that had traffic volumes less than 250 vehicles per hour. Roads with traffic speeds more than 30 miles per hour (50 kilometers per hour) were 1.26 times more likely to have child pedestrian accidents than were roads with speeds less than 40 km/ hr (Roberts, Norton, Jackson, and Hasell, 1995).

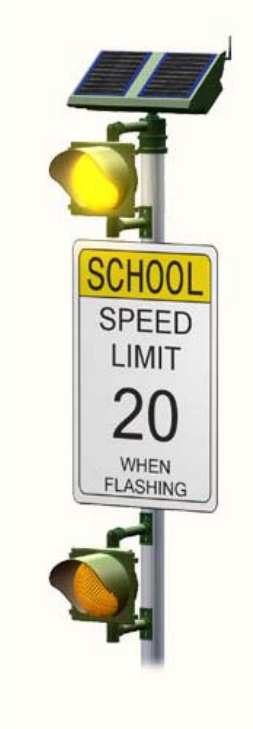
A survey conducted by Institute of Transportation Engineers, found many different ways of managing a school zone. Some of the most prominent methods are identified below.

- Some state departments of transportation are experimenting with green/yellow signs. This color would be reserved for school purposes only.
- Student crossing patrols are sometimes used; cones and special signs are used to let motorists know of this special situation. Many schools feel that it is necessary to separate parent drop-off area from bus drop-off area.
- Designating streets for one-way traffic for either bus or parent traffic is another method often used to ease congestion during peak times. Sometimes it is necessary to restrict parking in certain areas both to create a more pedestrian friendly environment and to ease the congestion.
- Staggering the dismissal time, allowing walkers to leave at a different time than bus riders, helps to avoid conflicts.

In some cases traffic engineers work closely together with the police or sheriff's department. This is important to ensure proper enforcement of the school zone. In other cases committees are formed and meet a few times a year to discuss safety issues (ITE, 1998).

The most common sign found in school zones is one that states that restrictions are in effect "when flashing" and other signs state "while children are present". Another is a sign that states the specific times that speed restrictions are enforced. Some different types of school zone signs are illustrated below.

Source: Carmanah Technologies Corporation, 2004



Source: Authors

There are different methods to make school zones safer for children. Some ideas include:

- Highly visible school zone signs

Source: Authors

Source: Authors

- Traffic calming
- Raised or colored pedestrian crossing

Source: Authors

Source: American Automobile Association, 2006

- Parking restrictions

Source: Authors

Source: Aronson, 2004

IV. RESULTS/FINDINGS

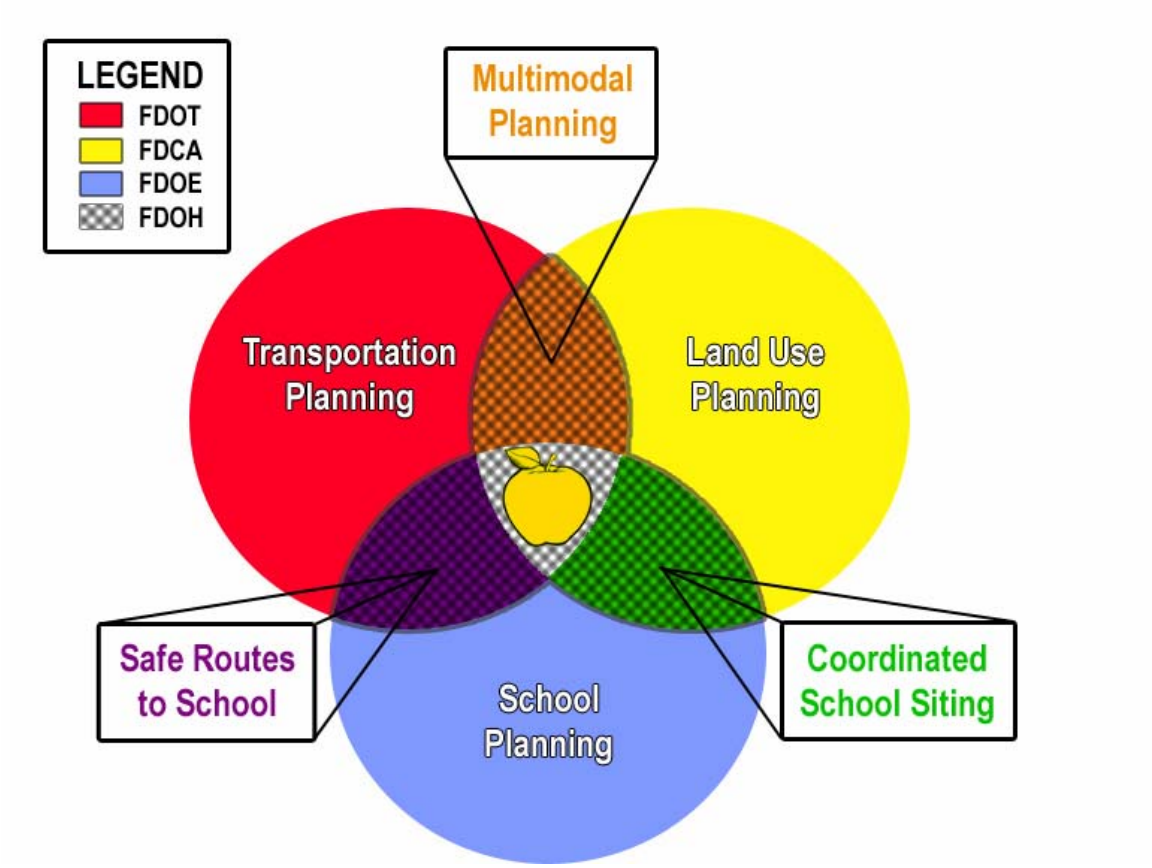
After examining the core issues surrounding school siting, multimodal planning, and Safe Routes to School programs, the report will begin to examine existing practices in Florida in these three areas. This section begins by discussing the legislation that applies to the three areas discussed herein. Next, state agency efforts to address coordination between school siting, transportation, land development, and children's safety on their way to school are discussed. Finally, best practices both nationwide and in Florida regarding multimodal planning, school siting, and Safe Routes to School are examined.

Existing Practice in Florida

When compared to the rest of the nation, many of the ingredients of effective school transportation planning are already in place in Florida concerning school siting, multimodal planning, and Safe Routes to School. These laws have evolved since the 1985 Growth Management legislation, which incorporates many components of the model defined above. In this section we explore the evolution of concurrency, which initially applied to transportation but not to schools. In a series of steps, Florida legislators have gradually increased the requirements applied to local governments in the areas of coordinated land use and transportation planning, and coordinated school planning. What is less understood is how local governments have adjusted to the state mandate for the coordination. Figure 9 identifies the state agencies involved in the areas of planning practice – transportation, land development, and school planning – that support the three associated and coordinated areas of planning: multimodal planning, coordinated school planning, and Safe Ways to School. As figure 9 shows, the FDOT is primarily responsible for transportation planning, the FDCA is primarily responsible for land use planning and the FDOE is responsible for school planning. In the areas that overlap between these three agencies: multimodal planning, coordinated school planning and Safe Ways to School, the agencies overlap. Thus, both the FDOT and FDCA are involved in multimodal planning through their responsibility for transportation and land use planning, respectively. Both the FDCA and the FDOE are involved in coordinated school planning through their responsibility for land use and school planning, respectively and both the FDOE and FDOT are responsible for Safe Ways to school through their responsibilities for school planning, and transportation planning, respectively. The FDOT, FDCA and FDOE all have responsibilities to coordinate transportation, land use and school siting to ensure that schools are built in locations that have residences close enough to the school, and safe, predictable and continuous transportation facilities are available to ensure that child have the option walking or bicycling to school. The FDOH also has several programs that encourage all members of families in Florida to be more physically active. This activity can most easily take place in physical environments in which physical activity is promoted through well-planned multimodal environments and for children in multimodal environments in which schools are located close

enough to residences that parents can walk their children to school as a part of routine physical activity.

Figure 9: Agency Coordination Areas that Support Safe Routes to School
Source: Authors



Existing Florida Legislation

The 1985 Local Government Comprehensive Planning and Land Development Act required that local government comprehensive plans include a capital improvements element with the "[e]stimated public facility cost, including a delineation of when facilities would be needed, the general location of the facilities and projected revenue sources to fund the facilities [FSA §166.3177 (3) (a) 2]." Each local government is required to issue Land Development regulations (LDRs) that ensured that public facilities and services satisfied the comprehensive plan requirement that they be "available when needed for the development orders and permits are conditioned on the availability of public facilities and services necessary to serve proposed development [FSA §166.202 (2) (g)]." In 1986, the GMA was further amended to state: [i]t is the intent of the Legislature that public facilities and services needed to support development shall be available concurrent with the impact of development (Powell 1993: 292)." Which "public facilities" were covered under the concurrency requirement was not clarified in legislation until the 1993 amendments to the GMA. These facilities

include: roads, sanitary sewer, solid waste, stormwater, potable water, parks and recreation, and mass transit [FSA § 163.3180 (1) (a)]. Notably absent in this list of public facilities is schools. While the concurrency requirement is seen as providing transportation facilities concurrent with the impact of development, they also require the coordination of land use with transportation. A concurrency requirement for schools would require the coordination of school siting with land development and the provision of other infrastructure, like transportation facilities.

The requirement for school concurrency was discussed during in the early 1990s, but the Florida Legislature took a different approach to the coordination of the location of school sites with development throughout the 1990s. The 1993 ELMS study suggested that "among the matters that should be addressed on a countywide basis are the siting of public schools, [and] the location and extension of public facilities and services that are subject to concurrency (ELMS 1992: 39)." Even as they recognized that schools "can generate significant impacts on local infrastructure and services, just like other forms of development (ELMS 1992: 47)," they made three recommendations for local school boards: (1) intergovernmental coordination be required between local governments and educational boards, (2) a dispute resolution process to ensure prompt resolution of disputes between local governments and school boards, and (3) cross training of employees of local governments and educational boards. In addition, the ELMS committee recommended that universities be required to engage in a special planning and permit review process and a negotiation with local governments over the impact of development.

School concurrency has become a state requirement through a series of legislation beginning in 1993. In 1993, intergovernmental coordination was required for any local government to coordinate school siting with land development. In 1995, the Educational Facilities Legislation required school districts to coordinate their information with development information of local governments. In 1998, the Legislature extended school concurrency as an option to local governments and this option was implemented in Palm Beach County, FL and in a different form in Orange County, FL. As will be discussed later, the GMRA of 2005 requires school concurrency for all school districts except those that have adequate capacity in their schools and are growing slowly.

Multimodal Planning

Multimodal planning has evolved from the requirement in the 1985 Growth Management Act for transportation concurrency. As described above, transportation concurrency has been changed several times to address identified concerns. The first evidence of problems with transportation concurrency surfaced in 1989 when the first comprehensive plans were being completed. According to Weaver *et al.* (1989, 1990) Pinellas, Dade, Hillsborough, and Broward Counties all had major deficiencies in transportation infrastructure that

put some development at risk of a moratoria. Planners in these urban counties struggled to match local development goals with the concurrency requirements. In response to the difficulties of implementation concurrency in urban counties, TCMAs were proposed during the 1990 Legislative session (Rhodes, 1991).

In 1992, legislation was passed that allowed the creation of a TCMA (Powell, 1994). The purpose of a TCMA is to "promote infill development or redevelopment within selected portions of urban areas in a manner that supports the provision of more efficient mobility alternatives, including public transit [FAC 9J-5.50055]." The TCMA may be established in "a compact geographic area with an existing network of roads where multiple, viable alternative travel paths or modes are available for common trips [FSA Sec. 163.3180 (7)]." An areawide LOS may be established for facilities with similar functions serving common origins and destinations [FSA Sec. 163.3180 (7)].

In 1991, Governor Lawton Chiles created the third Environmental Land Management Study Committee. The ELMS III Committee's recommendations lead to a series of amendments to the GMA in 1993 that created several new exceptions to address the concerns about sprawl, disincentives to redevelopment, and concerns about specific types of development that were being prevented because of the structure of the TCMAs (ELMSC, 1992). Exceptions to transportation concurrency regulations can be characterized as area-specific or project-specific (Durden *et al.,*1996).

The following project-specific exceptions were allowed as a result of the 1993 amendments to the GMA: (1) urban redevelopment projects [FSA 163.3180 (8)]; (2) *de minimus* projects [FSA 163.3180 (6)]; (3) projects that promote public transportation [FSA 163.3180 (5) (b) and 9J-5.0057 (7)]; (4) part-time projects [FSA 163.3180 (5) (c)]; and (5) projects for which private contributions are made [FSA 163.3180 (11) (c)]. Urban redevelopment projects, which are located in an existing urban service area and that may reduce the LOS below the adopted standard, are not subject to the concurrency requirement for up to 110% of the roadway impacts generated by prior development [FSA 163.3180 (8)].

In addition to the TCMA, two area-specific exceptions were added in 1993: (1) Long-term Concurrency Management System (LTCMS) [FSA Sec.163.3180 (9) (b)]; and (2) Transportation Concurrency Exception Area (TCEA) [FSA Sec. 163.3180 (5) (b)]. LTCMSs are established in areas with existing deficiencies. To eliminate the backlog, a comprehensive plan is established that identifies the improvements to be made over a ten-year period, or in exceptional circumstances over a fifteen-year period. The comprehensive plan must: (1) designate specific areas where the deficiency exists; (2) provide a financially feasible means to ensure that existing deficiencies will be corrected within the ten-year period, and (3) demonstrate how development will be accommodated and the facilities (including roads and public transit) to correct the existing deficiency [FAC 9J-5.0055 (4)].

The purpose of a TCEA is to "reduce the adverse impact transportation concurrency may have on urban infill and redevelopment and the achievement of other goals and policies of the state comprehensive plan, such as promoting the development of public transportation [FAC 9J-5.0055 (7) and FSA Sec. 163.3180 (5) (b)]." It can be established to meet three purposes: (1) promotion of urban infill development; (2) urban redevelopment; and (3) promotion of downtown revitalization. In a TCEA that is designed to promote urban infill, no more than ten percent of the land can be developable vacant land [FAC 9J-5.0055 (6) (a) 1. a.]. Specific development density and intensity thresholds must also be met [FAC 9J-5.0055 (6) (a) 1. b].

In 1998, the Legislature created the Transportation and Land Use Study Committee (TLUSC) to evaluate transportation and land use planning and coordination issues in Florida. The TLUSC identified several key issues with their recommendations:

> Florida must have true multimodal planning and transportation systems. … Regional mobility should not adversely affect community livability. … Transportation is essential to economic vitality. … Better land use planning will lead to better transportation systems. … Reward development in the right place at the right time with the right form. … One size does not fit all. … Focus on performance outcomes, not micro-managing local processes (TLUSC 1999: i-ii; all text bold in original).

During the 1999 session of the Legislature, several recommendations of the TLUSC were incorporated in amendments to the GMA. In particular, this legislation [S.B. 0017 (1998)]: (1) allows urban infill and redevelopment areas that, like the urban infill development, urban redevelopment, and downtown revitalization, can be a justification for a TCEA; (2) authorizes the establishment of MMTDs and the development of rules to implement them; (3) authorizes the reduction of certain fees in MMTDs; (4) provides that the concurrency requirement does not apply to public transit facilities; (5) revises the requirement for establishment of the LOS on certain facilities on the Federal Interstate Highway System; and (6) provides that a multiuse development of regional impact (DRI) may satisfy certain transportation concurrency requirements by payment of a proportionate-share contribution for traffic impacts under certain conditions.

The goal of an MMTD is to facilitate the use of multiple modes of transportation, leading to a reduction in automobile use and vehicle miles traveled. MMTDs may be established in two situations: (1) development in existing areas, such as a central core of a municipality, where the focus is on the enhancement of existing elements and qualities, and guiding redevelopment and infill opportunities; and (2) new proposed development located outside of the traditional municipal area (Guttenplan *et al.* 2003).

Community design features that provide an adequate level of multimodal mobility and accessibility within the district should support an MMTD.[5] An MMTD should contain the following community design elements:

- Complementary mix of land uses, including residential, educational, recreational, and cultural uses
- An interconnected network of streets designed to encourage walking and bicycling with traffic calming, where desirable
- Appropriate densities and intensities of land uses within walking distance of transit stops
- 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 conflicts with pedestrians, transit, automobile, and truck travel
- Transit service within the designated area, or definitive commitment to the provision of transit. This definitive commitment should be found in local planning documents and in the approved capital improvements program. For new developments, transit connectivity to the major urban area must be included, or a definitive commitment for transit connections, again evident in both planning documents and approved capital improvements program (FDOT 2003, p. 12).

For a complementary mix of land uses, there are three basic criteria. The MMTD should have a minimum residential population of 5,000, a ratio range of population to jobs from 1:1 to 3:1, and provide scheduled transit service. The appropriate mix of land uses should include three or more significant land uses, such as retail, office, residential, hotel/motel, entertainment, cultural, and recreational that are mutually supporting and that include a physical and functional integration of project components, including connected and continuous pedestrian facilities. Areas with the most multimodal potential should have a wide variety of land uses including a solid residential base. The types of areas that are suitable for MMTDs include: urban centers, regional centers, and traditional town or village (FDOT, 2003). These uses were adapted from *Planning for Transit Friendly Land Use, New Jersey Transit, 1994* (New Jersey Transit 1994). In addition to the appropriate scale and mix of land use, the MMTD should have the urban form, or pattern of land uses that promote transit, bicycle, and pedestrian travel, including good intermodal connections.

The 2005 GMRA makes several changes to transportation and school concurrency that may change how they are implemented. At this point it is not clear how many of these changes will affect how communities complete

---

[5] It should be noted that the location of schools and the planning for them within an MMTD is not currently addressed; recommendations for school siting within the context of MMTDs are presented in Recommendations Section of this study.

multimodal planning. The program establishes a Transportation Regional Incentive program that involves a 50% matching program and encourages the establishment of "corridor management techniques, including access management strategies, right of way acquisition and protection measures, and appropriate land use strategies, zoning and setback requirements for adjacent land uses" [§339.2819(4)(b)(3)]. The legislation puts additional focus on the Capital Improvements Element to require that it be financially feasible, updated annually, and ensures that concurrency is satisfied. One source of funding will come from another section in the act that requires local governments to have a methodology that allows developers to pay their proportionate share mitigation for transportation facilities that are contained in the financially feasible Capital Improvements Element. Finally, in §163.3180, the legislation requires that existing TCEAs include strategies "to support and fund mobility within the designated area, including alternative modes of transportation." The strategies must address "urban design, appropriate land use mixes, including intensity and density; and network connectivity plans needed to promote urban infill, redevelopment, or downtown revitalization" (§163.3180).

School Siting

The requirements for school siting have evolved since the early 1990s. When the 1985 GMA was passed, some legislators believed that schools should also be covered under the concurrency requirement; however, schools were not covered in the legislation or the administrative rules in of the early 1990s. In 1992, state legislation was passed that allowed for school concurrency as an optional element of the local comprehensive plan. The ELMS III Committee of 1993 recommended, and the Legislature passed a law requiring, that intergovernmental coordination be required between local governments and school boards. Additional legislation passed that required the completion of a study to determine how the requirement would be met and shared by the affected parties. In 1995, the Educational Facilities Act required school districts to coordinate their information related to school facilities and development with information used by local governments in the comprehensive planning process (Powell, 1997). In 1998, the Florida State Legislature passed a law that lead to the use of coordinated planning data and analysis among school districts and planning agencies to ensure that adequate school capacity is provided to accommodate new development (Powell, 1997). In 2000, the Florida Legislature began to recognize the benefits of smaller schools and took legislative action to direct new school construction to a smaller scale. Among the benefits of smaller schools are reductions in disciplinary problems, truancy rates, dropout rates, as well as improvements in teacher and student attitudes, parental involvement, and academic achievement. In addition, the Legislative findings were that the benefits of smaller schools could be enjoyed without increasing construction and administrative costs. The resulting statute, Bill 235.2157, "Small School Requirements" called for school enrollment limits to be set at 500 students for elementary schools, 700 students for middle schools, and 900 students for high

schools. Additionally, F.S. §235.2157(3)a states that "[b]eginning July 1, 2003, all plans for new educational facilities to be constructed within a school district and reflected in the 5-year school district facilities work plan shall be plans for small schools in order to promote increased learning and more effective use of school facilities". However, in the 2002 rewrite of Florida's Legislation, the small school requirement was not included.

In Florida, legislation was passed in 2002 (SB 1906), which required school boards and local governments to review school siting comprehensively. This legislative action occurred in response to the recurring growth management issue in Florida. In recent years, the legislation has focused on issues such as school siting, intergovernmental coordination, and school concurrency, and its initiatives have committed 3.3 billion dollars to build new schools between 1998 and 2001 (Boles, 2005). When the school district is considering acquiring new parcels for the construction of new school buildings, the current and anticipated needs must be taken into account. The board must consider all local comprehensive plans. District educational facilities are encouraged to develop close to urban residential areas, and should try to locate near public facilities such as parks, libraries, and community centers. Elementary schools, when possible, should be the focal point of a neighborhood (§1013.36(1) F.S.).

Each school site must be of size to accommodate the expected population of the school. Every site must have proper drainage to accommodate playing fields. The site must not be located in the flight path of an airport, the site must not adjoin a right-of-way of any railroad or through highway and must not be adjacent to any factory or other property from which noise, odors, or other disturbances. Sites should be chosen to provide safe access to schools from neighborhoods. It is the responsibility of the board to give proper notice to the municipality or the county, which the school is located in to install proper traffic safety devices. The board must annually check the safety devices to make sure they are functional (§1013.36(4)F.S.).

Interlocal Agreements. Section 163.01 of the Florida Interlocal Cooperation Act of 1969 allows different entities of local government to combine their expertise and skill to create the best possible situations. In 2002, Senate Bill 1906 furthered this collaboration by requiring local governments and school boards to enter into interlocal agreements. These agreements would address issues such as school siting, enrollment forecasting, school capacity, infrastructure, collocation, joint use of civic use and school facilities, sharing of information concerning construction and development information, and dispute resolution through the adoption of Chapter 163 Part 2 and Chapter 1013, F.S. Different school boards are allowed to enter into interlocal agreements to maintain a school together (§1013.52(1) F.S.).

All interlocal agreements must be reviewed and approved by the Florida DCA. There are financial penalties for those who refuse to enter into an

agreement. The department reviews plans for consistency and once consistency is established the Department publishes its findings in the Florida Administrative Weekly. Counties that are not experiencing growth in school age population can be exempt from requirements. Other reasons for exemptions include: no schools in the county, no plans for new schools in 5-10 years, or decrease in school age population. The Florida Senate also appropriated funds for alleviating the financial burden of developing the interlocal agreements.

Each district is qualified to receive a one-time grant for $550,000. To qualify for the grant the district must have entered into contract with the state by December 30, 2002, and must have completed the agreement by whichever came first, the due date or December 30, 2003. More information on interlocal agreements can be found on Florida's DCA website (FDCA, 2005).

School Concurrency. Whereas school concurrency used to be a local option, according to the recently passed Growth Management Reform Act of 2005, school concurrency is now mandatory statewide for all counties in Florida, save those counties that have reached build-out status or are not experiencing growth. With school concurrency mandatory, school facilities must be provided concurrent with new development. To that end, district school boards are required to enter into a school concurrency interlocal agreement with their local government. Consistent with the agreement, local governments must update their local comprehensive plans in order to include a Public School Facilities Element. The Public School Facilities Element consists of objectives and policies regarding the provision of new school infrastructure, collocation of new schools with other public facilities, the location of new schools near residential areas, and the use of schools as emergency shelters. Also part of the Public School Facilities Element, maps indicating the location of new schools and school improvements must be included. The legislation requires that these updates to the interlocal agreements and comprehensive plans must be completed before December 1, 2008. Local governments who do not enter into school concurrency interlocal agreements or do not add a public school facilities element to their comprehensive plan are prohibited from adopting any plan amendments that would increase residential density. School boards' failure to comply with the new legislation bears the penalty of funds withheld by the Florida Department of Education.

In implementing the new legislation, options are available to local governments who may have difficulty providing adequate school facilities. First, in areas where there is a backlog of school construction projects, local governments can develop a long-term school concurrency management system, which consists of 10- or even 15-year capital improvement schedules. Such systems must be financially feasible, work towards meeting the local governments' LOS standards, and remain consistent with the local comprehensive plan. Long-term school concurrency management systems must be approved by the FDCA and must be evaluated to assess LOS progress

periodically. Once these management systems have been approved, local governments can approve developments occurring in areas that have the necessary facilities scheduled in the capital improvement plan (Rebmann, 2005). These options are designed to help local governments meet the requirements of the new legislation.

Developers are also included as part of the most recent 2005 legislation regarding school siting. In order to be granted approval for new developments, developers may pay a proportionate share of the cost of the school facilities improvements that would be required in order to meet the demand created by that development. Developers can pay land or money, build facilities or provide public school facilities mitigation banking credits. These proportionate share payments must be included as part of a binding agreement between the developer and the local government in order to satisfy the new concurrency requirement. Any mitigation payments are to be credited to any existing school impact fees (Rebmann, 2005).

The Growth Management Reform Act of 2005 represents an important step for Florida to manage the shortage of school capacity. In order to ease the new legislation into practice, school districts are encouraged to begin to implement concurrency in districtwide service areas. Five years later school concurrency would be mandatory for less than districtwide service areas. These less than districtwide service areas are the boundaries used by local governments in their comprehensive plans. In order to aid local governments and district school boards in complying with the new legislation, the state has set aside $3 million for technical assistance. The legislation called for the state to create a School Concurrency Task Force, which did not receive an appropriation; the FDCA has a work group that is working on school concurrency and capacity issues to ensure that "schools are built and available when the expected demands of growth produce the need for new school facilities" (FDOT, 2005: 3) and legislative recommendations that will help ensure that school facilities are available as they are needed (Rebmann, 2005).

In addition to the state level School Concurrency Task Force, the Reform Act created two other study commissions that will report to the Legislature. The Impact Review Task Force reported to the state in February 2006 on the current use of impact fees in order to determine if legislation should be passed regarding methodology, payments, accounting, as well as other topics. Also, the Century Commission for a Sustainable Florida was created to "envision and plan Florida's future with an eye towards both 25-year and 50-year horizons and an emphasis on identifying exemplary community-building ideas (FDOT, 2005: 3)." Their first annual report is due in January of 2007.

School Facilities. In Florida, the Office of Educational Facilities does not require school boards to build schools with a particular site size. The OEF recommends acreage minimums outlined in the State Requirements for

Educational Facilities that are somewhat smaller than the generally accepted CEFPI guidelines outlined in the "Background Information" section. According to §1.4 of Florida's State Requirements for Educational Facilities (FDOE, 1999) concerning Recommended Useable Acreage:

"The [school] board should ensure that each site contains at least the minimum useable acreage necessary to meet the needs of the anticipated program as follows:

a) Elementary School. A minimum of four (4) acres for the first two hundred (200) student capacity plus one (1) acre for each additional one hundred (100) students.
b) Middle or Junior High School. A minimum of six (6) acres for the first three hundred (300) student capacity plus one (1) acre for each additional fifty (50) students up to one thousand (1,000) students, plus one (1) acre for each additional one hundred (100) students thereafter.
c) Senior High School. A minimum of seven (7) acres for the first three hundred (300) student capacity plus one (1) acre for each additional fifty (50) students up to one thousand (1000) students, plus one (1) acre for each additional one hundred (100) students thereafter.
d) EXCEPTION: The board may waive these minimum site sizes if a two-thirds (b) majority finds that an appropriate and equitable educational program can be provided on a smaller site.

It should be noted that the information listed above are recommendations in the State Requirements for Educational Facilities, NOT requirements. The FDOE and the Office of Educational Facilities allow decisions about school site selection, including size and locations, to be made at the local school district level, but the FDOE holds the authority to accept or reject these local decisions.

When the Office of Educational Facilities signs a contract to build a new school, the school is officially added to the Florida Inventory of School Houses, or FISH. Some of these standards include level of performance in the following areas: frugal production of high-quality projects, efficient finance and administration, optimal school and classroom size and utilization rate, safety, core facility space needs, cost-effective capacity improvements that consider demographic projections, and level of district local effort.

The legislation requires that each year every school district must adopt an educational facilities plan that includes a long-range plan discussing the projected needs of the district for five years. The long-range plan requires districts to appropriately plan and schedule maintenance of their educational plants and ancillary facilities, and to make certain that their planning provides an adequate number of satisfactory student stations for the projected student enrollment. The Office of Educational Facilities and the SMART Schools Clearinghouse monitor the plan (§1013.35 F.S.).

The Florida Business and Education in School Together (BEST) program was created to allow businesses and schools to partner together to offset cost of educational facilities construction, and to reduce overcrowding in schools. Each school board must advertise and request proposals from area businesses to allow the operation of a business and education partnership school in facilities owned or operated by the business. The legislation requires that each school board have a Florida BEST School Evaluation Committee. This committee will review operating costs, number of students to be served, proposed student-to-teacher ratio, number of years school will operate, and all other costs. A BEST school is defined as a satellite school that offers instruction to students from kindergarten through third grade. The school may choose to teach either one grade or multiple grade levels (§1013.501 and §1013.502 F.S.).

Hazardous Walk Conditions. The location of a school is linked to the safety of the routes students use to travel to the school site. A School Board's school site has notably impacted the local government's surrounding transportation network, especially since children need safe transportation to school. Consequently, the School Board may request county and municipal governments to construct and maintain sidewalks and bicycle trails within a 2-mile radius of each educational facility within the jurisdiction of the local government (§1013.36(5) F.S.). If the board finds a hazardous condition with the 2-mile radius of the school, then it has 24 hours (not including weekends and holidays) to report the hazard to the local government. The local government then has five days (excluding weekends or holidays) to either correct the hazard or provide a way for children to avoid the hazard. The local government may also inform the board in writing the reasons for not correcting the condition, and shall release the board from any liability that may arise from the hazardous condition (§1013.36(5) F.S.).

In the section of the legislation that discusses hazardous conditions, the word "students" is defined as elementary school-aged children under and including the sixth grade. School boards and local governments should work together to identify hazards. The local government has the responsibility of correcting the hazardous condition within a reasonable period of time. The school board has the responsibility to provide transportation to avoid a hazardous condition (1006.23F.S.). The state will provide funding for the transportation of children during the correction of the hazardous condition. This funding will cease once the hazard is corrected, or on the estimated completion date, whichever occurs first.

The state has determined standards for declaring a hazardous condition. The following is an excerpt taken from Section 1006.23(4) of the Florida Statutes describes these standards.

a) *Walkways parallel to the road—*

1. It shall be considered a hazardous walking condition with respect to any road along which students must walk in order to walk to and from school if there is not an area at least 4 feet wide adjacent to the road, having a surface upon which students may walk without being required to walk on the road surface. In addition, whenever the road along which students must walk is uncurbed and has a posted speed limit of 55 miles per hour, the area as described above for students to walk upon shall be set off the road by no less than 3 feet from the edge of the road.

2. The provisions of subparagraph 1 do not apply when the road along which students must walk:

a. Is in a residential area that has little or no transient traffic;

b. Is a road on which the volume of traffic is less than 180 vehicles per hour, per direction, during the time students walk to and from school; or

c. Is located in a residential area and has a posted speed limit of 30 miles per hour or less.

(b) *Walkways perpendicular to the road*—It shall be considered a hazardous walking condition with respect to any road across which students must walk in order to walk to and from school:

1. If the traffic volume on the road exceeds the rate of 360 vehicles per hour, per direction (including all lanes), during the time students walk to and from school and if the crossing site is uncontrolled. For purposes of this subsection, an "uncontrolled crossing site" is an intersection or other designated crossing site where no crossing guard, traffic enforcement officer, or stop sign or other traffic control signal is present during the times students walk to and from school.

2. If the total traffic volume on the road exceeds 4,000 vehicles per hour through an intersection or other crossing site controlled by a stop sign or other traffic control signal, unless crossing guards or other traffic enforcement officers are also present during the times students walk to and from school. Traffic volume shall be determined by the most current traffic engineering study conducted by a state or local governmental agency (§1006.23(4) F.S.).

Crossing Guard Act. The “Ramon Turnquest School Crossing Guard Act” (Section 316.75 Florida Statutes) was passed in response to a seven year-old child being hit by a truck on his way to school in Hallandale, Florida. The Act was passed in 1992 and requires the state to provide uniform training, administered

only by people who have successfully completed state-certified training, for crossing guards in counties that have populations exceeding 75,000. Counties with populations under 75,000 are not required to train crossing guards.

The FDOE was initially given responsibility for implementing the legislation, but due to funding problems this obligation was passed onto the FDOT. Within FDOT, the Crossing Guard Training Program is managed by the State Safety Office, which still maintains functional oversight of the program even though presently it is administratively housed within the Florida Department of Highway Safety and Motor Vehicles (FDHSMV).[6]

School Zone Statutes. The Florida Statutes mandate that the Department of Transportation, "shall adopt a uniform system of traffic control devices and pedestrian control devices for use on the streets and highways in the state surrounding all schools, public and private (§316.1895 F.S.)". Upon the request of the local government, FDOT will install these devices on state owned and maintained roads. The local government is responsible for installing and maintaining the devices on local roads. The statute also mandates that all zones need to be periodically inspected by the municipal police department, the county sheriff, or other qualified agency.

The speed limit in a school zone cannot be less than 15 miles per hour, unless local regulations state otherwise. The speed limit cannot be greater than 20 miles per hour in an urbanized area. These speed limits may only be enforced 30 minutes before, and after school, "the periods of time when pupils are arriving at a regularly scheduled breakfast program or a regularly scheduled school session and leaving at a regularly scheduled school session (§316.1895(5) F.S.)."

Permanent signs must designate a school zone and must clearly state the times of enforcement or must use a beacon to signify the time the school zone is enforced. Portable signs may be used but they must be uniform and only be in place during school zone hours. The speeding fines in a school zone are double that of speeding fines in non-school zones (§318.18(3)(c) F.S.).

A school safety zone includes the area within 500 feet around any elementary, middle, or high school. The principal of the school has the responsibility of notifying the proper authorities to discourage loitering within this zone. No person without legitimate business is allowed within the safety zone prior to one hour before the start of school and one hour after school (§810.0975 F.S.).

---

[6] The State Safety Office is currently working with researchers at Florida State University to revise many aspects of the School Crossing Guard Training program.

Safe Ways to School

Concerning the Safe Ways to School Program in Florida, two pieces of legislation have been passed at the state and federal in the last 5 years. The Safe Paths to School Bill was passed in Florida in 2002, and then at the federal level, SAFETEA-LU was passed just three years later. Generally, the Safe Paths to School Bill establishes a very general framework for a Safe Routes to School Program in Florida, and SAFETEA-LU provides federal funding for such a program.

Safe Paths to School Bill. In 2002, the Florida Legislature passed a bill calling for the establishment of a program in the FDOT to consider the "planning and construction of bicycle and pedestrian ways to provide safe transportation for children from neighborhoods to schools, parks, and the state's greenways and trails system (§335.066(1) F.S.)." This legislation gives FDOT the opportunity to establish a grant program to fund local, regional, and state bicycle and pedestrian projects that support the program (§335.066(2) F.S.). It also states that the department may adopt rules in order to administer the program. Development of such rules to administer a Safe Routes to School program remains one of the purposes of this study. Also in 2002, the Florida Statutes §1013.33 was revised to link educational facilities with the goals of the Safe Paths to School Program, adding to existing legislation that "all parties to the planning process must consult with state and local road departments to assist in implementing the Safe Paths to Schools program administered by the Department of Transportation" F.S. §1013.33(1). Although the legislation requires this consultation, it does not specify how this type of coordination is to occur, nor does it outline consequences for failure to coordinate educational facilities with Safe Paths to School objectives.

SAFETEA-LU. New Federal Legislation for 2005 just passed the SAFETEA-LU (the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users) bill. This bill amends Titles 23 and 49 of the United States Code and authorizes the disbursement of $286.5 billion dollars from 2005 through 2009. This new federal transportation bill (2005) will launch a Safe Routes to School program, and will aid in existing programs to make it safer for Americans to walk and bike (America Bikes Team, 2005). Safe Routes to School is now recognized by the SAFETEA-LU with $612 million in funding over five years, targeting elementary and middle schools. SAFETEA-LU allocates no less than $1 million per year to each state, with 10% to 30% of those funds to be used for non-infrastructure-related activities. A portion of these funds can be used by the state to fund a full-time Safe Routes to School coordinator. SAFETEA-LU also authorizes states to establish a Safe Routes to School Clearinghouse and Task Force (League of American Bicyclists, 2005). Florida is expected to receive approximately $4.5 million in 2006, and $4 to $9 million each year through 2009 (FDOT, 2005).

Related State Agency Efforts

Several state agencies take a direct or an indirect role in the safety of children for their travel to school. This section discusses other agency activities that affect the safety of children on their way to school, the siting of schools, and the development of multimodal transportation planning. On Table 1, the agencies that are involved in various programs related to the Safe Routes to School program are summarized. In the section below, the roles of various state agencies, including various offices of the Florida Department of Transportation, the Florida Department of Community Affairs, the Department of Education, the Department of Health and the Department of Environmental Protection are explored. Finally, activities of other non-state agencies are explored.

Table 1: State Agencies and Programs

	DOT	DCA	DOE	DOH	DEP
Strategic Intermodal System	X				
Strategic Highway Safety Plan	X				
Livable Communities Initiative	X				
FSCGTP[7]	X				
FTBSEP[8]	X				
Systems Planning Office	X				
Funding for Transportation	X				
Regional Transportation Planning	X	X			
Reauthorization of SAFETEA-LU	X	X			
Transportation Concurrency	X	X			
Growth Management Implementation		X	X		
Coordinated School Health Program			X	X	
Funding for Schools			X		
School Facilities Planning			X		
Governor's Obesity Task Force				X	
Office of Greenways and Trails	X				X
Rails to Trails Conservancy	X				X

Activities in the Florida Department of Transportation

Within the FDOT, the Planning Offices, including the Office of Policy Planning and the Office of Systems Planning engage in activities related to multimodal planning and community livability. These projects, which include multimodal planning activities and the Livability Communities initiative, now an initiative of the Environmental Management Office (EMO), are discussed in greater detail below. In addition, the Office of Policy Planning works with the Metropolitan Planning Organizations throughout the state and could assist with the regional efforts that are being implemented throughout the state.

---

[7] Florida School Crossing Guard Training Program
[8] Florida Traffic and Bicycle Safety Education Program

Systems Planning Office. Between 2000 and 2005, FDOT's Systems Planning Office conducted a series of studies to understand how to conduct multimodal analysis and to develop applicable tools. Several studies, which are available on the FDOT website have been used to develop a basis for understanding how to measure bicycle and pedestrian LOS; these include studies of point LOS (Crider, Burden and Han, 2001), why people cross where they do (Chu, Guttenplan and Baltes, 2002), mid-block crossing difficulty (Chu and Baltes, 2001), bicycle through movements (Landis, Guttenplan and Crider, 2003), and assessing LOS across modes (Winters et al., 2001). This research has been incorporated into the bicycle and pedestrian LOS methodologies in the FDOT's Quality/Level of Service Handbook, and the Multimodal Transportation Districts and Areawide Quality of Service Handbook (FDOT, 2003). A Model Regulations and Plan Amendments for Multimodal Transportation Districts document (Williams and Seggerman, 2004) was completed to provide guidance for local governments establishing MMTDs. A study on Multimodal Tradeoffs in Traffic Impact Studies (Steiner *et al.*, 2003) reviews the state of practice of multimodal transportation planning and develops a research agenda for additional study, including this study on the role of SW2S in multimodal planning. That study focuses on best practices in multimodal planning throughout the country but does not focus specifically on multimodal *school* planning.

Environmental Management Office (EMO). The Livable Communities Initiative began with the adoption of the Transportation Design for Livable Communities (TDLC) policy by the FDOT in 1998.; this program was moved to the EMO within the last few years. This policy was created as a commitment by the FDOT to consider TDLC features on the State Highway System when such features are desired, appropriate, and feasible. The intent of the policy is to achieve a balance between mobility and livability through a commitment to the following seven principles:

1. Safety of pedestrians, bicyclists, motorists and public transit users
2. Balancing community values and mobility needs
3. Efficient use of energy resources
4. Protection of the natural and man-made environment
5. Coordinated land use and transportation planning
6. Local and state economic development goals
7. Complementing & enhancing existing Department standards, systems, and processes (emphasis added; FDOT 1998).

Although there is no specific funding allocated to these projects, FDOT and the local governments mutually agree on what treatments are desirable and funding usually results from a joint venture. The FDOT funds the basic elements of a project, and the local government is responsible for financing the difference for upgrades in street furniture, landscaping, lighting, etc. As part of the agreement, local governments sign a Maintenance Agreement to ensure that FDOT will not be responsible for maintaining the upgrade elements mentioned above.

Livable Community Initiative projects have been successfully completed in FDOT District 4, Ft. Lauderdale, and are currently being implemented in FDOT District 6 in Miami as well. The EMO, in conjunction with the State Safety Office, has promoted Livable Community Initiatives in recent months through a series of workshops throughout the state for citizens, planners, elected officials, and developers.

State Safety Office. The FDOT State Safety Office manages several programs that are connected with the Safe Routes to School programs and children's safety, generally. These programs include the Strategic Highway Safety Plan, Florida School Crossing Guard Training Program (FSCGTP), the Florida Traffic and Bicycle Safety Education Program (FTBSEP), which includes Florida's Safe Ways to School Pilot program, and an ongoing study being conducted by the Florida State University Department of Urban and Regional Planning.

FDOT's Strategic Highway Safety Plan, which is prepared by the Safety Office, focuses on the need for pedestrian and bicycle safety education and explains a strategy to implement the Florida Traffic and Bicycle Safety Education Program in either three elementary or middle schools in each FDOT district every year (Strategy #5.3). Other goals in the Strategic Highway Safety Plan include:

1. Keep vehicles in the proper travel lane and minimize the effects of leaving the travel lanes
2. Improve the safety of intersections
3. Improve access management and conflict point control
4. Improve information and decision support systems
5. Improve pedestrian and bicycle safety

Florida School Crossing Guard Training Program (FSCGTP). The Florida School Crossing Guard Training Program was created by the Ramon Turnquest School Crossing Guard Act (§ 316.75 F.S.) in 1992 with the main goal of increasing the safety of children traveling to and from school. It requires the state provide uniform training for school crossing guards in counties with populations greater than 75,000 people. The Act also specifies that only state-certified trainers can train others to be school crossing guards. The Florida School Crossing Guard Training Program is the only program of its type in the nation because it uses standardized state curriculum in its training, consequently raising the professional level of crossing guards both in the counties and statewide (Steiner, Schneider, et al., 1999).

Florida Traffic and Bicycle Safety Education Program. Florida Traffic and Bicycle Safety Education Program is a statewide comprehensive school-based program that teaches school aged children how to safely walk and ride bicycles in traffic. The curriculum addresses four different age groups: elementary school level, middle school, pre-driver, and high school students. The curriculum for kindergarten to second grade focuses on pedestrian and school bus safety, while

students in the third to fifth grades receive bicycle safety instruction, middle school aged children receive training in bicycling handling skills and rules of the road as part of a “pre driver’s education” program, and high school students receive instruction as future drivers by learning appropriate ways to share the road safely and legally with bicyclists and pedestrians. Lessons at each curriculum level involve activities including outside, on-bike practice and inside instruction with interactive videos, activity worksheets, and handouts in how to “share the road” safety with bicyclists and pedestrians.

Regional trainers for the program offer workshops to provide instruction to educators, resource officers, law enforcement officers, firefighters, community leaders, advocates, and volunteers who then go out into their communities and teach the skills to children. The eight to ten hour workshops focus on activities to develop both pedestrian and on-bike skills appropriate for use with physical education classes, after school programs, summer camps, and bicycle rodeos.

Administration of Florida’s Safe Ways to School Program. The Florida Traffic and Bicycle Safety Education Program (FTBSEP) started the “Safe Ways to School” Program in Florida by developing a methodology and toolkit in 1997 and then pilot testing it in ten schools throughout the state in 1998-1999. The pilot project included testing out various tools and survey instruments, testing an implementation methodology and developing recommendations for funding and implementation strategies. Out of the pilot effort a tool kit was created and distributed to school districts through school transportation directors, the FDOE, FDOT, CTSTs, regional planning councils, Bicycle Pedestrian Advisory Boards, and Florida Parent Teacher Associations (PTAs). However, there was no funding directly associated with the program for either infrastructural improvement projects (sidewalks, crossings, signalization, etc.) or for program administration.

The FTBSEP’s “Safe Ways to School” tool kit includes an outline of the procedure for starting a “Safe Ways to School” program and setting up a school traffic safety team. The procedure outlined in the tool kit includes surveys for parents and students, a walkability audit, a school site assessment, and a travel mode survey for how children get to school. The “Safe Ways to School” tool kit also includes recommendations on education and encouragement programs and

gives a “How to” menu for implementing a “Safe Ways to School” Program. The FTBSEP continues to conduct regional workshops annually and to distribute tool kits upon request. The tool kit can be downloaded from the FTBSEP website.

The FDOT Safety Office awarded a grant in 2005-2006 to the Urban and Regional Planning Department for Florida State University to conduct an evaluation of the FTBSEP and the Florida School Crossing Guard Program, and to make recommendations for the best ways to spend anticipated federal “Safe Routes to School” funding.

The Regional Planning Councils, the Metropolitan Planning Organizations, and their respective Bicycle/Pedestrian Advisory boards have been involved at the regional and local level in “Safe Routes to School” initiatives. Broward County, Florida, as part of their long-range transportation plan, selected nine elementary schools to target “Safe Routes to School” programs. They hired a consultant to assist them with the data collection and analysis and setting up the programs. In addition, FDOT District 4, in Broward County has inventoried sidewalk gaps near schools on the state highway system and has made a prioritized effort to correct them. The Volusia County MPO has just completed an initial study of the facilities near ten schools in that county. The Winter Park Bicycle/Pedestrian Advisory Board selected Brookshire Elementary as their pilot school for initiating a “Safe Ways to School” effort. These programs are moving along and are being guided by the University of Florida’s Urban and Regional Planning faculty and the FTBSEP.

Activities in the Florida Department of Community Affairs

The Florida Department of Community Affairs (FDCA) has taken an active role in oversight of land development, and school planning in Florida. The Community Planning Division of DCA is responsible for compliance review of comprehensive plans, comprehensive plan amendments plans, and Evaluation and Appraisal Reports (EARs). They also review Developments of Regional Impact (DRIs), provide oversight of Areas of Critical State Concern and provide technical assistance to local governments in the comprehensive planning process. In response to the 2002 legislation to require intergovernmental coordination between local governments and school boards, the FDCA conducted a statewide research effort on best practices in School Siting with regards to local planning requirements and comprehensive planning efforts. They also review the proposal of local governments for MMTDs and TCEAs.

With the 2005 GMRA, the FDCA is an active participant in the School Concurrency Task Team, the Impact Fee Task Force, and the Century Commission on Growth Management. In additional several interagency work groups have been established to implement various parts of the GMRA of 2005. The FDCA has a new funding for the Classroom for Kids and the High Growth

County District Capital Outlay that will be distributed to school districts throughout the state based upon funding formulas in the legislation.

Activities in the Florida Department of Health

The Florida Department of Health (FDOH) has been actively involved in the issues associated with childhood obesity and the decrease in physical activity among children. They staffed the Governor's Task Force on the Obesity Epidemic in Florida. The Report of the Governor's Task Force on the Obesity Epidemic in Florida (FDOH, 2004) provides several recommendations that speak directly to the goals of the "Safe Routes to School" and multimodal planning strategies. They are as follows:

- Lifelong Physical Activity Opportunities: The task force strongly recommends that communities promote access to lifelong physical activity opportunities by working with local governments, planners, land and real estate developers, organizations and associations, clubs and other policy making agencies within the community. Communities must review local environments and assess where improvements for physical activity opportunities may be implemented and should invest in bicycle and pedestrian infrastructure and review of transit-oriented development to promote 'walkable' and 'bikeable' communities and should review long-term planning efforts to ensure that numerous physical activity options are available to residents for safe areas to exercise and play. Communities should consider interventions that promote creating, strengthening and maintaining social networks, use of 'buddy' systems, personal contracting, and walking groups. Communities should consider investing resources in efforts to assist family and community members to work with and mentor to youth to promote leadership and positive role models (FDOH, 2004: 24).

- Accommodating Bicycles and Pedestrians: The task force recommends that the state and local agencies responsible for community planning ensure that policies are routinely considered for accommodating pedestrians and bicyclists and others who share the roadways and pathways in each community and ensure the communities have bicycle and pedestrian development plans as part of their planning process for new construction. These agencies must also advocate for improved planning for new construction and determine the possibility of retrofitting current communities to designate safe areas for adults and children to exercise and play. This includes improvements for sidewalks, street lighting, traffic calming, and other environmentally safe constructs that encourage physical activity (FDOH, 2004: 24).

- Physical Activity Education: The task force strongly recommends that school districts elect to include formal curriculum on physical activity and physical education instruction in kindergarten through twelfth grades. Teachers will be given education and training on how to model physical activity behaviors; trained on the importance of building positive physical habits during school and away from school; and empowered to facilitate educational opportunities with other school program offerings to support and sustain lifelong physical activity. Physical activity and physical fitness education will be incorporated into various curricula including, but not limited to, math, science, home economics and language arts and will be linked to the Sunshine State Standards where possible. Physical activities will be integrated into other education opportunities both inside and outside of the classroom. Teachers, administrators and other school personnel will all collaborate on creating a positive physical activity environment (FDOH, 2004: 27).

- School Provision of Physically Active Opportunities: "The task force strongly recommends that school districts elect to enforce and monitor compliance with the current Centers for Disease Control and Prevention physical activity guidelines as they relate to school offerings. Where possible, standards should also be incorporated by schools to manage those activities not currently covered under these federal guidelines such as before and after school activities, school field trips and programs and other school fitness offerings. School districts should aim for providing numerous and creative physical activity selections such as dance, aerobics and weight training and should be encouraged to seek input from students on the types of offerings that appeal to them. Schools should reinstate regular recess periods (age appropriate) to encourage daily physical activity. Schools should investigate the possibility of using different methodologies and technologies to encourage students to increase their physical activity such as pedometers or interactive physically oriented computer programs and other devices. Schools should; address adaptive physical activity issues related to students with disabilities and/or special needs and provide opportunities for individual fitness activities also with organized group sports. Schools should work with local transit and community planning organizations to ensure safe routes to schools so that students and staff can walk or ride bikes to school. School clubs similar to school service clubs should be considered to support physical activity and fitness for those students who do not compete in organized school sporting activities. Schools should review local policies for utilizing school grounds and determine liability issues to support offering school physical fitness facility access to students and staff before and after school hours for activities other than organized sports (FDOH, 2004: 26).

Coordinated School Health Program. Florida's Coordinated School Health Program was established to enable the Florida Department of Education and the Florida Department of Health to collaborate with other state agencies to promote the health and well being of Florida's school children. The program has two main goals. Its first goal is to help state and local education agencies incorporate health education as part of an overall school health program using prevention education directed at youth health problems and health risk behaviors. The second goal is to strengthen the capacity of state education and health agencies to establish coordinated school health programs locally.

Other Efforts

For the Safe Routes to School programs to be successful, other statewide and community organizations need to be involved; the research team identified a few such organizations. The Rails to Trails Conservancy, in conjunction with the Office of Greenways and Trails of the Florida DEP, has been very involved in the "Safe Ways" or "Safe Paths" to school effort and was a major force in getting the 2002 legislation passed. They continue to be interested in furthering the Safe Routes to School program. The Safe Kids Coalition and other safety-focused organizations have been involved in advocating for safe access to schools.

Case Studies and Best Practices

This section presents best practices in multimodal planning, coordinated school siting, and Safe Routes to School. The multimodal practices described below include the Multimodal Transportation Districts and Quality of Service Handbook (FDOT 2003) and the ISPAC (Integrated Planning for School and Community) planning process, which is a research methodology developed by researchers in North Carolina. While there are many examples of multimodal planning throughout the country (see Steiner *et al.* 2003 for detail on these practices), few of these multimodal planning tools are directed specifically at multimodal planning for schools. Interviews with knowledgeable key informants suggest that best practices in multimodal planning derive from proper attention to school siting, developing multimodal environments generally and Safe Routes to School programs. The school siting section outlines cases at the state and national level that have exemplary processes for selecting good school sites that are conducive to pedestrian and bicycle modes. Likewise, the Safe Routes to School section identifies case studies of programmatic initiatives across the country and the globally that have demonstrated their effectiveness. For school siting and Safe Routes to School, best practices have been selected based on the case studies explored in the following sections.

Multimodal Planning

Florida's Multimodal Transportation Districts

The characteristics of MMTDs are important to school transportation because they create the kind of environment that favors children walking or bicycling to their schools. These districts are characterized by community design standards and mixed land uses that ensure a good pedestrian environment and mobility, and discourage the type of automobile centered development that constrains physical activity. These characteristics are expressed in the MMTD handbook as four main criteria for MMTD designation, and they include 1) a complementary mix of land uses, 2) appropriate density and intensity of these uses, 3) network connectivity of bicycle and pedestrian routes, 4) urban design standards that improve the bicycle/pedestrian environment, and 5) additional considerations, which include schools. Below is a brief summary of the MMTD, as outlined in the Florida Department of Transportation's Multimodal Transportation Districts and Quality of Service Handbook (FDOT 2003)

- MMTD

An MMTD is an area designed to use the relationship between transportation, land use, and urban design in order to create environments that encourage multiple modes of transportation. The main goal in the creation of MMTDs is to use the transportation-land use-urban design relationship to reduce automobile usage and vehicle miles traveled.

- Creation of MMTDs

MMTDs can develop on one of two tracks. The first track is for a proposed district in an already developed area, with a focus on enhancing the existing elements of the district. The second track is for new developments located outside of the traditional core. For these new MMTDs, the emphasis lies in incorporating the necessary elements for designation, and the establishment of regional connectivity to existing centralized areas.

- Characteristics of an MMTD

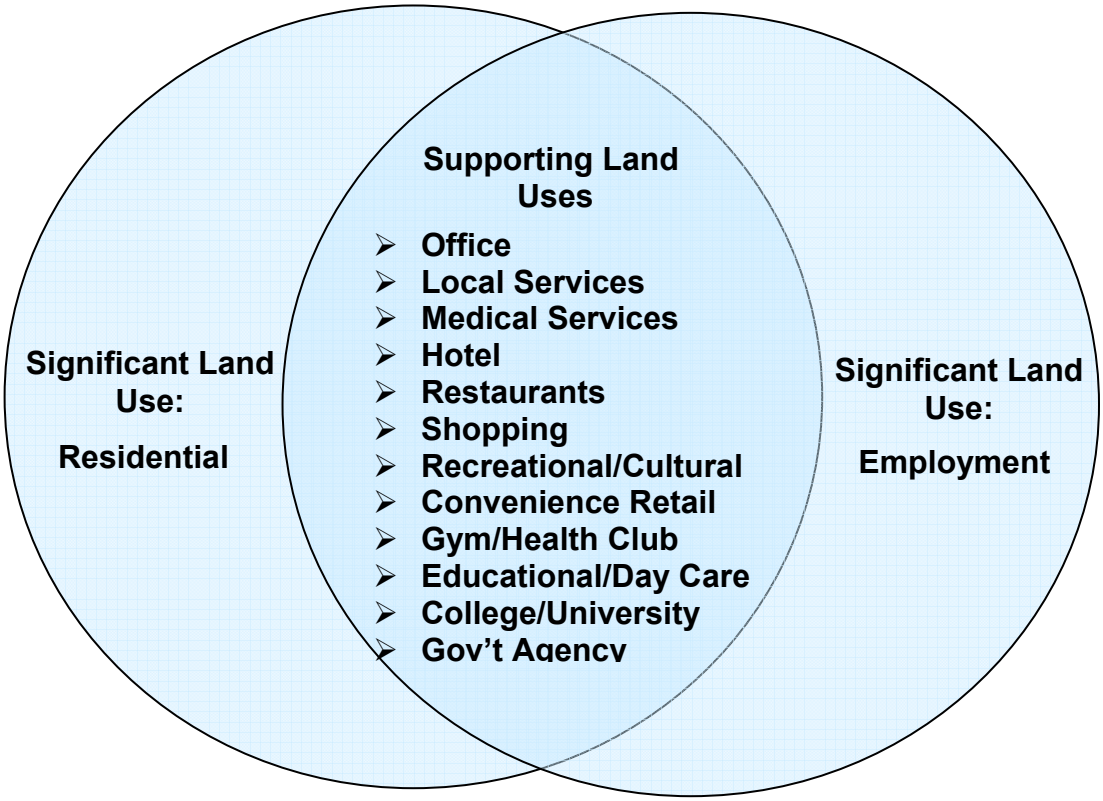
MMTDs are characterized by community design standards as mixed land uses that ensure a good pedestrian environment and mobility, as well as providing convenient connections to transit. The concurrency determinations within a district should be based on multimodal performance measures that consider all available modes of transportation, not just automobiles. Good candidates for MMTD designation have a mix of mutually supporting land uses, good urban design, good multimodal access and connectivity, interconnected transportation network, and the provision of alternative modes (other than

automobiles). Conversely, poor candidates exhibit a single land use, a poor transportation network (a large number of cul-de-sacs, for example), few accommodations for pedestrians and bicyclists, and no transit service. The main criteria for MMTD designation are listed and explained below:

1. *Complementary Mix*

In order to have a complementary mix, the district must exhibit three main qualities. First, the district must contain an appropriate scale of development. More precisely, the appropriate scale of development requires a minimum residential population of 5000, a ratio range of 1:1 to 3:1of population to jobs, and the provision of scheduled transit service. Second, the district must contain a mix of land uses that are mutually supporting. An appropriate mix of land uses means that the district must contain not only significant land uses (such as office, medium to high density residential, educational uses), but also supporting commercial land uses as well (such as theaters, restaurants, retail, or light industry). Figure 10 below shows the relationship between significant land uses and their supporting land uses. These land uses must be interconnected with pedestrian facilities. Third, MMTDs must contain transit and pedestrian design both within the district and to the central core. This design must include such pedestrian friendly design as architectural variety, visual interest, security, and an increased sense of community. Pedestrian-friendly design also includes pedestrian accessibility between residences and destinations, while limiting pedestrian trip distances to encourage walking. Walking times should be limited to a maximum of 25 minutes (about 1.25 miles) for work, 20 minutes (0.5 to 1 mile) for social and recreational purposes, and 10 minutes (0.25 to 0.5 mile) for shopping trips.

Figure 10: Land Uses and Multimodal Compatibility
Source: FDOT, 2003, p. 23



2. Appropriate Density and Intensity

In addition to providing a complementary mix of land uses, these uses must also be of the appropriate density and intensity. MMTDs should provide higher density development organized around a central core, with density being greatest at the central core, and lessening out to the edges. The central core should consist of a mix of high-density land uses that include commercial, retail, residential, and institutional properties up to 0.25 mi. from the center. Between 0.25 mi. and 0.5 mi., medium-density land uses should encircle the central core with townhouses, garden apartments, retail, and service uses. Land uses more than 0.5 mi. from the center should be low-density such as single-family residential, retail, and service. These central cores should be organized along major corridors, with the highest density of any land use located along the corridor, and lessening with distance from it in order to maximize walkability to activity centers.

3. Network Connectivity

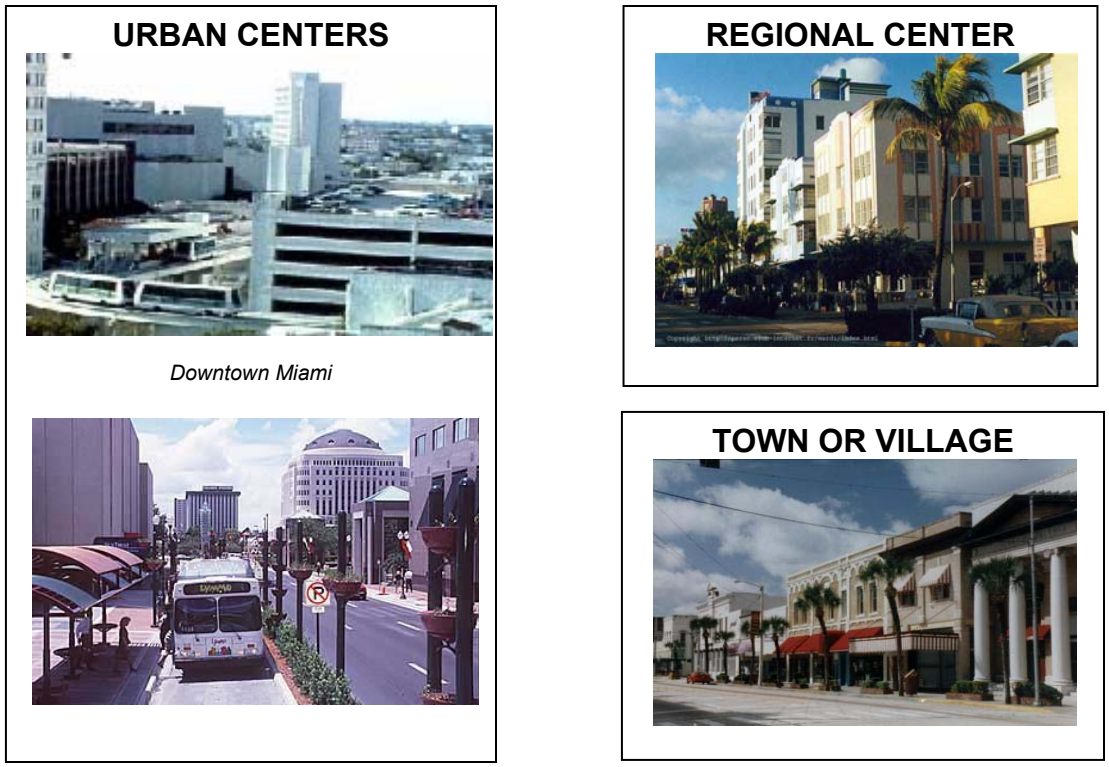
Network connectivity specifically applies to pedestrian, bicycle, and transit—not just automobiles. Network connectivity is accomplished through the provision of roadway patterns that accommodate all forms of transportation. Such a network would avoid meandering streets with dead ends that limit transit,

pedestrian, and bicycle access. Instead, MMTDs promote direct access routes for pedestrian and bicycle modes, and transit within walking distance of activity centers. MMTDs promote multiple modes by encouraging under-used pedestrian and bicycle modes by protecting pedestrians and cyclists at major roadway crossings, as well as through streetscaping that improves the pedestrian or cyclist's travel experience.

The FDOT measures how well a street pattern is organized for any particular travel mode through the use of a connectivity index. The connectivity index is determined by the polygon methodology, which is more thoroughly explained in the Multimodal Transportation Districts and Quality of Service Handbook (FDOT 2003). Basically, a modal network (pedestrian network, for example) is identified, and then the number of polygons contained in that network is counted. From examining communities with excellent connectivity, the FDOT determined that a minimum of 50 polygons per square mile is acceptable for a proposed MMTD. The polygon methodology can be used to measure network connectivity for any modal network.

Because network connectivity is such an important aspect of an MMTD, areas with greater network connectivity are better suited for MMTD designation. These areas tend to have shorter block size and mid-block crossings as well. There are three main areas that exhibit this pattern: urban centers, regional centers, and traditional towns/villages. Large developed urban areas with dense street patterns characterize urban centers. Regional centers are similar to urban centers, only smaller. Traditional towns/villages are communities organized around a focal point with a strong sense of community. These places exhibit the most potential for MMTD designation. Examples are shown below:

Figure 11: Potential Multimodal Transportation District Examples
Source: FDOT, 2003, p. 19



Although connection within modes is important, connection between modes is also of major importance in MMTDs. Pedestrians and bicyclists need easy access to transit, amenities at transit stops, accommodations for bikes on buses, and mid-block crossings. In addition, they need to have connections to regional intermodal facilities, including express buses, inter-city buses, train stations, and airports.

4. *Design*

The MMTD Handbook operates on the premise that every trip begins with walking regardless of the final mode choice, and that the design of the pedestrian environment should encourage the continuation of that walk. This pedestrian environment should be active, visually pleasing, interesting, and safe. It should be connected to transit through stations or stops that are well situated for travel to activity centers. The stops themselves should be safe and comfortable for users, and should be located at or within a walkable distance to major attractions and trip destinations. Automobile parking should be provided for transit access, but only on the outskirts of MMTDs because automobile traffic can deteriorate the pedestrian fabric. For the same reason, MMTDs should also restrict automobile use within the district by providing shorter block lengths. Shorter block lengths both increase network connectivity and give pedestrians more opportunities for crossing. These design elements can ameliorate the pedestrian

environment to encourage walking, bicycling, and transit in lieu of automobile use.

5. *Additional Considerations (including schools)*

As mentioned in the Multimodal Transportation District and Areawide Quality of Service Handbook, "schools are land uses with very high pedestrian, bicycle, and transit potential (FDOT, 2003: 14)." As a result, schools deserve special consideration for the designation of an MMTD. For K-12 schools, heightened safety standards for planning and design are necessary in order to protect younger walkers, bicyclists, and bus riders.

Focusing on Bicycles and Pedestrians

One of the most important aspects of an MMTD is transportation LOS by mode. LOS is a performance measure defined as a range of values from "A" to "F", with "A" being the best and "F" being the worst. Based on a variety of characteristics, the LOS is calculated and then used to show how well a transportation segment functions for its intended purpose. Although MMTDs address automobiles, they focus more on transit, pedestrian, and bicycle modes; because *Safe Routes to School* focuses on pedestrian and bicycle modes, they will be the focus of our discussion as well. The LOS criteria for bicycle and pedestrian modes are different that those used in determining automobile LOS. For pedestrian travel, the LOS is based on the pedestrians' perception of safety and comfort, with each factor weighted by relative importance. These factors include:

- Availability of sidewalks
- Lateral separation elements between the pedestrian and motorized traffic
- Motor vehicle traffic volume
- Motor vehicle speed

For bicycle LOS:

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

In MMTDs, the FDOT recommends a minimum LOS of a C for pedestrian and transit modes, and a D for bicycle mode in transit-oriented developments.[9] If the district is non-motorized oriented, bicycle LOS must be C or better, and a LOS D for transit is acceptable. The transit oriented and non-motorized oriented scenarios LOS variations represent the tradeoff between transit and bicycle LOS in each respective situation. In any case, the LOS C or better for pedestrian, bicycle, and transit modes is the baseline LOS in MMTDs.

The service area for walking and bicycling to school is a 2-mile radius as established by Florida's requirements for school bus transportation for students. The MMTD Areawide QOS Handbook recommends a "LOS B or better" for these modes "along major access routes to schools", and "special consideration of pedestrian and bicycle LOS in the school zone." The elevated LOS in areas surrounding schools reflects the need for additional safety requirements associated with a younger, more vulnerable population. In order to achieve this high LOS in the 2-mile zone surrounding schools, our recommendations will focus on specific manipulations to the factors mentioned above that influence pedestrian and bicycle LOS.

As discussed previously in the "Existing Florida Legislation" section examining multimodal planning, the 2005 GMRA has incorporated many of the strategies described above into new requirements for the establishment and evaluation of TCEAs. Specifically, in §163.3180, the legislation requires that existing TCEAs include strategies "to support and fund mobility within the designated area, including alternative modes of transportation." The strategies must address "urban design, appropriate land use mixes, including intensity and density; and network connectivity plans needed to promote urban infill, redevelopment, or downtown revitalization" (§163.3180). Additionally, the new legislation allows the use of TRIP funds for TCEAs as well. Currently, the Department of Community Affairs is working to establish guidance for local governments to follow as they strive to meet the requirements of this new legislation. At this point, it is not clear how many of these changes will affect how communities plan for multiple modes. Nevertheless, the 2005 GMRA makes TCEAs more similar to MMTDs, which represents an important step toward engaging more local governments in multimodal planning.

Integrated Planning for School and Community (IPSAC)

Another practice that combines the best practices for both multimodal planning and school siting is a planning process known as Integrated Planning for School and Community (IPSAC); this process provides school districts with

---

[9] LOS standards for each of the modes are determined through analysis that is described above. Like the roadway LOS measures, the LOS measures for each mode range from "A" to "F," however, they are not directly comparable. See *Winter et al 2001* for a comparison of LOS across modes.

“mathematically optimal solutions that minimize transportation distance” (Tsai and Miller, 2005). The process aims to forecast student enrollment at the school level to achieve this end. It begins forecasting student enrollment by looking at historic student enrollment at existing schools and conducting a land use study of the school district to determine future enrollment produced by area growth. These two sets of information are then integrated to yield a final enrollment forecast for each school building known as an *Out-of-Capacity Worksheet*.

IPSAC breaks down student enrollment and population forecasting by dividing school districts into planning segments consisting of 50 to 100 students, with all of the students in each segment assigned to the same school. Planning segment boundaries are designed to incorporate a variety of factors, including neighborhood boundaries and travel safety. These planning segments are the “building blocks” of school attendance boundaries, and serve also as the unit of analysis in the IPSAC process (Tsai and Miller, 2005). Student enrollment is forecasted by planning segments within school districts, and then each planning segment is assigned a school with the aim of minimizing transportation distance.

A land use study of the area surrounding the school district complements the IPSAC process. The land use study includes both community interviews and analysis of Geographic Information Systems (GIS) data. For the interview portion of the study, researchers receive input from planners, developers, realtors, and others who have knowledge of future land development in the area including new infrastructural and residential plans and permits (Tsai and Miller, 2005). For the GIS portion, the program examines the types of structures on each parcel to provide information that is used to calculate a student generation rate (SGR) for a particular area. This information is then used in conjunction with the interviews to determine where and how fast students are being generated. This detailed student population information is then used to determine mathematically optimal school sites and attendance boundaries that can balance transportation distances, demographics, or any other characteristic a school district may select over another. Using these values, GIS can be used to isolate specific “target areas” for new schools, which may or may not contain actual available parcels (Tsai and Miller, 2005). The land use study uses a two-pronged approach of community interviews and GIS analysis to locate optimal school sites and set attendance boundaries.

IPSAC’s innovation lies in its ability to incorporate a variety of factors into an objective, yet flexible site selection process. By using both a community element and a GIS element to produce student enrollment forecasting, IPSAC is able to produce more accurate student enrollment forecasts that are broken down to a manageable, school level. IPSAC manages to provide objective information to decision makers, yet maintains the flexibility decision makers need by offering target areas for new schools.

As of April 2005, IPSAC has been used in 30 school districts in North Carolina, and one school district South Carolina for school siting purposes, but none have incorporated active transportation as a factor thus far. Tsai and Miller (2005) have traced this exclusion back to a lack of accurate data supporting the need for alternate modes, and a poor understanding in general of the impacts of school siting on the greater transportation network. Although IPSAC has been used to site schools based on other factors important to school districts, active transportation factors have not been included in any school site selection.

School Siting

When it comes to coordinating school siting and planning between school districts and local governments, Florida's recent legislation requiring interlocal agreements is relatively different from many other states in the nation.

Orange County, FL – Capacity Review

Although Florida state law requires interlocal agreements, Orange County takes the goals of the agreements a step further by requiring capacity review. According to the 2004 issue of the Planning Commissioner's Journal, Orange County has one of the fastest growing school systems in the country, with 5,000 new pupils each year. With the county's population growing so fast, good planning is essential in providing residents with public schools near their homes.

To keep up with the fast growing demand for schools, Orange County staff and Orange County Public Schools collaborate to evaluate changes in land use and zoning that would affect school capacity. If schools serving a proposed development would be pushed over capacity, the developer is responsible for entering into a "Capacity Enhancement Agreement" with the public school system. As part of the agreement, the developer is responsible for paying school impact fees in advance in addition to contributing to pay for classroom capacity changes. As of 2004, Orange County Public Schools have made over 60 such agreements and secured funding agreements topping $93 million (Torres and Rigby, 2004).

In addition to the Capacity Enhancement Agreements, Orange County is also promoting walkability in its school planning. The new Horizon West development's plan includes the requirement that all new homes be no further than a half mile from elementary schools. Developers must contribute land for schools and other public facilities before developments can be approved. As a result, Orange County produces a concerted effort by the county and school board to promote walkability in its new school construction plans by locating schools closer to residences (Torres and Rigby, 2004).

Orange County's Capacity Enhancement Agreements are innovative because they accomplish many of the same goals as concurrency, and proved

effective at generating the necessary funding for schools. The county's commitment to concurrency ensures its involvement and regulation of new and existing residential development, school construction, and their supporting networks of sidewalks and roads. The agreements ensure local governments remain involved in every step in the process from plan to project completion.

Palm Beach County, FL – School Siting in a Fast Growth County

Palm Beach County was the only county in Florida to practice school concurrency before it was mandated. Between 1990 and 2000, the population of Palm Beach County grew by 31%, which was 8% higher than the state's average. With a student population of over 175,000, Palm Beach County School District is the ninth largest in the nation—and the growth is not expected to stop. By 2009, the county is expected to add an additional 28,000 residents, with the student population growing at a rate of approximately 5,000 students per year (Usher, 2005). Palm Beach's growth provided an early impetus for implementing school concurrency.

Modeled after transportation concurrency, school concurrency in Palm Beach County has proved to be a successful tool in meeting school facilities goals for the county. In 2000, half of all schools were overcrowded, according to the Florida Inventory of School Houses (FISH), which tracks school facilities and capacity throughout the state (Usher, 2005). In 5 years, the school district was able to significantly improve their capacity problems with only a few exception areas with solutions planned (Usher, 2005). Palm Beach County's successful implementation of school concurrency can be used as an example for other fast-growing Florida counties.

The concurrency model in Palm Beach County consists of three key components: 1) coordinated planning, 2) a five-year financially feasible capital improvements plan, and 3) strong regulatory review. Coordinated planning involves sharing information on population growth between local governments and the school board. This information is crucial to sound planning because all parties involved must know how much growth is occurring, and where that growth is located in order to provide public schools (Usher, 2005). The five-year capital improvements plan is then designed to meet the facilities needs for the anticipated growth in school-aged children through provision of additional school capacity. The plan takes into account the location and amount of population growth and defines, in advance, the source of funding for any needed improvements (Usher, 2005). Strong regulatory review refers to the residential development review on the part of the School Board as well as representation at public hearings. By representing itself in matters regarding residential growth, the School Board is able to confirm or deny adequate school capacity (Usher, 2005). These three components comprise Palm Beach County's effective school concurrency model.

The Palm Beach County School Board attributes its success in implementing concurrency to five main reasons. First, objective oversight in the school planning process by the technical advisory group, or TAG, was crucial in resolving disputes. Second, school district review of all residential applications allowed the school district leaders to maintain a working understanding of where students would be coming from, and in what concentrations. Third, strong accountability on the part of local governments and the School Board for their respective roles was a crucial component. Fourth, the population subcommittee was crucial in determining with reasonable accuracy where and when students would start school so that adequate schools could be provided in a timely manner. Finally, collaborative mapping and data gathering allowed the county to distribute its school construction funds to meet school demands. These main characteristics of Palm Beach County's school siting were identified as crucial to their successful school concurrency implementation (Usher, 2005).

Duval County, FL – Colocation and Joint Use

Duval County's interlocal agreement is rooted in support of co-location and joint use of City of Jacksonville (the City) and Duval County Public School (DCPS) facilities such as parks, schools, libraries, and community centers. The agreement outlines the two parties' commitments to co-location, as well as joint use. The agreement calls for the completion and yearly maintenance of a "joint use matrix" that shows which facilities are available for joint use, and commits to making such information readily available to the public. In addition, the interlocal agreement requires a smaller agreement, known as a "Memorandum of Understanding" between the City and DCPS. The Memorandum of Understanding outlines the terms of the joint use agreement, which must be approved by both the City and DCPS. The agreement may include topics such as liability, staffing, hours, prices, maintenance, or any other number of areas of concern.

Duval County's approach to co-location and joint use represents a commitment to the mix of complementary land uses that is so important in multimodal planning. Siting a school near a complementary use such as a library helps create the kind of community environment that makes places walkable. In addition, co-location and joint use are a more efficient means of using public facilities. For example, the use of a school playground as a public park after school hours maximizes the use of the land and allows city funds for parks can be spent elsewhere. Duval County's co-location and joint use agreement represents a best practice in Florida because of its efficiency and promotion of complementary land uses found in a multimodal environment.

Martin County, FL – Objective School Siting

Martin County, like all counties in Florida, was required to enter into an interlocal agreement with the district school board and the local municipalities.

As part of this agreement, the county has outlined a process for school site selection that includes stakeholders in a relatively objective manner. The site selection process is able to remain objective while still incorporating the main values of the community.

Martin County's site selection process is based on a weighted point system used to rank potential school sites for consideration. Sites are selected by a Technical Advisory Committee (TAC) that is comprised of five members representing the following stakeholders: two members appointed by the School Board, two members appointed by the County, and one member appointed by the City the school will serve. These members meet to discuss anywhere from three to five potential school sites that are ranked according to how they meet the community's goals in five main areas of concern: walkability, complementary uses, sustainable community design, infrastructure, and efficiency. First, the School Board notifies the TAC that a school site is needed, including what type of site (elementary, middle, or high school site) and the geographic area the school is intended to serve. The process uses a matrix worksheet (see Appendices B, C, and D) with the above-mentioned categories to assign weighted point values to each of the respective sites. The TAC is able to use this matrix and the criteria to remain objective, while assigning priority to some sites over others. Because the selection criteria are based on factors important to the community, the highest-scoring sites reflect those common values.

Martin County's school site selection process is an innovative practice because it maintains objectivity, involves stakeholders, and reflects the values of the community. The TAC members represent the stakeholders, and by using the point matrix, the TAC can remain objective in its decisions. Because the site selection criteria are based on community values, the sites selected also reflect these values. Martin County's interlocal agreement is effective at outlining a considerate, objective, and involved school site selection process.

Maine – Revolving Renovation Fund and Site Size Maximums

Between 1970 and 1995, the state of Maine had lost approximately 27,000 students from its elementary and secondary public schools, and yet the state had continued school construction projects. From 1975 to 1995, Maine committed $727 million to new school construction or renovation, and yet approximately 46% was used to build new schools in areas that encouraged suburban sprawl. This trend was created in part by the state's funding policy that provided funding only for new school construction, and by a lack of coordination between school planners and local land use planners (Valle, 2003).

In response to the cost of school construction, the Legislature made changes in state policy that would ultimately result in better-coordinated school planning originally by curbing new school construction costs. First, in 1998, the Legislature created the Maine School Facilities Program and School Revolving

Renovation Fund, which are governed by funding policies that favor school renovation projects over new school construction projects to accommodate Maine's student population. The Maine School Facilities Program requires each school administrative unit to develop and maintain a facility maintenance and capital improvement program that includes a plan for each building in the unit. This plan includes scheduled maintenance and replacement of all major building systems (e.g., HVAC, plumbing, electrical, roof). The School Revolving Renovation Fund was established "to make loans for school renovation projects that contribute to safe, healthy, and adequate school facilities" for school administration units (Code of Maine Rules, 2000: 9). The School Revolving Renovation Fund prioritizes the projects, with first priority renovations relating to health and safety, second to structural and system improvements, and third to learning space upgrades. These new programs were created in Maine to encourage renovation over new school construction, which the state recognized as a partial contributor to sprawl.

Maine State Legislature also changed the way the State Board of Education reviewed new school sites by making it more difficult to build new schools as opposed to renovating older schools, in keeping with Maine's goal of controlling urban sprawl. Effective in 2001, when reviewing a request for a site approval, the State Board of Education must consider "a comprehensive and complete 'Renovation-vs-New-Analysis' of the existing building and site; community involvement in the selection process; site development costs, both on and off the primary location of the project; the impact on student transportation, vehicular traffic and student safety", among other things (Code of Maine Rules, 2001: 1). In addition, the State Board of Education must consider school administrative unit's selected sites located within "a locally designated growth area identified in the municipality's comprehensive plan (Code of Maine Rules, 2001: 2)." For areas without a comprehensive plan to identify such an area, the State Board of Education must consider approving sites located in "a compact area of an urban compact municipality," with the requirement that if school administrative units choose not to locate within these preferred areas, they must provide a written explanation of their alternate site selection before the request can be reviewed by the State Board of Education (Code of Maine Rules, 2001: 2).

In addition, Maine also passed Legislation discouraging sprawl growth caused by schools by changing the state's site size requirements. Many states in the U.S. have provisions outlining a school site size minimum, or "minimum acreage", as discussed previously (see School Siting), and Maine is no exception. The minimum acreage requirements for schools in Maine are markedly smaller in size than the traditionally accepted sizes, though slightly larger than Florida's site minimums. Although Florida has smaller minimum site sizes, Maine keeps school sites small by capping their size with site size maximums as well. These formulas for calculating site size are listed in Table 2 below:

Table 2: Comparison of School Site Size Formulas
Source: Weiss, 2001; Code of Maine Rules, 2005; FDOE, 1999.

SCHOOL TYPE	STANDARD SCHOOL SITE SIZE FORMULAS (In Acres + Acres / # of additional students)			
	CEFPI Min.	**Florida's Min.**	**Maine's Min.**	**Maine's Max.**
Elementary	10 + 1/100	4/200 + 1/100	5 + 1 / 100	20 + 1 / 100
Middle	20 + 1/100	6/300 + 1/50 (up to 1000, then 1/100 thereafter)	10 + 1 / 100	25 + 1 / 100
High School	30 + 1/100	7/300 + 1/50 (up to 1000, then 1/100 thereafter)	15 + 1 / 100	30 + 1 / 100

Figures 12 and 13 below compare the school site sizes that result from the various formulas in Table 2, reflecting elementary and middle school sites, respectively. Whereas Florida and the CEFPI both recommend minimum site sizes, Maine requires that school site sizes fall between the specified minimum and maximum site sizes. Additionally, Maine's maximum school site sizes for middle schools are approximately the same size as the minimum school site size recommended by the CEFPI. In relation to Florida's site sizes, minimum middle school site sizes are smaller in Florida for schools with less than 1000 students, and nearly identical for student populations above 1000 students.

Figure 12: Comparison of Elementary School Site Sizes
Source: Weiss, 2001; Code of Maine Rules, 2005; FDOE, 1999.

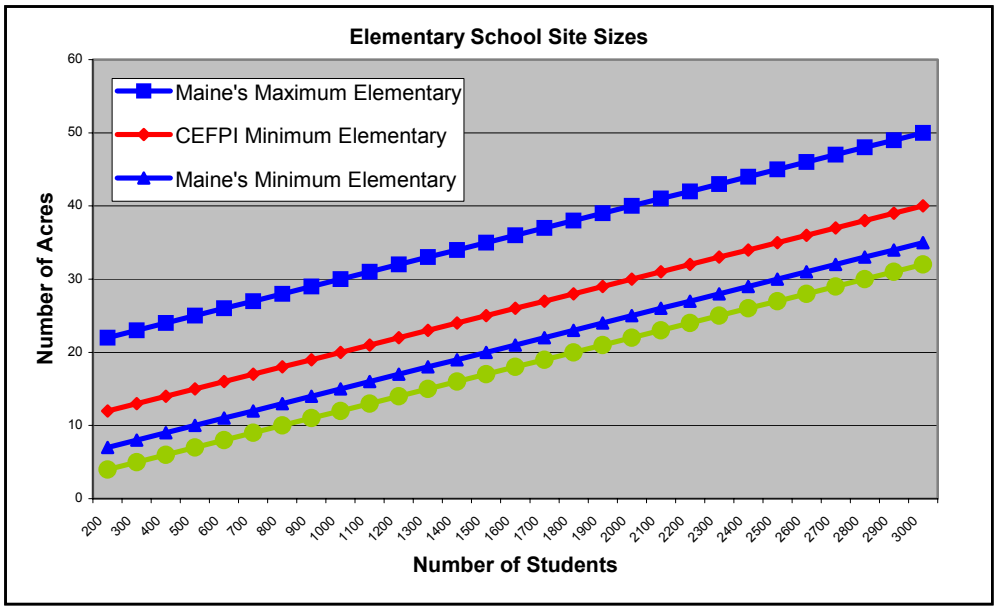
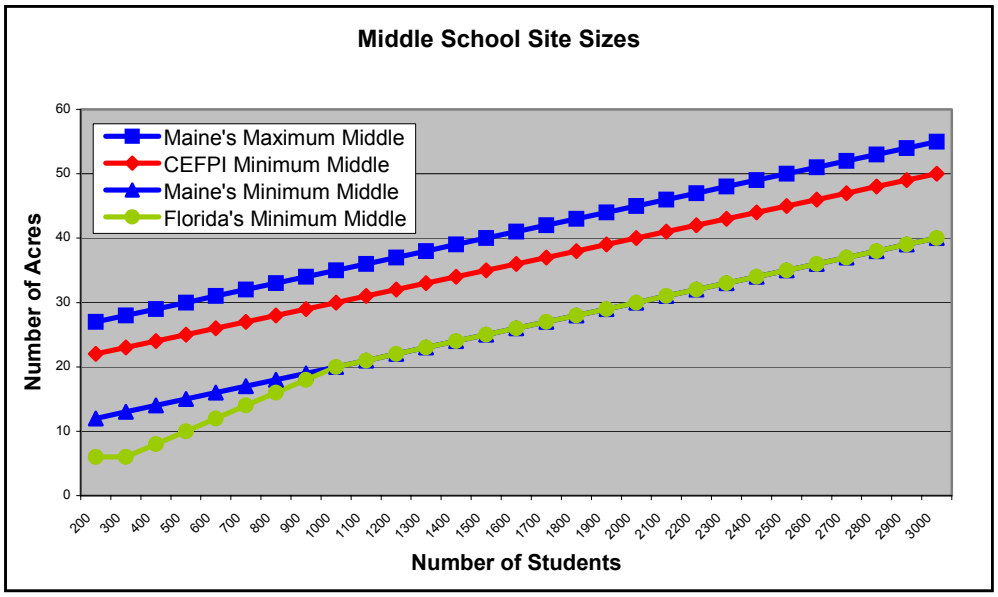


Figure 13: Comparison of Middle School Site Sizes
Source: Weiss, 2001; Code of Maine Rules, 2005; FDOE, 1999.



As part of this process of school siting reform, the State Board of Education, the Department of Education, and the State Planning Office began working together early in the planning phase to provide school districts and municipalities one-on-one assistance with school facility decisions involving improvements and plans for growth. From this experience, these agencies developed a brochure, the ABC's of School Site Selection, "to help districts, communities, and architects consider the interrelation of school facility decisions and sprawl (Valle, 2003: 2)."

Maryland – Renovation over New Construction

Maryland's State Public School Construction Program has also taken steps to keep schools in neighborhoods, thus promoting walkable and bikeable schools. In 1995, the State Public School Construction Program re-ordered its project classifications to favor renovation of existing buildings over new school construction. The program encourages communities to locate schools in locally identified growth areas. In addition, school districts are encouraged to renovate and add additions to existing neighborhood schools instead of developing new school sites. Further, local education agencies are encouraged to reopen and renovate older public school buildings that had been previously closed due to low enrollment. These older school sites targeted for renovation are usually located within existing neighborhood communities, not on the outskirts of them (Interagency Committee on School Construction, 2003). More information on Maryland's School Construction Program can be found on their website (see McGough, 2005).

New Jersey – Long Range Planning

In May of 2000, New Jersey Legislature passed the Education Facilities Construction Financing Act (EFCFA), which was created to force local governments to engage in school planning to keep up with student population changes. Each school district is mandated to prepare and submit a long range facilities plan every 5 years to the Commissioner of Education. The plan includes an educational adequacy inventory of all existing school facilities in the district, identifies all deficiencies in the current inventory, and proposes a future construction and renovation plan (New Jersey School Board Association, 1998). Similar to Florida's interlocal agreements, the EFCFA show that the State of New Jersey understands of the importance of keeping schools in the communities they serve so the schools can thrive as educational and community centers. The EFCFA aims to use the planning and construction of schools to further the economic and community development efforts of local governments to maximize the efficient use of government resources. More information on New Jersey's EFCFA is available on the state's website (New Jersey Department of Education School Facilities, 2005).

North Carolina – Bonus Funds for Walkable Schools

Orange County, North Carolina has taken a different approach to encourage schools to incorporate smart growth strategies. The Orange County Commission will award bonus funds to Chapel Hill-Carrboro City Schools in the construction of its third high school. The funds from this county program are intended to encourage the schools to use compact building design, increase bus use, reduced parking for students, ample sidewalks, and bike paths that encourage pedestrian and bicycle modes, and the use of distance learning. The commission has approved $1.9 million in bonus funds pending the completion of development exhibiting selected Smart Growth standards. In addition, if the schools can initiate school bus shuttles connecting the school to the city park and ride center, and use the city transportation systems, the commission is prepared to award $300,000 more to support these transportation efforts (Planning Commissioner's Journal, 2004).

Wisconsin – Neighborhood Schools Initiative

The Neighborhood School Initiative, a Milwaukee based organization, is taking significant strides to keep schools walkable. The organization is currently building six new schools, putting additions onto nineteen existing schools, and renovating fifteen other schools. These schools all exist in walkable neighborhoods, and yet the construction will yield 750,000 square feet of academic space. In addition, the schools are designed to welcome community use of the libraries, gyms, cafeterias, parent centers, art, and music rooms (EPA, 2003).

Best Practices Summary – School Siting

In examining nationwide best practices for coordination of school siting and local comprehensive planning, eight main areas contribute to the success of each state or county. These areas are listed below, along with a reference to the above sections for additional details.

Florida state law requires **sharing information** as part of the interlocal agreements, but the key lies in how much information is shared. Generally, additional information can be incorporated into the decisions of multiple parties. This information generally referred to school population projections, locations of new residential developments, and even new school construction plans. Sharing information between all involved parties provide valuable information that can influence decisions made by others.

Strong regulatory review is important in Orange County's implementation of its own form of school concurrency. By saying "no" to new development that would put the school system over capacity, the county is able to secure additional funding through Capacity Enhancement Agreements. In addition, the county has additional control over where schools are built, and more control over the infrastructure supports them.

The **objective approaches** to selecting optimal school sites, shown by IPSAC and used by Martin County, represent another important best practice that involves all parties. Martin County avoids disputes between parties about the location of schools by involving all stakeholders in their TACs. As with IPSAC, keeping the site selection process objective and even numerically based can result in selection of the best site overall, and leaves little room for disputes.

Maine's "ABCs of School Siting" brochure is an example of how **educating the general public** can impact school site selection. School siting trends have lead to the belief that bigger is better, and bigger sites often require parcels that encourage sprawl. When Maine revised its new school siting requirements to reflect an emphasis on smaller, neighborhood schools, the state's marketing efforts impacted how people thought about school sites. By challenging the old large school trend belief through marketing the neighborhood school as a more appealing alternative, the new regulations can be more widely accepted.

Many of the counties and states above encountered success by establishing **greater participation** for involved parties, including both the public and private sectors in school siting decisions to increase accountability. In Orange and Palm Beach counties, where residential development is occurring as fast, or faster than school boards could provide school capacity at new or existing facilities, holding local governments and developers accountable for their

decisions helped ease school overcrowding. In Orange County, developers were held accountable for the increase in school capacity they were creating, and were forced to pay for that increase. In Palm Beach County, local governments and school boards hold each other accountable for the consequences of the decisions made in their respective areas of control. Accountability is one of the key components of Palm Beach County's school concurrency program.

Maintenance standards are a hallmark of Maryland and Palm Beach County's school facilities programs. One way to make schools the center of communities is to prevent the destruction of existing neighborhood schools. Older schools that the public sees as "falling apart" make the decision to build a new school on a new site much easier. By investing smaller amounts of money to maintain existing buildings, Maryland and Palm Beach County have been able to avoid building expensive new school buildings.

North Carolina's **incentives** for schools using Smart Growth strategies allow the state to provide positive regulation of school construction. By providing grants to schools that use compact building design, increase bus use, reduce parking for students, provide ample sidewalks and bike paths that encourage pedestrian and bicycle modes, the state can get schools to look creatively at solving their own problems, and to take ownership of such innovations. Whereas a school official may examine the cheapest way to meet a regulation, they may be more motivated to devise a creative solution if an alternate party, such as a county commission, is willing to pay for it. Incentives for smart growth strategies provide an opportunity for schools to think creatively to solve costly problems that may even save money long term.

Co-location and joint use, as demonstrated by Duval County's interlocal agreement, represent two money saving strategies that also provide additional opportunities for multimodal planning. Co-location helps create the complementary mix of land uses proposed for MMTDs and when combined with joint use agreements, works together to maximize the cost-effectiveness of public facilities such as schools and libraries. Co-location and joint use of public facilities creates a symbiotic relationship that saves money and provides maximum benefit to the public.

Safe Routes to School

Safe Routes to School programs, in general, are programs that improve walking and bicycling conditions for school children. The motive and names of programs vary, but the common thread of safety is always present. The following section discusses best practices of "Safe Routes to School" programs throughout the world. The National Highway Traffic Safety Association identified eight programs discussed in this section as programs worthy of becoming models for future "Safe Routes to School" programs (Da Silva and Askew, 2004). Two additional programs were identified in this research for their "Best Practices."

Phoenix, Arizona was selected for its comprehensive approach to addressing the walk environment, particularly crossing needs and "Kidswalk to School," a program developed by the Center for Disease Control, was selected because of its national availability. It serves as a guidebook for any individual or neighborhood interested in starting a program at their school.

Marin County, California

The Safe Routes to School Program in Marin County, California began as a national pilot program with funding from the NHTSA in August 2000. Marin County decided to implement a Safe Routes to School Program because, despite its low population growth, traffic congestion had grown significantly. Twenty-one percent of the traffic before the implementation of this program was from parents driving their children to school. According to surveys distributed before the program, 73% of children were driven to school. Implementation of this program includes nine schools in four locations (USDOT and NHTSA, 2002). The Marin County program focused on best practices such as education and encouragement components, increase in public interest, evaluation of the program, and identifying hazards in the area. The program included the development of a "Safe Routes to School" Improvement Plan, and a toolkit including a school curriculum. Walk to School Days and rodeos were used to increase public involvement. Evaluations of the program are described below.

One innovative aspect of the Marin program is the "escort program" (similar in concept to the walking school bus). These programs were identified in the pilot program as a way to allow children to walk to school with adult supervision. This is later developed into the "school pool" program. This program allows parents to register online at the Safe Routes to School website. Interested parents fill out an application on the website and then they are able to match up with other interested parents. Children are then able to walk to school in groups with adult supervision. The adults can alternate the role of leading the group to school. The service only provides the match-list to the parents; the parents must then make the arrangements to meet with other parents. "RIDES" for Bay Area Commuters, Inc., a nonprofit organization, is responsible for maintaining the database. Addresses are confidential and a map with contact information is available for participating parents (RIDES for Bay Area Commuters, 2005).

Evaluations of this program show that it enhances the health of the community through reduced traffic congestion, and contributed to a greater sense of place by the networking of parents and the associated "walkability" of the community. The program resulted in increases in students walking and bicycling to school between fall 2000 and spring 2002,with 64 percent and 114 percent increases, respectively. The number of children using a carpool to get to and from school had increased by 90 percent (Staunton *et al.*, 2003).

The State of California has a statewide Safe Routes to School program, of which Marin County is also a part. This program focuses primarily on making infrastructure improvements. As a grant program, "California Safe Routes to School through Safe Communities" awards eight communities up to $25,000 over seventeen months to develop a broad-based community coalition in order to sell the community on the program and a strategic plan for the implementation of a Safe Routes to School program (McMillan *et al*., 2005).

An evaluation of this state program looked at the various construction projects and showed that, as a result of the "Safe Routes to School" projects, there was an increase in the percentage of children walking and bicycling to school (Boarnet, Anderson, Day, McMillan, Alfonso, Tang, and Newfal, 2003). This report indicated that engineering improvements contribute to the significant increase in the number of children who walk or bicycle to school (Boarnet *et al*., 2003).

Some methods of the Marin County program are listed below:

- Walking school bus
- Safe Routes to School Toolkit and other promotional materials
- Bicycle safety rodeo
- A "Safe Routes to School" Improvement Plan
- Walk to School Days
- School curriculum
- Frequent Rider Miles Contest.

Marin County has had great success with their *education and encouragement strategies* and has generated a great deal of interest, through media coverage, of their events.

<u>Arlington and Boston, MA</u>

"Walk Boston" partnered with National Park Services and Rivers and Trails Program to create a Safe Routes to School Program in 2000. The first year of the program included two schools in Arlington and the following year included two schools in Boston. This program is unique because both Boston and Arlington are considered "walkable," but other factors do not encourage walking. Schools in both areas actively discourage bicycling. The focus of this project is education and encouragement of parents, teachers and the community. Arlington had significant gains in children walking and cycling to school, whereas Boston's gains have been more modest. These results are explained by a higher level of involvement in the community of Arlington (Da Silva and Askew, 2004).

Methods of the program include:

- Walk to School Days

- SR2S Newsletters
- Parents as SR2S Coordinators
- Parents recruited through PTA meetings and informal networks
- Town Council included in plans
- Public Transit use encouraged.

This program is unique because it included the town council in the plans, and encourages the use of public transportation The program utilizes other strategies including improvements to the physical environment, and generating excitement through media coverage and special events. By encouraging children to use public transportation, rather than depending on their parents to take them to school, they will learn to be more independent, and will hopefully continue to use public transportation as adults.

The Bronx, NY

The Safe Routes to School Program in the Bronx, one of the oldest in the US, was developed to address safety issues in the New York City borough of the Bronx. Before the implementation of this project, being hit by a car was the number one cause of death in children aged 5–14 in New York City. This number was the highest in the Bronx. This program used a ten-step method that allowed parents, teachers, and students to work together to achieve a common goal. The nine steps outlined as follows: identify perspective schools, select schools, make initial contact with schools, conduct outreach at school, distribute surveys to schools, collate surveys, tour school site, make and install changes, and follow up (Transportation Alternatives, 2002). One difference between the Bronx and other Safe Routes programs is that children in the Bronx have always walked to school. The program addressed the need to improve traffic conditions for the children already walking.

This program has recently changed hands. In spring of 2004, the New York City Department of Transportation released its own Safe Routes to School Program. This program will compile crash map data, identify 135 schools with the worst pedestrian safety problems, and then select 32 priority schools to begin traffic calming. This program involves the entire city of New York, rather than just the borough of the Bronx (T.A. Bulletin, 2004).

Methods include:

- Surveying parents and teachers for hazardous locations
- Using crash mapping to determine high risk intersections
- Creating detailed traffic calming plans for New York City Department of Transportation to design and construct
- Using competitive nomination process to create interest and ensure participation of PTA and principals
- Building support for engineering and traffic calming measures

- Using extracurricular events such as treasure hunts, quizzes, and contests
- Organizing International Walk to School Day
- Organizing parental carpools and walking school bus

The best practice utilized by the Bronx Safe Routes program maps the crashes, locates and identifies hazards, and makes the necessary physical improvements to the walking environment.

Chicago, IL

Chicago is a large urban area with about 90% of its public school students walking to school. The Safe Routes to School Program in Chicago is aimed at making it safe for children to continue to walk or bicycle to school.

The lead administrator of this program was the Chicagoland Bicycle Federation. This program began in 2001 as a method of increasing activity levels in children and decreasing vehicular traffic. This program was implemented through four different phases. The first phase gathered demographic information of the participating schools, presented bicycle information to classes, conducted surveys to determine why children did not currently walk or bicycle to school, and examined the neighborhood and the potential of bicycle parking at the school. The second phase of implementation involved analyzing the results of the surveys and presenting the information gathered to school administration. The third phase organized meetings for parents and community members. These meetings were used to discuss the Safe Routes to School Program, review survey results, identify safe routes, and implement new countermeasures and facilities. The final phase of this program educated children and evaluated the success of the program (Transportation Alternatives, 2002).

In addition to this Safe Routes to School program, the City of Chicago and the Police Department have developed a program called *"Operation Safe Passage,"* in 1997. This program developed the "Walking School Bus" for which Chicago is well known. The "Walking School Bus" allows parents or other volunteers to escort children to school. This program was aimed at allowing children to safely walk to school free from worry about traffic, crime relating to gangs, shootings, or drugs (Carothers, 2004). In addition to allowing children to walk to school safely, a "Walking School Bus" encourages other children to walk, reduces traffic, and improves community relations by allowing parents, students, and other members of the community to work together toward a common good (NHTSA, 2005).

The program has been successful and is very dependent upon volunteers. The program is citywide, and includes over 3,000 volunteers. Each school distributes a Safe Passage to School pamphlet to educate students and parents

about the program. Two challenges that the program has faced include lack of government funding and keeping volunteers motivated (Carothers, 2004).

Methods used:

- Safe Routes and areas around the school are patrolled by police officers, parents, and public housing officials
- Employees of the Police Department train parent patrols
- Walking School Bus
- Background checks and fingerprints are conducted on all volunteers
- Work with the Bureau of Transportation to improve crosswalk marking and other signing.

By involving law enforcement as "partners," the main focus of this program is to protect children from crime occurring in the area. The program is known for its "walking school bus." Many other programs have modeled "walking school buses" after this program.

Kidswalk to School, Center for Disease Control and Prevention (CDC)

Kidswalk to School is a program sponsored by the CDC to encourage children to walk or bicycle to school in groups with their parents. This program emphasizes the need for children to be more physically active, encourage pedestrian safety, and to learn about their environment. This program is mainly targeted to those neighborhoods within one mile of a school, but can be adapted to those programs where there are no safe routes to school, or schools are further away. The CDC has shown in their composite research that children who are physically active are more alert by the time they reach class, have a healthier self-image, have improved social and emotional development, and have greater likelihood that they will be healthy adults. Not only does this program benefit the children, it also benefits the neighborhood by increasing the activity level of both adults and children, decreasing the traffic on the roads, increasing interaction with neighbors and thus reducing crime (CDC, 2002).

One interesting feature of this program is that it is organized at the neighborhood level and initiated by parents. This is different from other Safe Routes to School Programs, which are implemented at a state or school level. It does, however, use some of the same tools—such as a walkability survey, mapping of hazardous places, and mapping of interested families. Where the main tool in many safe routes to School Programs is a tool kit aimed at teachers and administrators, "KidsWalk" uses a step-by-step how-to-guide form implementing a KidsWalk-to-School Program in a Neighborhood. This guidebook identifies five steps to starting a program, and offers alternatives for making the program work in a community (CDC, 2002).

Methods of the program include:

- Creation of a guidebook
- Survey of current conditions of neighborhood
- Organizing parent leaders
- Organizing KidsWalk-to-School kickoff event.

This program is unique because the guidebook is targeted to parents and children who are interested in starting a program. This practice provides an opportunity and guidance for neighborhoods to initiate and implement a Safe Routes to School Program.

Portland, OR

Portland "Kids on the Move" was developed in Portland to improve child pedestrian safety through traffic calming, enforcement, and education. This project was an addition to an existing neighborhood traffic-calming program. Schools were prioritized in the existing program. Speeds through the neighborhoods are monitored using a stationary speed radar trailer, which measures motorists' speeds and then automatically reports speeds back to motorists as they approach the trailer. This program is supplemented by classroom activities, workshops, and pamphlets for the general public (Transportation Alternatives, 2002).

Methods used include:

- Neighborhood Traffic calming programs
- Safe Routes for Kids classroom bicycle instruction program
- School Beacon Program installed flashing yellow lights above school zone sites
- Portland Police Bureau School Police Division trains school safety patrols
- Educational programs such as "Portland Kids on the Move", Traffic Safety Town, and "Play it Safe."

This program was identified as a best practice because of its involvement with the police department, and the variety of educational programs offered.

Santa Ana, CA

The Safe Routes to School program in Santa Ana was based on concern for pedestrian traffic safety; although children aged five to nine represented only 9% of the population in 1997, they represented 21% of pedestrian injuries. This program began as the Santa Ana Pedestrian Safety Project (SAPSP). It operated this way for three years. During this time, all of the outcomes of the project were achieved and the City of Santa Ana took over and expanded the project to include twenty schools (Da Silva and Askew, 2004). Some unique programs that partnered with the Safe Routes to School program were a Family Literacy

program and Keep Kids Alive, Drive 25, which put signs in the front yards of residences near the school. Initial studies of this project indicate that 75% of drivers slowed down when they saw the signs (AHDCHP, 2003).

Methods used include:

- Creating a Citywide taskforce
- Developing a comprehensive toolkit
- Organizing Walk to School Day
- Providing grants to community based organizations
- Promoting literature through the Family Literacy Program
- Using neighborhood perception surveys, walkability checklists, GIS mapping, and police summaries
- Partnering with organizations to develop a pedestrian safety art exhibits
- Applying for funding for infrastructure improvements
- Keeping Suggested Routes to School Maps updated.

One unique strategy of this program is promoting literature concerning walking and bicycling to school through the Family Literacy Program.

Phoenix, AZ

The City of Phoenix developed a School Safety program in order to improve safety conditions around schools in Arizona. The Phoenix city council requested the creation of a school safety task force, which developed the Phoenix School Safety Program at the beginning of the 2001-2002 school year, after a tragic traffic collision which was caused by a young student running past the crossing guard at a busy traffic intersection (Grote and Cynecki, 2003).

Methods used include:

- Schools chosen on a first-come, first-serve basis
- School provided with walking attendance boundary, parent/school volunteers, and a meeting place in the school
- City provides aerial photographs, maps, AAA Safe Routes to School; brochure, a sample Safest Routes to School Plan, and guidelines
- Observed pedestrian activity
- Mapped and identified hazardous conditions
- Involved public in Safe Route to School Plan.

This program is unique because of the establishment of a school based safety task force and involvement of city council and city engineering staff as leaderships in program implementation. Some of the recommendations identified by the task force are indicated below:

- Development of New School Crossing Guard Training Videos – "Guardians of the Future"
- Distribution of new training pamphlet
- Development of a "Safest Route to School" Walking Plan for Phoenix Schools
- Development of a School Crossing Safety Audit
- Introduction of automated enforcement of speed limits at schools
- Installation of SCHOOL pavement stencils, sidewalk STOP lines to prevent children from crossing streets unattended, and fluorescent yellow-green school warning signs
- Introduction of experimental traffic control (Grote and Cynecki, 2003).

Great Britain

In the early 1990s, Great Britain discovered that it had one of the highest incidences of child pedestrian crashes in Europe, while at the same time having the highest percentage level of childhood travel and independence. In response to this alarming information, SUSTRANS, a civil engineering advocacy group, began a Safe Routes to School program in 1995 modeled after the program in Denmark. SUSTRANS began with ten schools and four local authorities. Traffic calming infrastructure was added to many of these schools. The Children's Play Council and Transport 2000, through the Home Zones Effort, helped to combine health, safety, and community-building goals (Da Silva and Askew, 2004).

A Home Zone is a street or network of streets where the neighborhood has decided that all forms of transportation, automotive, bicycle, and pedestrian have equal priority on the streets (Sustrans, n. d.). This concept is similar to those stressed in Florida's MMTDs.

Some methods of the Home Zone program include:

- Telephone and email hotlines
- Safe Routes to School Programs
- Conferences
- Curricula for teachers
- General information for the public
- Guides for traveling to and from school
- Infrastructure improvements planned and implemented
- Home Zones created.

The "Home Zones" aspect of this program is unique. By creating individual zones, this program involves the entire neighborhood. Giving the same priority to pedestrians as to other forms of transportation shows that the neighborhood is committed to the program.

Toronto, Ontario

The Active and Safe Routes to School program began in Ontario, Canada with a purpose to help create safer neighborhood routes for children, to facilitate cleaner air, to increase physical activity, and to construct a community. The shift away from students walking and bicycling to school turned neighborhood sidewalks into unused and unsafe places for children. This trend led to intense traffic conditions around schools where over 100 parents gathered to pick-up their children. Smog levels were significant on streets adjacent to schools (Kennedy, 2004). This program implemented a method including:

- Education and encouragement materials
- "Blazing Trails" (publication that aids in mapping safer routes)
- Encouragement components that includes International Walk to School Day
- Walking Challenge/ Kilometer Club
- Neighborhood Walkabout
- Home Zones
- No-idling zones at School
- Walking School Bus
- Classroom mapping projects and contests
- I-walk to school club, events, and contests.

This program focuses on health and the environment. This program has individual aspects that encourage children to walk to school or walk to the bus stop. The program also encourages parents to either drop off their children a couple of blocks away from the school and not to idle their engines while they wait. The emphasis of this program is not only on increasing physical activity of children but also on the detriment that idling engines can cause to the environment. The method of mapping hazards used in this program is unique because children map the hazards they encounter.

Successful Strategies for Safe Routes to School Programs

The Surface Transportation Policy Project (STPP) has identified six basic strategies that are common in successful safe routes to school programs (Twaddell, 2004).

1. *Invite Partners:* The most successful programs are supported by a variety of different organizations, often including parents, teachers, students, commissioners, administrators, planners, police, and public health representatives. These partners can become the local Safe Routes to School Team (Appleyard, 2003).
2. *Figure out how the physical environment could work better:* Those involved in the program should come together to discuss and map the physical environment. Hazardous areas should be identified.

3. *Make the necessary improvements:* Infrastructure improvements such as sidewalks, signal timing, raised crosswalks, and bike racks need to be made to provide access to schools.
4. *Create education and enforcement programs:* Education programs inform the public and the children of the program. Police can use enforcement to aggressively ticket drivers who do not follow posted procedures.
5. *Generate excitement through media coverage and special events:* This can be accomplished through events such as "Walk to School Days" and bicycle rodeos. When a SW2S program is just getting started, the program should begin with a main kickoff event, and then continue with smaller, more regular planned activities, such as the designation of all Wednesdays as "Walk to School Wednesdays (Appleyard, 2003)."
6. *Evaluate your program and reintroduce it each year:* Successful programs build onto their programs each year. The student body can be creative and innovative to ensure that the program continues to be successful by reintroducing and evaluating the program each year (Twaddell, 2004).

Safe Routes to School programs are developed for many different reasons. The program in Arlington was developed because, although the area is walkable, lifestyles did not allow children to walk or bicycle to school. Students here were discouraged from walking or bicycling to school. In the Bronx, traffic concerns triggered the development of the Safe Routes to School program. Chicago's program was developed for yet another reason; crime made the streets dangerous for children. Marin County developed their program to encourage walking and bicycling for health benefits. Although these reasons vary, the overall goal is still the same; *all of the programs encourage children to safely walk or bicycle to school.*

Many of the programs implemented similar tasks to achieve their goals. Surveying parents and students, implementing classroom activities, and identifying hazards within neighborhoods were common to many of the programs. Some methods were unique and original. Chicago became known for its "walking school bus." The Toronto program, "Active and Safe Routes to School," is innovative because of the encouragement component, which created a variety of tools and contests to encourage children to walk or bike to school. "Active and Safe Routes to School" also addresses the environmental consequences of children being driven to school. The "No-idling at School" encourages parents to not leave cars idling while waiting for their children.

"Safe Routes to School" is a project that is growing in popularity. This report looks at only ten programs. The list is not all-inclusive, but demonstrates some of the best practices (see Appendix E for the list of "Safe Routes to School" programs throughout the country).

The “best practices” gleaned from Florida’s 1997-98 pilot study are incorporated into their Safe Ways to School “tool kit” and included the following “Tips for Success.”

- *Involve the children* as campaigners and initiators (look what happened with anti-smoking and recycling campaigns when children got involved)
- *Bring it to parents* and get their buy in…Without them, nothing really changes
- *Find a “champion”* who will keep the effort going and the project focused, someone with passion and who is willing to take the time to make it a success
- *Empower the “team”* and make sure you have the right players on the team who can help with access to information, funding sources for physical improvements, media contacts, etc
- *Work from the bottom up (grassroots) and top down (school board/superintendent/mayor/city manager)* simultaneously. Both are needed to make the program successful
- *Be persistent.* What didn’t work last year may have just needed more time for the seeds to germinate
- *Evaluate and reintroduce* the program each year.
- *Have short but frequent meetings* and stay focused on small “do-able” tasks
- *Celebrate small successes* along the way, such as pizza parties for the class with the largest number of children walking on Wednesdays, gifts or certificates for parents as walking school bus volunteers, media story on bicycle safety classes in P.E., or interviews with school crossing guards
- *Most of all, keep the faith!* What will seem like an insurmountable task, will just take time. Others long after, will reap the rewards of this hard work and caring effort.

V. DISCUSSION

In this section, the barriers to the successful implementation of Safe Routes to School programs within the context of school siting and multimodal planning will be discussed. First the general barriers associated with coordinated multimodal planning, school siting and Safe Routes to School are discussed. Then some of the issues associated with each of the three areas of analysis: multimodal planning, school siting, and Safe Routes to School are considered. Finally, opportunities for mode shift within the context of carefully coordinated school planning, multimodal planning and the implications for Safe Routes to School are discussed.

General Barriers

The fundamental issue in creating safe ways to school is the "chicken and egg" problem associated with the traffic threat multiplier effect. The more children are driven to school, the greater the traffic near the school. As traffic increases near schools, parents are more likely to drive their child to school because they fear for their child's safety in traffic. Fundamentally, the question for policy makers in implementing Safe Routes to School program is "how can we reverse the cycle of automobile dependence?" To understand this cycle, it is useful to consider the interaction of each of the three areas of planning practice: land development, transportation, and school planning. Multimodal planning implies coordination between transportation and land use planning the balances regional mobility on high-speed roadways with the needs for local access to goods, services and activities that residents engage in on a daily basis. Coordination between school and land development planning means that we locate schools so that they are surrounded by the residences they are intended to serve and other uses that are compatible with schools. In making decisions on where to locate schools the long-term transportation costs of getting children to and from school are weighed against the additional cost of land in a more developed area. When school and transportation planning are coordinated, we provide a complete transportation network from residences to schools and the most direct access from residential neighborhoods to the school site. When all three of these types of planning are coordinated the result is: 1) a multimodal environment in which residences are located in close proximity to the school; 2) safe, continuous and predictable access is provided from the residential neighborhood to the school; and 3) the potential for a mode shift from the automobile to other modes of transportation. This is where the Safe Routes to School programs with their emphasis on education, encouragement, enforcement and engineering come in the picture.

In contrast, when these three areas of planning are not coordinated, we have the situation that exists in much of Florida today. School boards will consider the short-term costs of development and put the schools at the location in the community that is least expensive to build. This land is likely to be in a greenfield development. With this initial location, a number of problems follow:

residential development will follow the location of the school, but it too will be built by the suburban standards of the community; at a density that is too low to enable enough students to live close enough to the school that a sufficient number of students can walk or bicycle safely to school. Schools are built at the edge of the community without considering their connection to the residential neighborhood. The connectivity is not adequate from school sites so that even where the residents are close to the school, the children's path to the school is not connected or is interrupted by some type of barrier (interstate highway, railroad tracks, or a water body). Once the pattern of streets is established in a residential neighborhood it is extremely difficult to retrofit it to allow greater connectivity. Thus, we begin the cycle of dependence; the schools are placed in a location that is not adequate for walking and bicycling. Fewer students walk and bicycle, and the ones who do walk are walking and bicycling in less favorable environment because of all of the automobile traffic. Thus, we get into a cycle in which the high level of traffic leads to less favorable conditions for walking and bicycling, which leads to less walking and bicycling and the cycle continues.

Put another way, if we do not locate our schools properly, the community has little opportunity for children to walk and bicycle to school. We have a problem of our own creation; we are locating schools such that they will never be able to be well integrated into the community. Once a school is improperly sited, the long-term costs of getting children to the site will be more significant than if we had done the right thing in the first place.

Why is this happening? As has been discussed throughout his document, the decision making on various aspects of planning are not being coordinated. Two matrices were developed to understand the relationships between various agencies in implementing the Safe Routes to School program in Florida. The first table below, Table 3, identifies the roles taken by various state agencies in the various aspects of planning that are necessary to create multimodal environments that support children's walk to school. The second table below, Table 4, identifies the roles that various organizations at the state and local level should take to ensure the success of Safe Routes to School programs.

As the first table shows, the areas of primary responsibility for programs and policy related to the Safe Routes to School programs are spread throughout the FDOT; four other state agencies take actions that can affect the success of the Safe Routes to School program. Within the FDOT the Policy Planning Office, the Systems Planning Office, the Environmental Management Office (EMO), the Safety Office and other areas of the FDOT are involved in programs that impact the success of the Safe Routes to School program. The primary role of the FDOT is to manage transportation planning throughout the state, make decisions about transportation funding, and coordinate regional transportation planning throughout the state. Separate offices within the FDOT have different roles to take in other aspects of transportation planning. The Systems Planning Office

has primary responsibility for multimodal planning and planning for the Strategic Intermodal System while the Safety Office has primary responsibility for the Safe Routes to School program and the safety of users on multimodal transportation systems. The Environmental Management Office takes a role in multimodal planning through its Livable Communities Initiative. Throughout the FDOT, various offices also have an interest in aspects of land development planning and coordinated school siting; especially as they relate to traffic and safe movement of children around schools around schools in all modes of transportation.

Five other state agencies have primary responsibility and an interest in areas related to the Safe Routes to School program. The FDCA has primary responsibility for the implementation of the Growth Management and land development planning in general. The FDCA also has an interest in the coordinated school planning and transportation planning as they relate to the location of residences with respect to schools. The FDOE has primary responsibility in the areas of school planning and coordinated school planning. With respect to the Safe Routes to School, the FDOE also needs to be interested in transportation and land development planning the supports the location of schools and the ability of children to access those school through a variety of modes of travel. While the Department of Environmental Protection has a minor role to take in transportation planning, they have a primary role to take in the development of multiuse trails and can shape their location to facilitate and encourage safer travel for children when the trail is located between residences and schools. Similarly, the FDOH can reinforce the activities of the FDOT in developing Safe Routes to School programs by coordinating the activities of their agency that reinforce walking and bicycling to school as a means of routine physical activity that also reduces the rate of obesity among school children.

The second table identifies organizational missions related to various aspects of Safe Routes to School and the various organizations that should be interested in each of these areas. Four organizational missions are identified: (1) transportation planning, (2) land development planning; (3) education and school planning; and (4) health and safety. Within the organizational mission of transportation planning, FDOT offices, District FDOT offices, MPOs, local governments and local transit agencies have responsibility for both transportation planning and multimodal planning. The FDOT Safety Office and the FDOT District Offices have additional programmatic responsibilities for the Safe Routes to School program. Local governments have responsibility for transportation planning and multimodal transportation planning but they have additional responsibilities for land development planning because of the transportation concurrency requirements of the Growth Management Act.

Under the organizational mission of land development planning, the FDCA and the regional planning council have primary responsibility. The FDCA also has primary responsibility for coordinated school siting. Local governments have primary responsibility in the areas transportation planning, multimodal

transportation planning, coordinated school planning and Safe Routes to School programs. The decisions of local governments in land development planning directly affect Safe Routes to School programs. If local school districts develop land in a manner that provides continuous, safe, and predictable sidewalks and bicycle paths, then children will have an opportunity to walk or bicycle to school. If on the other hand, residences are too far from schools, the walking and bicycling conditions are not safe, or direct access is not provided to the school, the number of children who will walk and bicycle to school will generally be limited to those who have no other transportation options.

Educational and school siting issues will have a significant impact on the success or failure of Safe Routes to School programs. The FDOE Office of Educational Facilities can have a major impact on how school boards site their schools with respect to adjacent residential development and the transportation facilities and choices of modes to the school. The guidelines for school siting and school site design need to consider the importance of adequate transportation access for all modes of transportation. Local school boards need to understand the importance of multimodal planning and Safe Routes to School programs when they select sites for schools. If schools are located too far from residences, sidewalks are not connected between the school and the adjacent residential neighborhood, or the school site is surrounded by fences limiting access to the school site, the school district will incur significant transportation costs related to school busing or courtesy busing for locations in which hazardous walking conditions exist. The FDOE Office of School Transportation will be constrained in their choices by the guidance provided by the Office of Educational Facilities and the decisions of local school boards regarding the organization of school sites and the connection to the adjacent neighborhood. The State of Florida and local school boards currently spend over $750 million per year to provide bus transportation for children to get to school for students who live more than two miles from the school or encounter hazardous walk conditions. With the increase in the price of oil, the cost of school transportation will continue to increase. As school transportation costs increase, the costs are shifted to local school districts that will face difficult decisions; for example, cutting school programs or eliminating courtesy bussing. Major decisions about school siting and minor decisions about school site design can have a major impact on the life cycle costs of the school. A more expensive school site centrally located in the community and with good multimodal connections to adjacent residential development may cost less in the long run than a cheaper site isolated from residential development. Because of this relationship, advocates for children's safety, the FDOH, county health departments, CTSTs, and law enforcement need to be concerned about developing a built environment in which the location of schools is coordinated with residential development and safe predictable, and direct multimodal access is provided. If children are denied the opportunity to walk or bicycle to school because of the characteristics of the built environment, we may be trading the risk associated with children's safety in traffic with the risk associated with higher incidences of chronic disease.

Table 3: Current State Agency Responsibilities for Planning Activities Associated with Safe Routes to School Programs						
Agency and Program	**Transportation Planning**	**Multimodal Planning**	**Land Development Planning**	**Coordinated School Siting**	**School Planning**	**Safe Routes to School**
FDOT	**P**					
Systems/Policy Planning Offices	P	P	I	I		
Strategic Intermodal System	P	I				
Transportation Concurrency	P	P	I	I		I
Environmental Management Office	P	P	I	I		
Livable Communities Initiative	P	P	I	I	I	I
Safety Office	P	P				
Strategic Highway Safety Plan	P	P				
FSCGTP Crossing Guard Training						P
FTBSEP Traffic and Bicycle Safety Education Program		I				P
Safe Routes to School Program	P	P		I	I	P
Funding for Transportation	P	P				I
Regional Transportation Planning	P	P	I		I	I
SAFETEA-LU – Safe Routes to School Program	I	I	I			P
FDCA			**P**			
Growth Management Implementation	I	I	P	I		I
FDOE					**P**	
School Facilities Planning				P	P	
Funding for Schools	I	I	I	P	P	I
FDOH						I
Coordinated School Health Program				I		P
Governor's Obesity Task Force		I	I	I	I	I
FDEP		I				
Office of Greenways and Trails		P	I	I		I
P - Agency has primary responsibility in this program or policy; I - Agency has interest in this area of policy						

Table 4: Organizational Mission and State, Regional and Local Agency Responsibilities for Planning Activities to Implement Safe Routes to School Programs

Organizational Mission and Acting Agencies	Transportation Planning	Multimodal Planning	Land Development Planning	Coordinated School Siting	School Planning	Safe Routes To School
Transportation Planning						
Systems/Policy Planning Offices	P	P	I			I
Environmental Management Office	P	P				
Safety Office	P	P				P
FDOT District Offices	P	P	I			P
Metropolitan Planning Organizations	P	P	I			I
FDEP Office of Greenways and Trails	I	I				I
Local Governments	P	P	P	P	I	I
Local Transit Agencies	P	P	I			I
School Boards	I	I	I	P	P	
Land Development						
Department of Community Affairs	I	I	P	P	I	I
Regional Planning Councils	I	I	P			
Local Governments	P	P	P	P		P
Education/Schools						
FDOE Office of Educational Facilities	I	P	P	P	P	P
FDOE Office of School Transportation	I	P	I	P	P	P
School Boards	I	P	I	P	P	P
Advocacy Groups for Children's Safety	P	P	P	P	P	P
Health and Safety						
Department of Health	I	I	I	P		P
County Health Departments	I	P	I	P		P
CTSTs, Enforcement, Crossing guards	I			P	P	P
Office of Transit	P	P	I			I

P- Agency has primary responsibility for organizational mission; I - Agency has interest in this area of policy

The State and regional transportation planners are considering how people can get around within the region, but not how they can get around in their neighborhoods. The local transportation planners may or may not consider how people will get around their neighborhoods. The school planners are considering the short-term costs associated with land development, but not the long-term costs associated with bus and automobile travel. Furthermore, they are not coordinating the location of the school with the location of new housing. Land development planners may or may not coordinate land development with transportation or schools. This fragmentation of responsibility extends to the attitudes of members of the school board and school transportation directors who emphasize the parent and school bus drop-off areas as their main priority and responsibility instead of balancing the needs of all families for access to the school. The State provides assistance to create safer walking conditions to school with their hazardous walk conditions. However, this too involves a perverse incentive; once a route to school is declared to have hazardous walk conditions, the state pays for the children to be bussed. The school district and local government have no incentive to improve the pedestrian and bicycle facility because they are not paying the price for the unsafe conditions in the community. Once a route is designated as having hazardous walk conditions, the parents will pressure the local government to maintain this designation because their children will ride the bus to school. Safe Routes to School becomes a Band-Aid on a problem that is much bigger than simply getting children to and from school.

This fragmentation of responsibility for community building between transportation, land development, and school planning has not always existed. If we review the history of planning, the school was once located at the center of the neighborhood surrounded by residences and connected by bicycle and pedestrian facilities. This neighborhood unit coordinated the needs of the community for safe access to school and access for all members of the community independent of their ability to drive within the community. If we can once again bring the school back to the center of neighborhoods that are developed to support all modes of transportation, we can begin to encourage decisions by parents to allow their children to walk or bicycle to school.

In an ideal world, master planning entire cities would ensure that land development, transportation infrastructure, and school sites were all located and built in time to maximize livability and efficient use of resources. Planning these aspects simultaneously can foster improved coordination. Many of the problems with Safe Routes to School, school siting, and multimodal planning arise because development does not always occur in a master-planned fashion. Homes are built before school sites are selected, and transportation infrastructure (like sidewalks) is added after homes or schools are in place. These types of retroactive construction are almost always more costly and less effective because they involve correcting an existing problem or deficiency. Buildings and infrastructure last longer than people, and once a building is completed such as a

school, a home, a sidewalk or roadway—these represent a commitment to a certain type of future. A school built far from a home or a wide roadway without sidewalks—these represent a commitment to a future of automobile transportation. Then, when programs like Safe Routes to School are introduced in these environments, they are faced with the daunting task of disrupting the pattern of travel that is dominated by automobile use. No amount of funding can move the homes closer to the schools or sidewalks closer to homes. This is not to say conditions can not be improved, but more effective solutions would be possible if the problem were approached prior to building. Construction projects, such as those associated with school siting, land development, and multimodal transportation planning, must be pre-emptive measures to create that commitment to transportation options. Then, programmatic elements like Safe Routes to School can be most effective acting retroactively. The built environment must set the stage for the type of transportation activity we want to encourage by providing options. Then, programs like Safe Routes to School can motivate parents and students to choose physically active options like walking and bicycling.

Multimodal Planning

Multimodal planning has received much attention during the last twenty years as our culture has become more and more dominated by travel by the automobile. However, even with the broader area of multimodal transportation planning, little research has been conducted on travel to school. Like most areas of transportation planning, the focus continues to be on travel to work. This is logical because the journey to work has been concentrated in space and time. In recent years, additional research has been conducted on travel within the neighborhood with a series of studies on differences in the travel characteristics of the neighborhood (See Ewing and Cervero, 2001 and the IOM/TRB, 2005 on the connection between urban form and physical activity for a summary of major studies). The few studies that emphasize multimodal planning for school are a part of the literature on Safe Routes to School (see, e.g., McMillan, Starnes *et al* 1992) or on school siting (see, for example, Ewing, 2001).

Fundamentally, there is a dilemma in siting schools between locating them on a major arterial or putting them in the middle of a residential neighborhood. In the latter situation, residents of neighborhoods will object to traffic inside their neighborhood. In the former situation, getting children to and from school will contribute to traffic congestion on the arterial. The decision on where to locate the school must consider and balance the access with traffic impacts on adjacent land uses.

The FDOT Multimodal Areawide QOS Handbook similarly emphasizes travel to work. For example, the complementary land uses shown earlier in this report shows primary uses and complementary uses in multimodal districts. The primary uses are defined as residential and employment. To understand multimodal planning for schools, it is necessary to consider the role of schools

within the broader neighborhood. Thus, the relationships between the various areas of a multimodal district need to be considered. The school needs to be located near the residences, but it can be located near the activity center or it can be located as a subcenter away from the activity center. If it is located in the mixed-use activity center, the types of activities must be consistent with the safety of children in the area around the school. Around schools, the complementary land uses can be characterized as: (1) primarily residential and (2) mixed use residential zone. The primarily residential area would surround the school in the middle of a residential neighborhood that is connected to the mixed-use center in the middle of the MMTD. The mixed-use residential zone would have many of the same types of development as are located in the center of the MMTD, but the level of density and intensity and the mix of land uses would differ to be compatible with the school. Thus, land uses that induce heavy traffic or heavy truck traffic, especially during the peak periods for school travel would be discouraged in these locations. See Recommendations for additional details on how to update the Multimodal Handbook.

School Siting

The school is the destination in the home to school trip, and as such, remains a key piece in the school transportation puzzle. With the destination too far from residences, the effectiveness of a Safe Routes to School program is drastically compromised. As we have shown, Florida has had some difficulty coordinating school district decisions on school sites with the location of new residential development. Although statewide school concurrency holds the potential to coordinate school and residential locations more effectively, the exact effects of this legislation on the specific relationship between residences and the school site cannot be determined without additional data collection. The GMRA of 2005 creates an opportunity to improve this coordination by linking residential and school development in time. Whether the locations of these supporting land uses are coordinated in space to support Safe Routes to School initiatives will depend upon many factors that limit decisions on the location of schools.

Also, school size remains an area of debate. Large schools are generally perceived as cheaper to operate than small schools and can accommodate more students. Unfortunately, larger schools have shown to be less efficient when analyzed at a cost-per-graduate level. Additionally, larger schools require more land and can be difficult and expensive to locate. Small schools can be easier and less expensive to site. Research shows that small schools may be more expensive on a cost-per-student basis, but more efficient on a cost-per-graduate basis (Lee and Smith, 1996). Small schools are often rejected because they hold fewer children, and are often perceived as offering fewer educational opportunities than larger schools. Additional variables affect which populations benefit from different school sizes, with no “magic number” for the number of students at a school representing the ideal size. With site size having such an impact on the potential location of the site, this ongoing debate has a significant

impact on a local government and school district's ability to engage in walkable or bikable school planning efforts that foster effective Safe Routes to School programs. These issues, among others, continue to threaten siting schools close enough to residences for children to walk or bike, and undermine the effectiveness of Safe Routes to School.

There are other current issues that threaten and complicate the siting of walkable and bikable schools that we have not previously addressed. The "No Child Left Behind" Act (NCLB), magnet schools, and charter schools are all part of the growing "school choice" movement that has been gaining popularity recently in the United States, but threatens walkable school initiatives like Safe Routes to School. Before the school choice movement, students were assigned a school to attend by their local school board, and loosely based on their proximity to the school. The school choice movement presents significant changes to the norm. Although NCLB, private schools, magnet schools, vouchers, and charter schools present school choice for different reasons and in different formats, the basic premise of all three remains the same: Give parents options about where their children can attend school so they may choose which school they want their child to attend. For the purpose of this discussion, they will be referred to collectively as "schools of choice" because the problems they present are the same regardless of their semantics.

Planning in general is based on two important factors: 1) predictions about population projections, and more importantly, 2) where those numbers of people will be concentrated; school planning is no different. In order to adequately provide school facilities and transportation for students, it is imperative to know a) how many students, and b) which schools those students will be attending. Before schools of choice, school boards were able to use local government population projections to predict where students would be living. They could use this information to plan when and where new school would need to be built. They had the option of locating schools near these student populations, and the power to assign students to these schools through attendance boundaries as needed to use schools efficiently. Under that format, school boards had as much information over the entire school system to make informed decisions.

The school choice movement takes the power to define which school a student will attend from the school board and gives it to the parent, introducing two elements that significantly undermine the school board's ability to plan effectively: uncertainty and variability. School boards cannot be certain about where to build schools to best serve student populations. If a school board builds a school to serve a new residential development, there is no certainty as to how many students will attend that school. In addition, just because parents choose a school for their student one year does not guarantee that they will choose the same school the next year. This situation introduces variability that exacerbates the school board's already complicated planning process.

By destroying the link between the location of the student and the school that student will attend, school boards are left unprepared to make important and expensive decisions related to school planning, including school siting and school transportation. If a new school is sited in an area experiencing growth, school boards can only hope that parents will choose to send their student to that school. If a parent chooses not to send their student to that school and selects a different school too far away for pedestrian and bicycle modes, then someone must pay for the school transportation costs associated with that decision. Those costs could be the result of the additional school busing that would be required to transport those students to school further from their homes. Those costs could also be from the effects additional private automobiles transporting children would have on the existing transportation network. Additional school busing places a hefty burden on already-strained school transportation budgets at both the state and local level, as an indeterminate and variable amount of tax dollars would need to be poured into school busing or into improved transportation infrastructure to compensate for the increase in traffic. The school choice movement undermines a school board or local government's ability to engage in effective and efficient school planning.

The school choice movement can be detrimental to Safe Routes to School and other walkable school initiatives if the school of choice is too far from children's residences. By disconnecting a student's residential location from the school they attend, a school board or local government is faced with additional uncertainty and variability that are expensive and unhealthy to overcome. If school boards and local governments are expected to pay for public services like school facilities and school transportation, then they should be given the power to control the costs associated with those services. Walkable school initiatives like Safe Routes to School are designed to help these agencies cut school transportation costs, whereas the school choice movement gives a virtual "blank check" on school costs to the public. As a result, these agencies are forced to react to the public demand for schools rather than plan to accommodate this demand.

Although no research has been conducted to date that documents the impacts of the school choice movement on school transportation, the potential problems are a barrier to active student transportation. The NCLB Act was signed into law in 2002, and so the 2004 school year would have been the first opportunity for parents in "failing" schools to change their student's school, since parents are not given the school choice option until their school has failed for two consecutive years. In Alachua County, FL, for example, many parents decided to give the failing school an additional year to demonstrate improvement. The NCLB Act is still too new to evaluate the impact of the legislation on where students attend school; nevertheless, with over 80% of Florida's schools "failing" by federal standards, the potential problems should not be overlooked (Winerip, 2004).

Safe Routes to School

The Safe Routes to School concept has its own inherent barriers to success that will necessitate an entire cultural "shift" for this nation. The prevalence of two-parent working households, "trip-chaining" with the child drop off or pick up at school being one part of that, and fears about child abduction and crime in neighborhoods have made parents reluctant for their children to walk or bicycle to school, even when the distance is reasonable and walk conditions are relatively safe. The daylight savings schedule, which begins early in the spring and runs until the end of October, often means that in the morning children will walk to school or the school bus in the dark, or at dawn, when glare from headlights becomes a safety hazard.

The issues surrounding security, while often times are more "perceived" than actually incident based, are nevertheless *real* to the parents. Every time an incident occurs and is publicized on TV and radio, the community is reminded of the security. Even if it is in a far away town, it is a constant reminder of the potential and a major deterrent to parents supporting their children walking. The publishing of "sex offender" lists and addresses is yet another reminder that children have something to fear; this security/fear factor impacts the potential success of Safe Routes to School programs. However, the location of homes of sex offenders can be a factor in the local designation of a safe route to school.

The existence of "school-based management" in Florida's school administrative policy also creates a challenge for the implementation of a statewide program. Each school independently governs the policies, procedures, and curriculum of their school, with some guidance and requirements given by the state or local school board. However, Florida's localized school management arrangement also could present an opportunity for SW2S as a school-based program itself. Presently, the State education statutes do not directly address or support safe access to school (regarding traffic), nor do they support curriculum requirements for traffic safety education.

Barriers that exist relative to funding have been the competitive nature of the various funding sources previously available for funding infrastructural projects (sidewalks, traffic calming, signage, lighting, etc.). Surface Transportation Planning (STP) "enhancements" funds can be used to fund sidewalk and bikeway projects but usually the list is long and the funding cycle seven years out from the time that a project is first brought forward. "Hazard Elimination" (safety) funds, have required a formula that demonstrates a cost-benefit ratio for expenditures relative to the number of crashes (fatalities and serious injuries) that occur associated with the prospective project. This formula involves dividing the recorded crashes by the amount of vehicular road use. Such a formula fails to account for the fact that many bicyclists and pedestrians will avoid busier roads and intersections, potentially skewing the funding data away from pedestrian and bicycle infrastructure that would benefit programs like

Safe Routes to School. In general, these sources respond to the past history of crashes rather than focusing on prevention and the creation of a safe environment for children to walk and bike to school (Appleyard, 2003).

Even with the advent of the new SAFETEA-LU funded earmark for "Safe Routes to School," the amount of money each state receives (and then will allocate to its districts) will not come close to funding all the infrastructure projects that would be needed to truly make this program successful. However, *it is a start*, and a focus, which hopefully will bring attention to the need for more funding sources to be made available, first as matching grants, and eventually as part of community needs for roadway and trail funding.

While these barriers might seem overwhelming, they are a part of the challenge of implementing a Safe Routes to School program in Florida, and if they can be addressed up front, with honesty and concern, they are not insurmountable. They may become of a part of a cultural shift resulting from increasing emphasis on green buildings and infrastructure in the wake of Hurricane Katrina and the continuing increases in gasoline prices. Coupled with health concerns for children's fitness and obesity levels, and air pollution from cars impacting the quality of our communities, the future school transportation scenario may shift away from one of car dominance. This broadening of thought gives call for optimism, a necessary ingredient in the Safe Routes to School program implementation strategy.

Conversion of School Trips: Pushing and Pulling for Change

In order to understand parents' decision about school travel mode choice is to consider it in light of a "push-pull" theory of change. Under this theory, in order to choose one mode over another, parents must see one mode as more favorable than the other. The best way to create mode shift is to make one mode less favorable, while making another mode more favorable. In other words, by creating a push factor from one mode and a pull factor to draw parents to another mode. Thus, for a mode shift driving to walking would require parents to perceive of the choice of walking as more favorable than driving their child to school. If parents consider the health benefits they receive from walking their child to school, they may choose to incorporate it into their daily routine and avoid the congestion involved in driving their child to school. Similarly, local governments could create a push from automobile travel through parking restrictions or limited access to the school site, while creating a pull to the pedestrian mode by adding sidewalks that connect to schools. The combination of the push from one mode and the pull to another mode is the most effective way to create mode shift.

The conversion of school trips from automobile to bicycling and walking can be considered in a series of sequential steps that determine the availability and convenience of various modes and the decision by parents about the

choices they make based upon available options. As has been described in some detail, three areas of planning – transportation, land development, and school – affect three areas of coordination: multimodal planning, coordinated school siting, and Safe Routes to School. These three areas of coordination, in turn, affect the options available to parents and the decisions that parents make about how their children get to school. Table 5 below summarizes the major factors in parents' decisions about how their children will get to school. One of the key differences between these three areas of planning is that currently school siting and multimodal planning are pre-emptive measures. These two areas of coordination can establish an environment that can favor bicycle and pedestrian modes of children's travel to school. Ideally, this environment would have the bicycle/pedestrian-friendly characteristics of an MMTD, and have schools sited in locations near residential land uses. Conversely, Safe Routes to School programs take a retrospective approach in establishing a team to improve the safety on a school-by-school basis. Health and safety of children, which is of key importance to a parent's home-to-school travel mode decision, is directly impacted by all three of these areas.

Table 5: Impact of Planning Decisions on Parents' School Transportation

	Planning for Multimodal Environments	**School Board Decisions about School Siting**	**Safe Routes to School Program & Educational Initiatives**
Proximity to School Site/Travel Distance	X	X	X
Existence/Quality of Infrastructure	X	X	X
Availability of "High Convenience" Options	X	X	X
Perceived Enjoyment of Trip	X		X
Children's Knowledge of Traffic and Safety			X
Health and Safety of Children	X	X	X

To understand the mode shift to walking and bicycling to school it is useful to divide these factors into two categories: (1) providing a physical environment that is supportive of the choice to walk or bicycle to school; and (2) factors that are amenable to change in light of the "push-pull" theory of change through the Safe Routes to School program. The first three factors – existence and quality of infrastructure, availability of "high convenience" options, and proximity to school – are all associated with providing a physical environment that is supportive of walking and bicycling to school. If many residences are located near the school, the neighborhood is designed with a street and sidewalk connectivity, and the neighborhood is well-connected to the school site, the mode shift to walking and

bicycling is supported; encouragement, education, and enforcement may be necessary to overcome other barriers to this mode shift. In the absence of a good physical environment for walking, achieving a mode shift will be difficult; the only families that are likely to bicycle or walk will do so because they are exceptionally committed to doing what they consider "right," or they have no other options.

The availability of high convenience options for travel to school can be considered in a variety of dimensions. For parents who live in close proximity to the school, walking and bicycling may be a convenient option that avoids the congestion associated with school traffic. For parents whose children walk along a route that had been determined to have "hazardous" walk conditions, the school bus may be more convenient than driving their children the short distance to school. For parents who live beyond two-miles from school, driving may be more convenient than putting children on the bus especially if the family has more than one driver.

Thus, once the physical environment that encourages walking and bicycling is in place through careful multimodal and coordinated school planning, the challenge of affecting mode shift becomes a part of the Safe Routes to School Program. Influencing this change involves four components, which are basically included as part of TDM programs and are generally called the 4 E's of traffic safety: engineering, enforcement, education, and encouragement. Taken together, these four components can be used to overcome some of the more difficult barriers to walking and bicycling and increase the enjoyment of the school trip and children's knowledge of traffic and safety. In the next section, these four components will be discussed in detail.

Engineering solutions involve changes in the physical environment, such features of the roadway, which reduce the risk of pedestrian injuries and improve infrastructure for those on foot or on bicycles. Each school is unique and needs to be individually assessed, but there are some solutions that are universal. For example, reducing traffic speed is critical, both to prevent encounters between vehicles and pedestrians and to reduce the mortality of such encounters when they do occur. In a British study, the risk of pedestrian death in crashes rose from five per cent at 20 mph to 45 percent at 30 mph and 85 percent at 40 mph (Pucher and Dijkstra, 2003). The town of Odense in Denmark implemented an example of the Engineering Model of the Safe Routes to School program in 1978. The program was very successful, and reduced the number of child pedestrian crashes from 10 per year to 2 per year. This reduced rate occurred within a year by performing tasks such as installing speeding humps, traffic circles, and installing wider sidewalks (Transportation Alternatives, 2002).

Many engineering solutions aim to reduce congestion as well as speed. In the immediate vicinity of schools, much of the traffic consists of parents themselves, dropping children off and picking them up. Slowing the traffic is

accomplished with “traffic calming” techniques such as single-lane roundabouts, raised or colored crossings, speed humps, curb extensions (bulbouts) at intersections, and pedestrian warning signs or flashing devices. Widened sidewalks, exclusive pedestrian signal phasing, pedestrian refuge islands and increased intensity of roadway lighting are also in the “tool box” of infrastructure improvements that enhance the pedestrian and cycling environment (Retting, Ferguson, and McCartt, 2003: 1462). Children face greater risk when trying to walk or bike across larger and more complex intersections. Therefore, measures that focus on improving pedestrian safety along heavily traveled roads, crossing major intersections or finding parallel, lower volume routes are critical to improving safety. Additional engineering solutions are shown in Table 6, and broader principles of school traffic management are shown in Table 7.

Table 6: Engineering measures to improve safety encourage walking and bicycling

- Increasing school zone beyond school property boundary to include major crossings adjacent to school
- Overhead and solar panel flashers for school zone designation where crossings occur
- Special emphasis crosswalks (including use of yellow color vs. white for crossing stripes in school zones), raised pedestrian crossings (stamped or real brick inlay)
- Staggered dismissal times to separate students walking from car traffic
- Parent drop off zones away from school site but close to designated walk routes for safe access
- Bright yellow green school zone and pedestrian crossing signs to designate school zones
- Pavement markings and bulb-outs at corners to reduce crossing distance and tighten turning radii

Traffic calming techniques including:

- Vertical deflections such as speed bumps and rumble strips
- Horizontal deflections such as “chicanes” (a series of street narrowing on alternating sides of the street, forming S-shaped curves)
- Road narrowing
- Islands in streets, including pedestrian refuges
- “No turn on red” or exclusive pedestrian signaling (FTBSEP, n.d.)

Table 7: Principles of school traffic management

- Keep all movements separate (i.e. pedestrian, bicycle, auto, bus)
- Keep all turning movements low-speed
- Reduce speed in school walk zones to 20 m.p.h. or lower
- Provide well-identified (high emphasis) crossings (i.e. "Zebra" striping or brick)
- Give priority to pedestrians and bicyclists
- Release walkers and bicyclists before auto pickup
- Do not permit queuing in undesirable locations
- Do not permit drivers to cross main pedestrian routes
- Use school crossing guards and safety patrols for elementary students
- No right turn on red in school zone crossings
- Avoid multiple-lane highways at school entrances
- Encourage access management techniques for ingress and egress (FTBSEP, n.d.)

Enforcement addresses parental and community concerns about two kinds of danger: automobile traffic and crimes against children. Police departments generally foster the enforcement component. Often the police map data to determine which schools have the highest number of crashes in order to gauge enforcement needs. The enforcement component also uses education as a method of reducing crashes (Transportation Alternatives, 2002). With regard to automobile traffic, enforcement focuses on visible, consistent application of speed limits and similar laws, and the presence of crossing guards. Speed limits should be held down to 20 mph. or below during walk times (morning and afternoon) and then strictly enforced. (Many communities impose double fines for speeding in school zones). Police, crossing guards, and the presence of other adults may provide some reassuring protection from crime, abduction, and bullying. These protection strategies may aid in addressing safety concerns (Crider and Hall, in press). More examples of enforcement techniques can be found in Table 8.

Table 8: Enforcement techniques for pedestrian safety.

- Site-based crossing guards (school teachers, parent volunteers) who receive four-hour mini-training for "on-site" guards in the school zones
- Off-site crossing guards hired, trained, supervised and strategically placed by law enforcement agency
- Sheriff's "Citizen Courtesy Notices" as a type of community watch program
- Speed trailers or variable message signs for speed control
- Bike patrols and cadet bike patrols "on duty" in school zones during school start and dismissal times
- Speed limits visibly posted and aggressively enforced

- “Neighborhood watch” programs and similar “eyes on the street” programs (FTBSEP, n.d.)

Education takes many forms beginning with early pedestrian safety education for children, as well as education aimed toward parents, and motorists in school zones. Pedestrian education targeted to schoolchildren has been shown to have had mixed degrees of effectiveness, especially as the only strategy employed. Children’s knowledge of safe crossing techniques and their crossing behaviors can show improvement, but this is conflicting across studies (Duperrex *et al.*, 2002; Rivara, Booth, Bergman, Rogers, and Weiss, 1991). In fact, it has been suggested that the cost-benefit ratio is far higher for traffic calming than for pedestrian education (Roberts, Ashton, Dunn, and Lee-Joe, 1994). However, in combination with other approaches, education may well improve safety.

Safety officials can deliver early and repeated education for children in the techniques and skills of pedestrian and bicycle safety through physical education classes, videos, and presentations. A curriculum on pedestrian and bicycle safety is ordinarily designed as a continuum, with age-appropriate materials for elementary through high school students (when it is incorporated into Drivers Education classes). One commonly used activity involves children and their parents mapping and walking their route to school, identifying the safest route as well as any hazards, and addressing how to minimize the hazards. This can be coordinated with an early fall or late summer PTA walk to school program when there are still plenty of daylight hours. Education for parents who drive their children to school focuses on their awareness to watch for children walking and bicycling and to not speed away after the drop off. School zone signage, overhead flashing lights, bright yellow/green pedestrian crossing signs, and speed trailers are techniques mentioned earlier under engineering or enforcement, but all serve to alert and educate motorists on roadways surrounding schools. Other educational strategies include PTA programs with safety topics, student-produced materials asking parents to slow down and watch for children crossing, and student-created “Parents Be Safe” videos (Florida’s Safe Ways to School Program Took Kit).

Encouragement, the fourth “E,” corresponds to social marketing, persuading both parents and children that walking and bicycling are viable choices. International Walk to School Day is an annual event that promotes this concept (PBIC, 2005). There is an opportunity for the parents to network, form a “walking school bus” from various neighborhoods, and for the administration to demonstrate support for walking and bicycling. While it is only done as a one-day event, the concept is to be the impetus for walking and bicycling on an ongoing basis. Thus getting parents to walk their child to school on one day, may, with additional encouragement, get them to walk their child once a month or once a week. When coupled with organized activities among parents in the neighborhood, the cumulative impact of individual decisions can be significant.

An important technique is the use of "walking school buses" or "bicycle trains." These are coordinated, scheduled group journeys to school on foot or by bicycle. In a typical program, a route to school and schedule are formulated and distributed. Each morning, the "bus"—a group of children walking—departs a fixed location and continues along the route, often with volunteer adult escort. As the bus proceeds, children can join it for the walk to school. Some groups pull along a cart to carry heavy backpacks, and some use specials flags or vests to alert motorists. This mode of transportation provides many advantages, including a friendly, safe, and secure method to travel to school. Additionally, this technique facilitates a social network among walkers (Crider and Hall, in press). Walking school bus programs can range from being as informal as a small group of interested parents traveling together with their children to school, or as formal as a large group of parents and students with a planned, designated route, pre-scheduled student pickup times, and a rotation schedule for who will lead the group on any given day. There are positive and negative implications for either selection. For example, while an informal program can be more flexible and easier to plan, it may not reach as many families or have as much of an impact on traffic congestion. Likewise, a formal program would be more difficult to plan, coordinate, and maintain, but reaches more families and can relieve more traffic congestion). Another form of encouragement involves carpools for children who live beyond a comfortable walking distance from the school. A wide variety of creative encouragement techniques exist, and examples are shown below in Table 9.

Table 9: Techniques to encourage walking and bicycling to school

- Park and walk (parents drop children off within walking distance of the school) for parents who live too far for their children to walk directly from home
- Children's "frequent rider" (bicycle or carpooler) miles certificates
- Competitions among schools for the best innovations to promote walking and bicycling (e.g. the British "Safe and Sound Challenge" program, which offers cash prizes to winning schools)
- "Walk on Wednesdays" programs providing small gifts, a special lunch or certificates for the class with the greatest number of walkers on that day
- Footprints or "paw prints" (representative of a school mascot) imprinted or painted into the sidewalk along the designated safe path to school
- Schoolwide safety week, posters contests, class prizes for highest percent of walkers and bicyclers (extra recess, morning snacks)
- Banners for street "reclaiming" or to celebrate "Walk A Child to School" week
- Bike Safety Festival Day
- "Corner Captains" (retirees reading in their front yards supervising children)
- Neighborhood safe watch programs
- "Safe house" designations
- School phone trees for safe arrival (FTBSEP, n.d.)

VI. RECOMMENDATIONS

Based upon the review conducted as a part of this research and the input provided by our Statewide Advisory Council, several recommendations have been established for state and local action to provide a safe and supportive environment for the implementation of Safe Routes to Schools programs. This chapter is organized from general to specific recommendations. First strategies and guiding principles are identified. Then, recommendations for state legislation are outlined. Next, recommendations for state agency and local government and school board action in existing programs are identified. These recommendations are ranked to reflect the opinions of our Statewide Advisory Council, and a brief discussion of the council's findings on the recommendations follows. Finally, recommendations for specific tools for each of the three separate areas of analysis are identified based upon best practices identified earlier in this document.

Strategies and Guiding Principles

The most critical aspect of the safe ways to school program is the need for **ongoing coordination** between the state agencies, local governments, including cities, counties and school boards, and other private and public organizations. The efforts should involve activities directed at organizations at the state and local level. The goal of this coordination should be the development of communities that balance the need for safe, continuous, and predictable environments for pedestrians, bicyclists, especially near schools, with the need for mobility within the community. Without attention to the creation of multimodal environments that encourage alternatives to the automobile throughout the community, the traffic near school zones is likely to remain an issue. This goal should be encouraged irrespective of whether a school is located in an MMTD or in another area of the city. The creation of these types of environments should be a priority of all organizations and should be facilitated by state agencies through rules and guidance, legislation and programs. With this goal, we recommend the following actions:

1. First and foremost, the State of Florida Safe Routes to School **program should be administered by a single organization** connected with a research and training institution with an administrative center and staff supported through FDOT or federal "Safe Routes to School" funds. The so-called "Safe Routes to School Center" should be headed by a coordinator and assistant coordinator, and be responsible for supporting training, a clearinghouse, a resource center, and a research program that examines project and program effectiveness, maintains a database for travel mode and crash data, and provide technical assistance to school districts, principals, planning organizations, and other public and private sector organizations involved in providing a safe environment for children to go to school. This Center should have a link to the State's LTAP for

the purposes of providing training. This Safe Routes to School Center should direct a state advisory board selected by the coordinator that manages a grant-funding program and the funding criteria, with 30% of funding to be spent on non-infrastructure projects. The State Advisory Board should be required to meet annually or biannually to review individual grant awards for SW2S programs.

2. The State Safe Routes to School Center, with the advice and consent of the **State Safe Routes to School Advisory Board, should establish a statewide grant program** for infrastructural projects and educational programs associated with school traffic safety, and the promotion of Safe Routes to School programs. The Advisory Board should establish criteria for funding of projects within the 2-mile walk distance of schools in such a manner that identifies schools that have the potential to convert from automobile to walk and bicycle trips. Highest priority schools would be those with a high number of students near schools and schools with high numbers of students walking despite hazardous conditions. The criteria for grant awards should also include:

    - Schools with high numbers of children living within 2 mile walk distance, who are presently driven by private automobile
    - Schools that demonstrate a high level of interest in supporting walking and bicycling and are willing to fully participate in the project (This item is the most critical element. Unless the school administration, parents, and students are willing to support a Safe Routes to School Program, lots of time and money can be spent with no increase in the number of kids walking and bicycling to school.)
    - Schools in with a high number of pedestrian and bicycle injuries/fatalities among children
    - Schools with a significant walking population and poor pedestrian and bicycle facilities (no or incomplete sidewalk or side path network or major barriers to direct access) and a need for safety
    - Schools requiring “courtesy busing” for Hazardous Walking conditions**;**
    - Schools that need safety improvements
    - Schools that need financial assistance to complete feasible bikeway or pathway connections (via utility easements, Rails-to-Trails, greenways,) that connect to neighborhoods and parks
    - Schools that incorporate safe school access in their School Improvement Plan, the county comprehensive plan, or as part of an interlocal agreement between the county and school board.
    - Schools exhibiting poor health indicators, such as elevated Body Mass Index levels.

3. The FDOT should continue to support the Safe Routes to School efforts in Florida through **partnerships** with the FDCA, FDOE, FDOH, Parent Teacher Associations, Department of Highway Safety and Motor Vehicles, FTBSEP, Metropolitan Planning Organizations, Rails to Trails Conservancy, Office of Greenways and Trails, CTST coalitions, and local planning staff and advisory boards, local county health departments, SAFE KIDS chapters, and others with the goal of ongoing coordination to ensure that the Safe Routes to School Program is successfully implemented.

4. The FDOT and FDCA should work together to provide guidance to local governments and school districts on **best practices in school siting** that reflects multimodal planning concepts and ensures that walkable and bikeable roadways are available within residential areas proximal to elementary and middle schools. This guidance should be directed towards all new development and redevelopment. Development adjacent to school property should be required to provide a right of way and a direct safe access path for pedestrian travel to the school site. The access route shall connect to the neighborhood's existing pedestrian network.

Legislation

5. **Formalize the funding process to receive federal funds** and set aside a minimum percentage (not less than the federal recommended formula) for each FDOT district to earmark for school safety projects that remove hazards and improve conditions for walking and bicycling by amending the state "Safe Paths to School" Bill; provide criteria for prioritizing projects and establish an advisory committee to award annual grants. In the allocation of the Safe Routes to School funds, due consideration should be given to ensure that projects that are developed as part of this program are implemented quickly enough to show program results in their communities during the period covered by SAFETEA-LU legislation.

6. **Hazardous Walking Conditions** as defined by the FDOE shall provide funding to districts under the current criteria for a **5-year period only**, after which the local jurisdiction must show reason why the hazard has not been addressed.

7. **Land Development Regulations** for all new or redevelopment initiatives that are within two miles of an existing or planned school, shall be required to complete sidewalks (minimum 5 feet) along the corridor that directly serves the school, or qualifies as an acceptable designated walk or bike route to the school (greenway, trail easement). New development within two miles of a school must provide a sidewalk on both sides of the street or a direct route to the community school. Developments immediately adjacent to school sites shall be required to have direct access from the

neighborhood to the school site. In the interim, these requirements should be reflected in the interlocal agreements of any Safe Routes to School pilot schools.

8. Encourage and enhance the **Florida School Crossing Guard Training Program** by recommendations for administrative support, appropriate funding strategies, training, and legal status given to guards.

9. Within MMTDs, the **speed limit should be reduced to 25 mph** on all school routes and 15 mph in school zones. Local governments, in cooperation with school boards, would designate school zones.

10. Create a state requirement for all state accredited educational institutions K-12 to provide a minimum of **4 hours of traffic safety instruction** at each level (elementary, middle, high school) each year, with recommended curriculum units (pedestrian, bicycle, driver education) at each of the three levels.

State Agency Action

11. **Department of Education** should require local school districts to conduct an annual **Student Travel Mode count** at all elementary and middle schools. These counts should be maintained by the school district transportation director and available to city/county planning agencies, CTSTs and other local agencies dealing with school transportation issues. These data would be used to establish baseline data for each school, help to identify target schools for travel mode shift efforts, and helps evaluate program effectiveness. During the course of this project, the research team found that the FDOE and the FDOH are conducting similar efforts that may be substituted for the travel mode counts, which the FDOT should research further.

12. The **FDOE** should require local school districts to incorporate **long-range student transportation costs in their decisions** regarding the selection of school sites.

13. The **FDOT and FDCA** should work together to **provide guidance to local governments** and FDOT districts to ensure that the transportation network balances the need for regional mobility and community livability. In areas with SIS and TRIP facilities near schools, the FDOT should work with MPOs and local governments to develop a connected street grid that offers a safe and lower speed alternative to roadways designed for state and regional mobility.

14. A subcommittee of the **MPOAC or CTST Coalition** would also solicit and recommend project funding for Safe Routes (Ways) to School, and even nominate schools for grants.

15. The **FDOT** should develop **recommendations** through the multimodal district planning efforts for **encouraging mode shift for school trips** from auto to bike and walk, through improved connectivity, bicycle and pedestrian LOS at "B" or better on all routes to adjoining existing schools, and traffic calming methods for speed reduction.

16. In MMTDs and TCEAs**, peak hour school trips must be minimized**, including trips to schools of choice or "charter" schools. In addition, the bicycle and pedestrian LOS along the routes to school should maintain a minimum of LOS of "B."

17. **School Zones** should be re-evaluated by local governments to consider safe crossing of children across major roadways. FDOE guidelines should be lengthened around the school site to incorporated adjoining intersections and roadway segments to the next nearest adjoining crossing.

18. FDOT and FDOE should include bicycling and walking incentive strategies for **multimodal districts and new schools**, respectively, including:

    c. Sidewalks (complete, unobstructed, continuous, minimum 5 ft. width) within 1 mile of elementary schools and 2 miles of middle schools within the multimodal district
    d. Connectivity plan utilizing trails, various right-of-way easements off of the major road system, and established as walk/bike trails to destinations including schools and parks, from adjoining neighborhoods.

19. The **FDOE, FDCA, and FDOT** should adopt an **objective school siting process,** such as the Martin County Matrix, which reflects a commitment to walkable and bikeable schools.

20. The **FDOE, FDCA, and FDOT** should research the **applicability of IPSAC in Florida** as an objective and comprehensive process for coordinating school siting decisions, land development patterns, transportation costs, and location efficiency.

21. The **FDCA, FDOT and FDOE** should expand their **research** efforts on the connection between **school siting and concurrency practice**. The data collected in the annual Travel Mode Survey will provide the basis for

understanding what factors are associated with sting schools in locations that support multiple modes of travel.

22. **Public schools** chosen by parents as alternatives to those assigned by the local school district **should be located within the same neighborhood** as the student's residence.

Local Governments and School Boards

23. All approved MPO **Long Range Transportation Plans (LRTP**) shall 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.

24. **Speed limit recommendation in MMTD** 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.

25. Within **school zones**, an emphasis should be placed on crosswalks and other forms of traffic calming.

26. **The school siting process** should include better coordination in the preliminary stages of site planning.

27. 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**. This encouragement could be funded with an increase of $0.50 to $1.00 on every driver's license issued in the State of Florida and allocated for traffic safety education. This money is collected by the FDHSMV and distributed to FDOE for district level traffic safety education and instructors.

Recommendations Meeting Results

Upon reviewing the final recommendations, the Statewide Advisory Council met to discuss the final recommendations of this report, and to rank the recommendations in order of priority based on their respective areas of involvement. Each of the council's fifteen representatives received a total of eight votes to allocate towards the recommendations they felt were most important. Table 10 provides the resulting recommendations ranking developed at the final Statewide Advisory Council meeting in December of 2005.

From the discussion of the final recommendations, several state agency representatives made commitments in support of various recommendations based on the council's prioritization. The FDOE, FDCA, and FDOT agreed to incorporate the long range costs of transportation into their guidance on school construction cost feasibility, including the maintenance, operational, and capital improvements costs associated with school busing. Both the FDOT and FDCA agreed to build guidance on balancing regional mobility and connectivity into their mitigation documents for local governments. Additionally, both the FDOT and FDCA agreed to incorporate encouragement of "LOS B or better around schools" into their evaluation criteria. Based on the group's discussion, the FDOE, FDCA, and FDOT representatives recognized steps their respective agencies could take to improve the current school transportation issues.

Besides state agency action commitments, the group's selection of the highest priority recommendations was focused on two main themes: 1) the funding sources and distribution for Safe Routes to School programs; and 2) the implementation of the programmatic elements of the program through existing channels. The group's top-priority recommendation addressed both of these themes, and the second and third highest addressed funding and program administration strategies as well. The council eventually built a consensus focused on funding Safe Routes to School programs as a justifiable intervention program for FDOH or CDC funds aimed at the obesity epidemic. These funds could be used through the Coordinated School Health Program, which represents a partnership between the FDOE and the FDOH. The localized channel of implementation would be through the Health and Fitness portion of the FDOE's School Improvement Plans[10], or the FDOH's Wellness Plans.

---

[10] As of December 2005, the DOE was in the process of developing guidance for the Health and Fitness portion of the School Improvement Plan. This guidance is aimed at improving the focus of the School Improvement Plans, and especially in the area of Health and Fitness.

Table 10: State Advisory Council's Recommendations Ranking

RANK	RECOMMENDATION (Recommendation #)	TOTAL VOTES
1	SIPs to include safe bike/ped strategy through traffic education funds (#27)	13
2	Administration by a single organization (#1)	10
	Establishment of statewide grant program (#2)	10
3	State guidance on walkable school siting (#4)	6
4	FDOE, FDCA, & FDOT to adopt objective school siting process (#19)	5
	Guidance on balancing regional mobility & regional connectivity (#13)	5
	LRTPs to include safe school access (#23)	5
5	Long-range transportation costs in feasibility (#12)	4
	Sidewalk completion requirement (#7)	4
6	FDOE to require Student Travel Mode count surveys (#11)	3
7	Limit funding for HWC to 5 years (#6)	2
	School zone areas increased to include adjoining intersections (#17)	2
	State required 4 hours traffic safety instruction at each level (#10)	2
8	FDOE, FDCA, & FDOT to research connections between school siting and concurrency (#21)	1
	FDOT MMTD bicycle/pedestrian incentive strategies (#18)	1
	Preliminary coordination in school siting process (#26)	1
	Speed limit in MMTDs limited to 25 and 15 mph (#24)	1
9	FDOE, FDCA, & FDOT to research applicability of IPSAC in Florida (#20)	0
	FDOT to encourage LOS B or better around schools (#15)	0
	Earmark federal STP funds for SW2S (#5)	0
	Emphasis on crosswalks and traffic calming in school zones (#25)	0
	FDOT supported partnerships w/state agencies (#3)	0
	FSCGTP enhancement (#8)	0
	MPOAC/CTST subcommittee to recommend SW2S project funding (#14)	0
	Peak-hour school trip minimization in MMTDs & TCEAs (#16)	0
	Schools of choice to be located w/in MMTD (#22)	0

Recommendations #1-4: Strategies and Principles
Recommendations #5-10: Legislation
Recommendations #11-22: State Agency Action
Recommendations #23-27: Local Governments and School Boards

Analysis Tools

Multimodal Handbook

The Multimodal Transportation Districts and Areawide Quality of Service Handbook should be updated to reflect the recommendations of this document. The current handbook describes schools as a supportive of the significant land uses – employment and residences. To understand the role of schools in an MMTD, two diagrams have been developed to show the relationship between residences and schools. These diagrams are not meant to supplement the diagram that indicates the mix of land uses within the broader MMTD, but to indicate the types of land uses in a

sub-area of the MMTD. The complementary land uses can be characterized by either of two diagrams: (1) primarily residential (see Figure 14) and (2) mixed use residential zone (see Figure 15). The primarily residential area would surround the school in the middle of a residential neighborhood that is connected to the mixed-use center in the middle of the MMTD. This diagram shows the relationship between the residences and the school; the connection to the activity center in the MMTD is not indicated here. The mixed-use residential zone would have many of the same types of development as are located in the center of the MMTD, but the level of density and intensity and the mix of land uses, would differ and be compatible with the school. Thus, land uses that induce heavy truck traffic, or automobile traffic, especially during peak school periods, would be discouraged in these locations.

Figure 14: Primarily Residential Area of MMTD.
Source: Authors

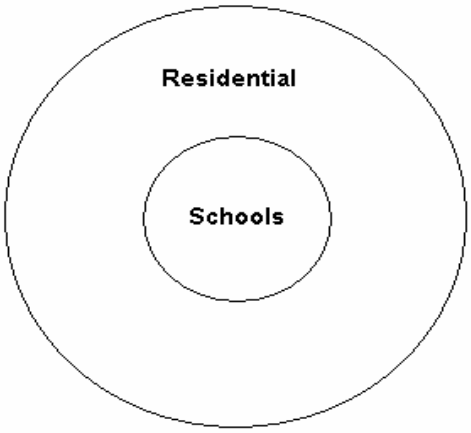
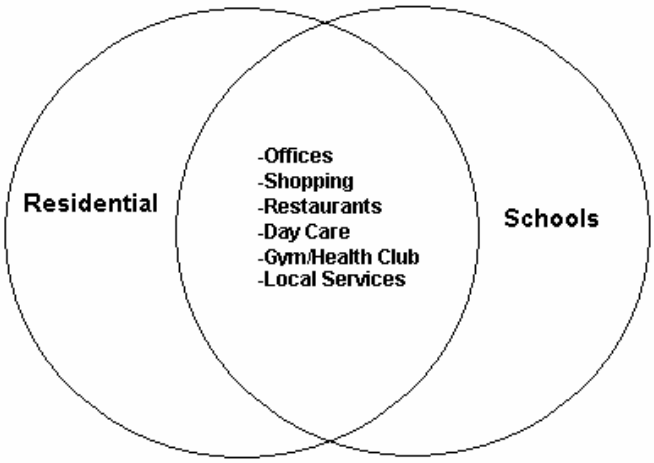


Figure 15: Mixed-Use Residential School Area in an MMTD
Source: Adapted from FDOT, 2003



School Siting "Best Practices" Tools

- **Martin County's School Siting Matrix** should be adopted by the Florida Department of Education and local school districts as an objective and comprehensive tool for school siting. This matrix should be tailored to fit the individualized needs of local districts, but should simultaneously reflect a commitment to walkable and bikeable schools located within the neighborhoods they are intended to serve.

- **Integrated Planning for School and Community (IPSAC)** should be researched further to determine its applicability in the State of Florida as an objective tool for school siting. IPSAC should be recognized for its potential to reduce coordination problems between school boards and local governments in Florida by planning objectively with the interests of both parties reflected.

Safe Ways to School Toolkit

As discussed earlier in this report, the Florida Traffic and Bicycle Safety Education Program staff developed a "Safe Ways to School Toolkit" as part of the 1998-1999 pilot project. This tool kit contains a number of assessments and survey instruments that are helpful in the implementation of a Safe Ways or Safe Routes program. The entire tool kit, as originally published, can be downloaded from their website (see Florida Traffic and Bicycle Safety Education Program, n.d.).

As part of this research, the project team gathered and evaluated survey instruments from other programs across the U.S. and Canada and will suggest replacement or supplementary tools for future implementation of Florida Safe Routes to School initiatives. These tools will be listed below, along with their respective sources. Refer to the "Works Cited" section for information or to obtain originals of the documents mentioned in this section.

1. **Travel Mode Surveys**
   The **Student Travel Survey,** found in the Florida tool kit (see FTBSEP, n.d.), is recommended as a starting point for assessing the mode split (walking, bicycling, car, school bus) and a bi-annual check to see if programs are making a shift to more walking and bicycling. It is critical baseline information, obtained by a classroom activity where the teacher requests a show of hand to indicate how they came to school on that day. Recommendations for revision of the form include localizing it for return information and date.

Separating out morning from afternoon mode of travel should be considered.

2. **School Site Audits**
   The CDC "Kidswalk" handbook revised the Florida tool kit "**School Site Assessment**" deleting the sections on school administration and policy regarding education and enforcement programs, existing safety teams, and school siting policy. In doing so, they shortened this form, making it more useable for a school administrator and safety team to fill out. However, somewhere in the process of program implementation, an assessment of education programs and crossing guard programs should be addressed. The CDC tool is titled **"School Site Audit"** and can be found online (see *Maryland Safe Routes to Schools Guidebook – Sample Documents*, n.d.). It is recommended that there be space left at the end of each section for comments.

3. **Neighborhood "Walkability" Audits**
   A number of instruments were analyzed to assess the conditions on children's walk route to school. The need to create a list for planning improvements requires an accurate assessment (audit) of what currently exists, especially regarding sidewalks (availability, completeness, width, and condition), traffic control devices and signage for school zones, street crossing conditions (crossing guards present type of roadway and number of lanes to be crossed), and various other "walkability" conditions (security from crime, bad dogs, street fights, construction zones, railroad tracks, etc.). The city of Phoenix, Arizona, conducts a **School Crossing Safety Audit** that is used primarily to help in the placement of crossing guards (see City of Phoenix Street Transportation Department, 2003).

   NHTSA provides a "walkability" survey to be used by parents and neighborhoods to assess how pleasant (or not) the streets of their neighborhood are to walk. It is a useful tool for raising the consciousness for walkability, but lacks the necessary "rigor" for an actual audit of specific information needed to make project improvement lists.

   With the necessary equipment, there is a portable handheld recording system for conducting a **Walkability Audit with ArcPad GIS**. It utilizes a program loaded on a personal digital assistant (PDA) and mobile version of GIS to spatially record data regarding street segment conditions that can be used to assess the pedestrian environment. It can also take a compact flash picture

and link it to the specific street segment (see Schlossberg, M., Phillips, P., and Wyss, D., 2005).

Florida's **Neighborhood Site Assessment** tool is long, with several categories in a type of matrix of conditions. It requires the assistance of a transportation engineer along with parent volunteers to fill it out. It does, however, give a rather complete picture of the walking conditions, and enough useful information to suggest needed improvements (see FTBSEP, n.d.).

The CDC's **Walkable Routes to School Survey** incorporates the categories of the Florida tool, but simplifies it and gives a space for specific locational information next to the identified deficiency (see Center for Disease Control, n.d.). As such, it is a useful tool and is recommended as an alternative to the Florida Neighborhood Site Assessment Tool.

4. **Parent Surveys**
   It is *imperative* to have support from the parents to make the Safe Routes to School Program successful and to accurately assess concerns about their children walking or bicycling to and from school. The survey can get some information, but it is best to combine it with a parent meeting or focus session (PTA or School Advisory Committee meetings work) to find the parents who are most supportive and willing to participate in the implementation of a program.

   Florida's tool kit **Parent Survey** is one possible approach. Variations of the survey have been included in the CDC "Kids Walk to School" manual, including the **Parent Survey** and **Walk-To-School Survey** (see CDC, n.d.), Marin County's parent survey (see Marin County Bicycle Coalition, n.d.) and **New York City's "Walk to School, Parent/Guardian Survey** (see New York City Department of Transportation, 2004). All of these instruments ask questions about the children's mode of travel, distance from school, and safety/security concerns. Several surveys also include questions about what initiatives could be taken that would encourage parents to allow their children to walk or to accompany their child to school. A section on "sign up here" if interested in helping with the program, can also be included.

5. **Student Surveys and Activities**
   Students are another vital piece to making a successful program. They are often the most knowledgeable on the issues associated with their walking route and what will help them to feel safer making this daily trip by foot or bike. As such, it is important to ask them to identify their route, and what conditions need to be improved. The Florida tool kit includes a student activity form that has students identify their travel mode, distance to school

(in time), and what things they think would help make it safer (see FTBSEP, n.d.). It also involves using a map of the school zone and drawing their route to school, listing any specific problem areas and possible solutions. Marin County and many other existing programs have similar student surveys and activity guides. All are good and useful. Children are incredibly talented at getting to the heart of the issue without constraints of political or budgetary concerns. They want the ability to walk and ride their bicycles and want adults to help make that possible.

6. **"Walk to School Day" press releases and other encouragement tools**
   The websites (see Pedestrian and Bicycle Information Center and Partnership for a Walkable America, 2006) have numerous promotional materials for conducting events and activities that support Safe Routes to School programs, as do many of the state and federal agencies (see Appendix E). These pieces are very important in the community "buy in" part of this program. Without that, it is not successful.

   (Note: These are just a sampling of the good work that is being done around the U.S. and in many other nations as mentioned earlier in the "best practices" section. As this movement grows, other tools will emerge that refine and improve the programs. Better methods will be found that help encourage parents; children, teachers, administrators and community leaders to give children back the safe mobility they deserve. All will benefit.)

VII. CONCLUSION

Parents' decisions about how to safely get their children to school are complex and dependent upon the travel options available. For some children, who live a long distance from school, the choice will be limited to taking the school bus or being driven to school by their parents. For other children, the physical environment surrounding the school may be a determining factor in the choice of transportation mode to school. State agencies, including the FDOT, FDCA, and FDOE, local governments and school boards, and other private and public organizations, all have a role in improving the coordination between transportation, land use and school planning and the overlapping areas of coordination: multimodal planning, coordinated school planning and Safe Routes to School. Multimodal planning and coordinated school planning can create a safe and predictable built environment in which the 4 E's of the Safe Routes to School Program – education, encouragement, enforcement and engineering - can be implemented to increase the opportunities for children to engage in routine physical activity while walking to school.

The most critical aspect of the Safe Routes to School Program is the need for ongoing coordination between these diverse programs. The goal of this coordination should be the development of communities that balance the need for safe, continuous, and predictable environments for pedestrians, bicyclists, especially near schools, with the need for mobility within the community. Without attention to the creation of multimodal environments that encourage alternatives to the automobile throughout the community, the traffic near school zones is likely to remain an issue and our children are likely to continue to experience the negative consequences of a lack of physical activity. With improved attention to multimodal transportation planning, coordinated school planning and Safe Routes to School programs we may be able to halt the decline in the number of children walking and bicycling to school.

APPENDICES

APPENDIX A: List of Abbreviations and Terms

- CIE: Capital Improvements Element
- CTST: Community Traffic Safety Team
- EAR: Evaluation and Appraisal Report
- EPA: Environmental Protection Agency (United States)
- FDCA: Florida Department of Community Affairs
- FDEP: Florida Department of Environmental Protection
- FDHSMV: Florida Department of Highway Safety and Motor Vehicles
- FDOE: Florida Department of Education
- FDOH: Florida Department of Health
- FDOT: Florida Department of Transportation
- FTBSEP: Florida Traffic and Bicycle Safety Education Program
- LOS: Level of Service
- LRTP: Long Range Transportation Plan
- MMTD: Multimodal Transportation District
- NHTS: National Household Transportation Survey
- NPTS: National Personal Transportation Survey
- NHTSA: National Highway Traffic Safety Administration
- OGT: Office of Greenways and Trails (Florida)
- PTA: Parent Teacher Association
- PDOT: Portland Department of Transportation
- RTC: Rails to Trails Conservancy
- SR2S: Safe Routes to School Program, a generic term to describe various state programs, and a federal program established in the SAFETEA-LU legislation in 2005
- SW2S: Safe Ways to School Program, established in Florida in 1997, and managed by the Florida Traffic and Bicycle Safety Education Program
- SP2S: Safe Paths to School legislation of 2002, which sets up a program in the Florida Department of Transportation for a statewide initiative
- TCEA: Transportation Concurrency Exception Area
- TCMA: Transportation Concurrency Management Area
- TND: Traditional Neighborhood Development
- TRIP: Transportation Regional Incentive Program

APPENDIX B: Martin County Elementary School Siting Matrix

SUBJECT SITE: _____

GEOGRAPHIC - WALKABILITY

		RAW SCORE (1-5)	WEIGHT FACTOR	WEIGHTED SCORE
1	% of students existing within 2-mile radius (0=none; 5=all)(existing students + approved subdivisions/lots projected to be built w/in 5 years but yet unbuilt;MC ARDP data)		5	0
2	% of students proposed within 2-mile radius (0=none; 5=all) (NOTE: score as improvement to existing condition-- as area builds out)((per adopted FLUM and approved subdivisions/lots projected beyond 5 years)		5	0
3	existing/proposed condition of sidewalk network (0=need to build whole network; 5=network ready)(existing, within first 5 years of adopted CIP + within adopted private master plan)		1	0
4	walkability of 2-mile radius (along "pedestrian routes" as defined by Chapter 6A-3, F.S.) (0=not walkable; 5=highly walkable)		3	0
5	average adopted speed of roadway network within 2-mile radius (use 25 MPH as base) (0=too fast; 5=25 MPH)		3	0
	SUB-TOTAL FOR CATEGORY (max. of 85)			0

GEOGRAPHIC - COMPLEMENTARY USES

6	proximity of existing/planned public park/rec. uses/sites (w/in 2-3 miles; after-school activities) (0=distant; 5=close) (existing + within first 5 years of adopted CIP)		2	0
7	proximity of existing/planned complementary public uses (library, comm. center) (w/in 2 miles) (0=distant; 5=close) (existing + within first 5 years of adopted CIP)		2	0
8	potential to co-locate with proposed school facility, public park/rec use, or complementary public use (0=not able; 5=able)		2	0
9	ability for noxious uses to locate within 1-mile radius (industrial, heavy commercial) (0=any; 5=none)(NOTE: existing or potential use based upon adopted FLUM or LDRs; MC to provide list)		2	0
	SUB-TOTAL FOR CATEGORY (max. of 40)			0

SUSTAINABLE COMMUNITY DESIGN

10	inclusion of site within adopted public sector plan (e.g., CRA or neighborhood plan) (0=no plan; 5=within plan)		4	0
11	inclusion of site within adopted private master plan (0=no plan; 5=within plan)		2	0
12	proximity to population centers (0=distant; 5=close proximity) (MC TAZ)		5	0
13	degree of triangulation (0=poor triangulation; 5=ideal triangulation) (use SB standard)		2	0
14	opportunity to redevelop existing underutilized site/adaptive re-use (0=no redevelopment; 5=full redevelopment)		4	0
15	ability to maintain diversity of student population (reflect MC student demographics) (0=less diverse; 5=as diverse) (existing condition - SB FL Schools Indicator Report)		5	0
16	size of site as compared to technical standard (0=too big or small; 5=optimal)(NOTE: technical standards: Elementary = 20; Middle = 40; High = 60)(prerequesite minimums: Elementary = 10; Middle = 20; High = 35; SB to scale optimization)		4	0
	SUB-TOTAL FOR CATEGORY (max. of 130)			0

ENVIRONMENTAL & HYDROLOGIC

17	wetland complications per SFWMD & Martin County LDRs (0=many complications; 5=none)		5	0
18	functional hydrology of site (high vs. low terrain; amount of fill needed) (0=low site/drainage problems; 5=high & dry site) (DATA: stormwater plans, topo maps)		3	0
19	impacts to native habitat/uplands (0=relocation of listed species; inability to provide wetland buffers; 5=compact area left undisturbed, no impacts upon listed species; wetland buffers provided)		3	0
	SUB-TOTAL FOR CATEGORY (max. of 55)			0

INFRASTRUCTURE & EFFICIENCY

20	availability of water - line proximity (0=lines beyond 10 years in CIP; 3=lines within 5 years in CIP; 5=lines close/abutting property)		2	0
21	water plant capacity (0 = no plant capacity available; 3 = minimal capacity improvements needed; 5 = surplus capacity available)		1	0
22	availability of sewer - line proximity (0=lines beyond 10 years in CIP; 3=lines within 5 years in CIP; 5=lines close/abutting property)		2	0
23	sewer plant capacity (0 = no plant capacity available; 3 = minimal capacity improvements needed; 5 = surplus capacity available)		1	0
24	availability of stormwater (0=lines beyond 10 years in CIP; no plant capacity available; 3=lines within 5 years in CIP; minimal capacity improvements needed; 5=lines close/abutting property; surplus capacity available)		2	0
25	transportation costs for School Board (amount of bussing required) (0=all bussing; 5=minimal bussing)		4	0
26	acquisition complications (need for eminent domain, multiple ownership) (0=many; 5=single-owner & no problems)		5	0
27	inclusion of site within Urban Service District Boundary (0=outside; 3=within secondary; 5=within primary)		5	0
	SUB-TOTAL FOR CATEGORY (max. of 110)			0
	TOTAL SCORES (OUT OF 420 POINTS)			0

APPENDIX C: Martin County Middle School Siting Matrix

SUBJECT SITE: _____

		RAW SCORE (1-5)	WEIGHT FACTOR	WEIGHTED SCORE
	GEOGRAPHIC - WALKABILITY			
1	% of students existing within 2-mile radius (0=none; 5=all)(existing students + approved subdivisions/lots projected to be built w/in 5 years but yet unbuilt;MC ARDP data)		3	0
2	% of students proposed within 2-mile radius (0=none; 5=all) (NOTE: score as improvement to existing condition-- as area builds out)((per adopted FLUM and approved subdivisions/lots projected beyond 5 years)		3	0
3	existing/proposed condition of sidewalk network (0=need to build whole network; 5=network ready)(existing, within first 5 years of adopted CIP + within adopted private master plan)		1	0
4	walkability of 2-mile radius (along "pedestrian routes" as defined by Chapter 6A-3, F.S.) (0=not walkable; 5=highly walkable)		2	0
5	average adopted speed of roadway network within 2-mile radius (use 25 MPH as base) (0=too fast; 5=25 MPH)		2	0
	SUB-TOTAL FOR CATEGORY (max. of 55)			0
	GEOGRAPHIC - COMPLEMENTARY USES			
6	proximity of existing/planned public park/rec. uses/sites (w/in 2-3 miles; after-school activities) (0=distant; 5=close) (existing + within first 5 years of adopted CIP)		2	0
7	proximity of existing/planned complementary public uses (library, comm. center) (w/in 2 miles) (0=distant; 5=close) (existing + within first 5 years of adopted CIP)		2	0
8	potential to co-locate with proposed school facility, public park/rec use, or complementary public use (0=not able; 5=able)		2	0
9	ability for noxious uses to locate within 1-mile radius (industrial, heavy commercial) (0=any; 5=none)(NOTE: existing or potential use based upon adopted FLUM or LDRs; MC to provide list)		2	0
	SUB-TOTAL FOR CATEGORY (max. of 40)			0

SUSTAINABLE COMMUNITY DESIGN

10	inclusion of site within adopted public sector plan (e.g., CRA or neighborhood plan) (0=no plan; 5=within plan)		4	0
11	inclusion of site within adopted private master plan (0=no plan; 5=within plan)		2	0
12	proximity to population centers (0=distant; 5=close proximity) (MC TAZ)		5	0
13	degree of triangulation (0=poor triangulation; 5=ideal triangulation) (use SB standard)		4	0
14	opportunity to redevelop existing underutilized site/adaptive re-use (0=no redevelopment; 5=full redevelopment)		4	0
15	ability to maintain diversity of student population (reflect MC student demographics) (0=less diverse; 5=as diverse) (existing condition - SB FL Schools Indicator Report)		5	0
16	size of site as compared to technical standard (0=too big or small; 5=optimal)(NOTE: technical standards: Elementary = 20; Middle = 40; High = 60)(prerequesite minimums: Elementary = 10; Middle = 20; High = 35; SB to scale optimization)		4	0
	SUB-TOTAL FOR CATEGORY (max. of 140)			0

ENVIRONMENTAL & HYDROLOGIC

17	wetland complications per SFWMD & Martin County LDRs (0=many complications; 5=none)		5	0
18	functional hydrology of site (high vs. low terrain; amount of fill needed) (0=low site/drainage problems; 5=high & dry site) (DATA: stormwater plans, topo maps)		3	0
19	impacts to native habitat/uplands (0=relocation of listed species; inability to provide wetland buffers; 5=compact area left undisturbed, no impacts upon listed species; wetland buffers provided)		3	0
	SUB-TOTAL FOR CATEGORY (max. of 55)			0

INFRASTRUCTURE & EFFICIENCY

20	availability of water - line proximity (0=lines beyond 10 years in CIP; 3=lines within 5 years in CIP; 5=lines close/abutting property)		2	0
21	water plant capacity (0 = no plant capacity available; 3 = minimal capacity improvements needed; 5 = surplus capacity available)		1	0
22	availability of sewer - line proximity (0=lines beyond 10 years in CIP; 3=lines within 5 years in CIP; 5=lines close/abutting property)		2	0
23	sewer plant capacity (0 = no plant capacity available; 3 = minimal capacity improvements needed; 5 = surplus capacity available)		1	0
24	availability of stormwater (0=lines beyond 10 years in CIP; no plant capacity available; 3=lines within 5 years in CIP; minimal capacity improvements needed; 5=lines close/abutting property; surplus capacity available)		2	0
25	transportation costs for School Board (amount of bussing required) (0=all bussing; 5=minimal bussing)		5	0
26	acquisition complications (need for eminent domain, multiple ownership) (0=many; 5=single-owner & no problems)		5	0
27	inclusion of site within Urban Service District Boundary (0=outside; 3=within secondary; 5=within primary)		5	0
	SUB-TOTAL FOR CATEGORY (max. of 115)			0

TOTAL SCORES (OUT OF 405 POINTS)			0

APPENDIX D: Martin County High School Siting Matrix

SUBJECT SITE: _____

		RAW SCORE (1-5)	WEIGHT FACTOR	WEIGHTED SCORE
GEOGRAPHIC - WALKABILITY				
1	% of students existing within 2-mile radius (0=none; 5=all)(existing students + approved subdivisions/lots projected to be built w/in 5 years but yet unbuilt;MC ARDP data)		2	0
2	% of students proposed within 2-mile radius (0=none; 5=all) (NOTE: score as improvement to existing condition-- as area builds out)((per adopted FLUM and approved subdivisions/lots projected beyond 5 years)		2	0
3	existing/proposed condition of sidewalk network (0=need to build whole network; 5=network ready)(existing, within first 5 years of adopted CIP + within adopted private master plan)		1	0
	SUB-TOTAL FOR CATEGORY (max. of 25)			0
GEOGRAPHIC - COMPLEMENTARY USES				
4	proximity of existing/planned public park/rec. uses/sites (ballfields abutting; pool, tennis, golf w/in 1 mile) (0=distant; 5=close) (existing + within first 5 years of adopted CIP)		1	0
5	proximity of existing/planned complementary public uses (library, comm. center) (w/in 5 miles) (0=distant; 5=close) (existing + within first 5 years of adopted CIP)		1	0
6	proximity of existing/planned neighborhood commercial/office uses (HS after-school jobs, co-op learning) (0=beyond 5 miles; 5=within 1 mile) (existing = approved within 5-year time frame)		1	0
7	potential to co-locate with proposed school facility, public park/rec use, or complementary public use (0=not able; 5=able)		3	0
8	ability for noxious uses to locate within 1-mile radius (industrial, heavy commercial) (0=any; 5=none)(NOTE: existing or potential use based upon adopted FLUM or LDRs; MC to provide list)		2	0
9	proximity of facilities for additional educational opportunities (e.g., IRCCm performing arts center, teaching hospital (0=beyond 1 mile; 5=within 1 mile)		1	0
	SUB-TOTAL FOR CATEGORY (max. of 45)			0

SUSTAINABLE COMMUNITY DESIGN

10	inclusion of site within adopted public sector plan (e.g., CRA or neighborhood plan) (0=no plan; 5=within plan)		4	0
11	inclusion of site within adopted private master plan (0=no plan; 5=within plan)		2	0
12	proximity to population centers (0=distant; 5=close proximity) (MC TAZ)		5	0
13	degree of triangulation (0=poor triangulation; 5=ideal triangulation) (use SB standard)		5	0
14	opportunity to redevelop existing underutilized site/adaptive re-use (0=no redevelopment; 5=full redevelopment)		4	0
15	ability to maintain diversity of student population (reflect MC student demographics) (0=less diverse; 5=as diverse) (existing condition - SB FL Schools Indicator Report)		5	0
16	dispersion ability of roadway network (0=limited dispersion; 5=extensive dispersion) (need list of roadway classifications)		2	0
17	size of site as compared to technical standard (0=too big or small; 5=optimal)(NOTE: technical standards: Elementary = 20; Middle = 40; High = 60)(prerequesite minimums: Elementary = 10; Middle = 20; High = 35; SB to scale optimization)		4	0
	SUB-TOTAL FOR CATEGORY (max. of 155)			0

ENVIRONMENTAL & HYDROLOGIC

18	wetland complications per SFWMD & Martin County LDRs (0=many complications; 5=none)		5	0
19	functional hydrology of site (high vs. low terrain; amount of fill needed) (0=low site/drainage problems; 5=high & dry site) (DATA: stormwater plans, topo maps)		3	0
20	impacts to native habitat/uplands (0=relocation of listed species; inability to provide wetland buffers; 5=compact area left undisturbed, no impacts upon listed species; wetland buffers provided)		3	0
	SUB-TOTAL FOR CATEGORY (max. of 55)			0

INFRASTRUCTURE & EFFICIENCY

21	availability of water - line proximity (0=lines beyond 10 years in CIP; 3=lines within 5 years in CIP; 5=lines close/abutting property)		2	0
22	water plant capacity (0 = no plant capacity available; 3 = minimal capacity improvements needed; 5 = surplus capacity available)		1	0
23	availability of sewer - line proximity (0=lines beyond 10 years in CIP; 3=lines within 5 years in CIP; 5=lines close/abutting property)		2	0
24	sewer plant capacity (0 = no plant capacity available; 3 = minimal capacity improvements needed; 5 = surplus capacity available)		1	0
25	availability of stormwater (0=lines beyond 10 years in CIP; no plant capacity available; 3=lines within 5 years in CIP; minimal capacity improvements needed; 5=lines close/abutting property; surplus capacity available)		2	0
26	LOS of closest major arterial road (0=currently over-capacity; 5=projected surplus of capacity in 5 years) (NOTE: Include planned improvements up to school ETA)		3	0
27	proximity of major arterial road (HS traffic circulation; prevents nhbd. Disrubption) (0=far away; 5=close/abutting (MPO/traffic planners to determine appropriate distance)		2	0
28	transportation costs for School Board (amount of bussing required) (0=all bussing; 5=minimal bussing)		5	0
29	acquisition complications (need for eminent domain, multiple ownership) (0=many; 5=single-owner & no problems)		5	0
30	inclusion of site within Urban Service District Boundary (0=outside; 3=within secondary; 5=within primary)		5	0
	SUB-TOTAL FOR CATEGORY (max. of 140)			0

TOTAL SCORES (OUT OF 420 POINTS)			0

APPENDIX E: Current Safe Routes to School Programs

Arizona

- Safest Routes to School - City of Phoenix
  http://www.ci.phoenix.az.us
- Prescott Alternative Transportation
  http://www.prescottbikeped.org

California

- Bicycle-Friendly Berkeley Coalition
  http://www.bfbc.org
- Safe Walks Home Program Oakland Pedestrian Safety Project
  http://www.oaklandnet.com
- City of Palo Alto; Department of Planning & Community Environment
  http://www.city.palo-alto.ca.us
- Caltrans Safe Routes To School Construction Program
  http://www.dot.ca.gov/hg/LocalPrograms/
- Safe Routes To School Initiative Planning Grantees
  http://www.dhs.ca.gov/routes2school/
- Safe Routes To School, Marin County
  http://www.saferoutestoschools.org
- Mid-City Safe Routes To School, Center for Healthier Communities, Children's Hospital San Diego
  http://www.chsd.org
- Santa Ana Pedestrian Safety Project
  http://www.ci.santa-ana.ca.us
- Safe Moves
  http://www.safemoves.org

Colorado

- Bicycle & Pedestrian Traffic Safety Education: Home to School Safe Travel for Children
  http://www.dot.state.co.us
- Colorado Safe Routes to School
  http://bicyclecolo.org/site/page.cfm?PageID=451

Connecticut

- Connecticut Bicycle Coalition- Safe Routes to School
  http://www.ctbike.org/saferoutes1.htm

Delaware

- Statewide Safe Routes to School
  http://www.state.de.us/planning/livedel/information/ln_schools.shtml

Florida

- Safe Ways to School
  http://www11.myflorida.com/Safety/Ped_Bike/Ped_Bike.htm

Georgia

- Kids Walk
  http://www.peds.org
- Georgia- Atlanta
  http://www.atlantabike.org/srtsFRONTPAGE.html

Illinois

- Safe Passage/The Walking School Bus
  http://www.cityofchicago.org/cp/AboutCAPS/HowCAPSWorks/
  Walking Schoolbus.html
- Safe Routes to School Chicagoland Bicycle Federation
  http://www.biketraffic.org
- Walkers Win
  http://www.cnt.org

Massachusetts

- Walking in Arlington
  http://walking_in_arlington.tripod.com/safe.htm
- Safe Routes To School Walk Boston
  http://www.walkboston.org

Maine

- Kids and Transportation Program
  http://www.gpcog.org/trnsprttn/k_&_t/k_&_t.htm

Maryland

- Maryland Safe Routes to School
  http://fha.state.md.us/fha/cphs/chn/pdf/SR2S_Guidebook_1.pdf
- Child Pedestrian Injury Project
  http://www.jhsph.edu

Minnesota

- Minnesota Bicycle and Pedestrian Alliance
  http://www.bikeped.org

Missouri

- Safe Routes to School Task Force Bureau of Chronic Disease Control
  http://www.dhss.state.mo.us

New Mexico

- Pedestrian Safety Program
  http://www.dgr.unm.edu/tsb/tsbprograms/pedsafe.html

New York

- Safe Routes to School: The Bronx
  http://www.saferoutestoschool.org

Nevada

- City of Las Vegas- Safe Routes to School
  http://www.lasvegasnevada.gov/1617_1624.htm

Oregon

- Portland Kids On The Move
  http://www.trans.ci.portland.or.us

Pennsylvania

- Pennsylvania DOT- Safe Routes to School and Home Town Streets Programs
  http://www.dot.state.pa.us/penndot/Bureaus/CPDM/Prod/Saferoute.nsf
- Pennsylvania Walk To School Trails Program
  http://www.RailTrails.org/PA/Active_Pages/Programs/main.asp
- Safe Routes to School
  http://www.ceo.indiana.pa.us

Texas

- Safe Routes To School TX Bicycle Coalition
  http://www.biketexas.org
  http://www.saferoutestexas.org
- Texas Department of Transportation Safe Routes to School Program
  http://www.dot.state.tx.us/trafficsafety/srs/default.htm
- WALK Austin
  http://www.io.com/~snm/walk/index.html

Virginia

- Arlington Co. Safe Routes to School
  http://www.co.arlington.va.us

Washington

- Washington Department of Transportation Safe Routes to School Program
  http://www.wsdot.wa.gov/bike/Safe_Routes.htm

Wisconsin

- Teaching Safe Bicycling Program
  http://www.dot.state.wi.us

National SR2S Efforts

- National SAFE KIDS Campaign SAFE KIDS Walk This Way
  http://www.safekids.org
- Keep Kids Alive Drive25®
  http://www.keepkidsalive.com
- Kids Walk-to-School Program
  http://www.cdc.gov/nccdphp/dnpa/kidswalk.htm
- FHWA's Safe Routes to School Program website
  http://safety.fhwa.dot.gov/saferoutes/

WORKS CITED

The Alexandria (VA) Health Department's Cardiovascular Health Project. (2003). "Safe Routes to School---Programs around the Nation."

American Automobile Association. (2006). Automobile Club of New York Web Page. Retrieved electronically from http://www.aaany.com/safety/traffic/bicycles_and_pedestrians/local_calming_efforts/images/GreenXwalkWellwoodAv1.jpg on May 25, 2006.

America Bikes Team. (2005). America Bikes Team Website accessed electronically at: http://www.americabikes.org/

Appleyard, Bruce S. (2003). *Planning Safe Routes to School*. Planning Magazine. May 2003.

Appleyard, Bruce S. (2003). *Can't Get There From Here: The Declining Independent Mobility of California's Children and Youth*. Surface Transportation Policy Project, Transportation and Land Use Coalition, and Latino Issues Forum. September 2003.

Aronson, M. (2004). Sutter Middle School Website. Retrieved electronically from http://schools.scusd.edu/sutter/CarsBuses.htm on May 25, 2006.

Bearer, C.F. (1995) Future Child 1995: 5(2): 11-26.

Boarnet, M, Anderson, C, Day, K., McMillan, T; Alfonso, M; Tang, I. and Layal Nawfal. (2003). "Evaluation of the California Safe Routes to School Construction Program." University of California, Irvine.

Boles, Gene. (2005). "Best Practices for Coordinated School Planning." Unpublished document.

Bureau of Transportation Statistics. (2003). National Household Travel Survey, NHTS Version 1.0 CD (Preliminary Release) January 2003.

California Health Resources Board. (2002). The Children's Health Study, Fact Sheet. Available electronically from http://www.arb.ca.gov/research/chs/CHSfact.pdf on Feb, 19, 2005.

Carmanah Technologies, Inc. (2004). "School Zone Beacon: Model R829." Accessed electronically at http://www.roadlights.com/content/products/R829/default.aspx

Center for Disease Control. (n.d.). *Kidswalk to School- A Guide to Promote Walking to School*. US Department of Health and Human Services, Centers for Disease Control and Prevention. Retrieved electronically from

http://www.cdc.gov/nccdphp/dnpa/kidswalk/pdf/kidswalk.pdf on December 15, 2004.

Congress for the New Urbanism. (1999). Charter of the New Urbanism: Region / Neighborhood, District, and Corridor / Block, Street, and Building. New York: McGraw-Hill Books.

City of Phoenix Street Transportation Department. (2003). "Phoenix School Safety Program." Retrieved from http://www.walkinginfo.org/cps/saferoutes_phoenix.htm#4 on April 24, 2006.

Code of Maine Rules. (2000, 2001, 2002, 2003, 2004, 2005).

Chu, X., and Guttenplan, M., and Baltes, M. (October 2002). Why People Cross Where They Do: The Role of the Street Environment. TRB Paper No. 03-3078. Retrieved electronically from http://www.dot.state.fl.us/planning/systems/sm/los/pdfs/CGBrev03.pdf on April 10, 2006.

Chu, X., and Baltes, M. (December 2001). Pedestrian Mid-Block Crossing Difficulty. Final Report DTRS98-G-0032. National Center for Transit Research. Retrieved electronically from http://www.dot.state.fl.us/planning/systems/sm/los/pdfs/pedestrian.pdf on April 10, 2006.

Crider, L.B., Burden, J., and Han, F. (August 2001). Multimodal LOS "Point" Level of Service Project. Retrieved electronically from http://www.dot.state.fl.us/planning/systems/sm/los/pdfs/pointlos.pdf on April 10, 2006.

Crider, L., and Hall, A. (in press). Healthy ways to school. In H. Frumpkin, R. Gellar, and I.L. Rubin (Eds.), *Safe and healthy school environments*. New York: Oxford University Press.

da Silva, Peggy and Gracie Askew. (2004). "Safe Routes to School. Practice and Promise." Center for Health Training. Available online at http://www.nhtsa.dot.gov/people/injury/pedbimot/bike/Safe-Routes-2004/index.html

David TG, Weinstein CS. (1987). The built environment and children's development. In: Weinstein CS, David TG, (Eds.), *Spaces for Children: The Built Environment and Child Development*. York: Plenum, 1987, pp 3-20.

Dellinger AM, Staunton CE. (2002). Barriers to children walking and bicycling to school—United States, 1999. Morbidity and Mortality Weekly Report 2002; 51(32): 701-704.

Dubay, Ann. "See Dick and Jane Sit in Traffic," The Press Democrat, September 7, 2003.

Environmental Protection Agency. (2003). Travel and Environmental Implications of School Siting. EPA 231-R-03-004. Washington: USEPA, October, 2003. Available: http://www.epa.gov/smartgrowth/pdf/school_travel.pdf.

Environmental Protection Agency. (2005). "About Smart Growth". Accessed August 23, 2005 electronically at http://www.epa.gov/smartgrowth/about_sg.htm

Ewing, R., and R. Cervero. (2001). Travel and the built environment: A synthesis. Transportation Research Record 1780: 87-113.

Fehr & Peers Transportation Consultants. (2005). Accessed electronically at http://www.trafficcalming.org

Flegal, K.M. (1999). The obesity epidemic in children and adults: Current evidence and research issues. Medicine & Science in Sports & Exercise, 31(II), Supplement, S509-S514.

Florida Department of Community Affairs. (2005). "School Planning". Accessed electronically at: http://www.dca.state.fl.us/fdcp/dcp/SchoolPlanning/index.cfm on June 13, 2005.

Florida Department of Education (FDOE). (2004). The Quality Link: Florida School District Transportation Profiles, School Year 2002-2003.

Florida Department of Education. (1999). "State Requirements for Educational Facilities.: Office of Educational Facilities: Volume I. Accessed electronically at http://www.firn.edu/doe/edfacil/pdf/srefvol1.pdf on April 18, 2006.

Florida Department of Health (DOH). (2004). Obesity in Florida: Report of the Governor's Task Force on the Obesity Epidemic. Bureau of Chronic Disease Prevention. February, 2004.

Florida Department of Transportation. (2005). "SAFETEA-LU Analysis: New Programs." Retrieved from http://www.dot.state.fl.us/planning/safetealu/pdfs/new-programs.pdf on May 3, 2006.

Florida Department of Transportation. (2005). "Secretaries Applaud Passage of Growth Management Reform." Retrieved on June 25, 2005 from http://www.dot.state.fl.us/planning/gm/GMPressConf.pdf

Florida Department of Transportation. (2003). Multimodal Transportation Districts and Areawide Quality of Service Handbook. Systems Planning Office: November 2003.

Florida Department of Transportation and Florida School Crossing Guard Task Force (FDOT/FSCGTF). (1993). "Florida School Crossing Guard Training Guidelines" Retrieved electronically from http://www.dot.state.fl.us/Safety/ped_bike/brochures/pdf/xingguard.pdf on April 22, 2005.

Florida Traffic and Bicycle Safety Education Program, (n.d.). "Safe Ways to School Took Kit". Unpublished document. Available electronically at http://www.dcp.ufl.edu/centers/trafficsafetyed/safeways.htm

Friedman M., Powell K., Hutwagner L., Graham, L., and Teague, W. (2001). Impact of changes in transportation and commuting behaviors during the 1996 Summer Olympic games in Atlanta on air quality and childhood asthma. JAMA, 285:897-905.

Grote, J and Cynecki, M. (2003). "Phoenix Develops a New Comprehensive School Safety Program." From the Public Realm 4(2): 4-6.

Holtz Kay, J. (1998). Asphalt Nation: How the Automobile Took Over America and How We Can Take it Back. University of California Press.

Huang T., and Goran, M. (2003). "Prevention of Type 2 diabetes in young people: A theoretical perspective." Pediatric Diabetes, 4(I), 38-56.

Interagency Committee on School Construction. (2003). "State of Maryland School Construction Program". Accessed electronically from http://www.pscp.state.md.us/GI/gioverview.htm on May 4, 2005.

International Centre for Technology Assessment. (2000). In Car Air Pollution: The Hidden Threat to Automobile Drivers. International Centre for Technology Assessment, Washington D.C. Available at http://www.icta.org/projects/trans/incar.pdf

Irmsher, K. (1997). School Size. (Report No. 113). Eugene, OR: Clearinghouse on Educational Management. (retrieved March 10, 2005 from ERIC Digest, ERIC No. ED414615).

Killingsworth, R., and Lambing, J. (2001). Development and public health: Could our development patterns be affecting our personal health? Urban Land, 12-17.

Kennedy, J. (2004). "Active and Safe Routes to School" Green Communities The Green Communities Association.

League of American Bicyclists. (2005). Accessed electronically at http://www.bikeleague.org.

Lee, V.E., and Smith, J.B. (1996). "High School Size: Which Works Best, and for Whom?" Draft. Paper presented at the annual meeting of the American Educational Research Association, New York, April 1996. ED 396 888.

Marin County Bicycle Coalition. (n.d.). *Safe Routes to Schools.* Retrieved from http://www.saferoutestoschools.org on April 24, 2006.

Maryland Safe Routes to Schools Guidebook — Sample Documents. (n.d.). Retrieved April 24, 2006 from http://www.fha.state.md.us/cphs/fitness/cpf_resources.cfm.

McGough, P. (2005). *Maryland School Construction Program*. Retrieved May 16, 2006 from http://www.pscp.state.md.us.

McGuckin, N. and E. Murakami. (1997). "Examining Trip-Chaining Behavior: A Comparison of Travel by Men and Women" Report prepared for the Federal Highway Administration. (retrieved April 15, 2006 from: http://npts.ornl.gov/npts/1995/Doc/Chain2.pdf

McMillan, T., Day, K., Boarnet, M., Alfonzo, M., and Anderson, C. (2004). "Johnny can walk to school-why can't Sally? Examining gender difference in children's active travel to school."

McMillan, Tracy. (2003) Chapter 5 from Walking and Urban Form: Modeling and Testing Parental Decisions about Children's Travel, unpublished dissertation. UCI.

McMillan, Tracy. (2005). "Urban Form and a Child's Trip to School: The Current Literature and a Framework for Future Research." Journal of Planning Literature 19(4).

National Automobile Chamber of Commerce, Inc. (1930). "Facts and Figures of the Automobile Industry". National Automobile Chamber of Commerce, Inc. New York, NY. Accessed electronically at: http://www.railsandtrails.com/AutoFacts/default.html. Courtesy of Cleveland Public Library.

National Highway and Traffic Safety Administration. (2005). NHTSA Website. Accessed electronically at http://www.nhtsa.dot.gov/

National Trust for Historic Preservation. (2005). "Smart Growth Schools Fact Sheet". Retrieved electronically at http://www.nationaltrust.org/issues/schools/schools_smartgrowth_facts.pdf

New Jersey Department of Education. (2005). School Facilities Website. Accessed electronically at http://www.state.nj.us/njded/facilities/

New Jersey School Board Association. (1998). Summary: Educational Facilities Construction and Financing Act. Accessed electronically at http://www.state.nj.us/njded/facilities/background/act_summ.shtml on May 4, 2005.

New York City Department of Transportation. (n.d.). *Walk to School*. Retrieved electronically from http://www.nyc.gov/html/dot/html/safety/walktoschool.html on April 24, 2006.

New York City Department of Transportation. (2004). *Walk to School Parent/Guardian Survey.* Retrieved from http://www.nyc.gov/html/dot/pdf/wts_psurvey.pdf on April 24, 2006.

O'Brien, Catherine. (2003). "TRANSPORTATION…That's Actually Good for the Soul." NCBW Forum Article 12-03-03.

Ogden, C.L., Flegal, K.M., Carroll M.D., and Johnson, C.L. (2002). Prevalence and trends in overweight among U.S. children and adolescents, 1999-2000. JAMA;288(14): 1728-1732.

One Motoring "On the Road: Road Safety" Retrieved electronically from http://www.onemotoring.com.sg/publish/onemotoring/en/traffic/road_safety/school_zone_safet html on April 28, 2005.

Oregon Department of Land Conservation and Development. (2001). *Concepts Sketchbook: Street Connectivity.*

Pedestrian and Bicycle Information Center. (2005). "iwalk: The Official Website of International Walk to School Day." Retrieved from www.iwalktoschool.org on May 16, 2006.

Pedestrian and Bicycle Information Center. (2005). PBIC Website accessed electronically at: http://www.bicyclinginfo.org/

Pedestrian and Bicycle Information Center and Partnership for a Walkable America. (2006). *Walk and Bike to School*. Retrieved from http://www.walktoschool.org on April 24, 2006.

PDOT "Safe Routes Program" Retrieved electronically from http://www.trans.ci.portland.or.us/SafeRoutes/program/4Es.htm on April 25, 2005.

Proshansky, H.M., and Fabian, A.K. (1987). The development of place identity in the child. In: Weinstein CS, David TG, (Eds.) Spaces for Children: The Built Environment and Child Development. York: Plenum, pp. 21-40.

Pucher, J. and Dijkstra, L. (2003). Promoting Safe walking and cycling to improve public health: Lessons from the Netherlands and Germany. American Journal of Public Health 93:1509-1516.

Retting, R., Ferguson, S.A., and McCartt, A.T. (2003). A review of evidence-based traffic engineering measures designed to reduce pedestrian-motor vehicle crashes. American Journal of Public Health 93:1456-1462.

RIDES for Bay Area Commuters, Inc. (2005). Website accessed electronically at: http://www.rides.org/main/bikeresourcceguide.htm

RIDES for Bay Area Commuters. Share Pool. Available online at http://www.saferoutestoschool.org on November 26, 2004.

Rivara, F.P., Booth, C.L., Bergman, A.B., Rogers, L.W., and Weiss, J. (1991). Prevention of pedestrian injuries to children: Effectiveness of a school training program. Pediatrics 88: 770-775.

Roberts, I., Ashton, T., Dunn, R., and Lee-Joe, T. (1994). Preventing child pedestrian injury: pedestrian education or traffic calming? Australian Journal of Public Health 18(2): 209-212.

Roberts, I., Norton, R., Jackson, R., and I. Hassell. (1995). "Effect of Environmental Factors on Risk of Injury of Child Pedestrians by Motor Vehicles: A Case-Control Study. British Medical Journal, 310, 91-94.

Roy, E. (2005). School Board Member, Alachua County School Board. Personal Interview. March 18, 2005.

Sallis, J., and Owen, N. (1999). Physical activity and behavioral medicine. Thousand Oaks, CA: Sage.

Schlossberg, M., Phillips, P., and Wyss, D. (2005). *Conducting a Walkability Audit with ArcPad GIS*. University of Oregon. Retrieved from http://www.uoregon.edu/~schlossb/arcpad/walkability/walkability.htm on April 25, 2006.

Schlossberg, M., Phillips, P., Johnson, B., and Parker, R. (2005). "How Do You They Get There? A Spatial Analysis of a 'Sprawl School' In Oregon." Planning Practice & Research, Vol. 20, No. 2, pp. 147 – 162.

Siegel, A.W., Kirasic, K.C., and Kail, R.V. Jr. (1978). Stalking the elusive cognitive map: The development of children's representations of geographic space. In: Altman I, Wohlwill JF, (Eds.) Children and the Environment. Human Behavior and Environment, Volume 3. New York, Plenum Press. 223-258.

Florida Department of Transportation (FDOT) Safety Office. (n.d.). "Florida School Crossing Guard Training Program." Retrieved from

http://www.dot.state.fl.us/Safety/ped_bike/training/ped_bike_training.htm on September 10, 2004.

Starnes, E., Stein, J., Crider, L., Audirac, I., Pither, A., *et al*. (1992). "Home-To-School Transportation Study: Executive Summary". Department of Urban and Regional Planning, University of Florida.

Staunton, C.E., Hubsmith, D., and Kalis, W. (2003). Promoting safe walking and biking to school: The Marin County Success Story. American Journal of Public Health 93: 1431-1434.

Stein, C.S., and Mumford, L. (1965). Towards New Towns for America. The MIT Press: Cambridge, Massachusetts. pp. 41-48.

Steiner, R., Li, I., Shad, P., and Brown, M. (2003). "Multimodal Tradeoff Analysis in Traffic Impact Studies". Prepared for FDOT May 2003. Available electronically at: http://www.dot.state.fl.us/planning/systems/sm/los/pdfs/multimodaltradeoff_061203.pdf on December 28, 2004.

Steiner, R.L., and Crider, L.B. (1999). "Safe Ways to School: Combining Resources at the State, County and Local Level to Improve Safety to School," Transportation Research Board Preprint #990993.

Steiner, Ruth L., Richard H. Schneider, April Alperin with assistance from Lauren Jones and Jodi Burden. "An Evaluation of the Florida School Crossing Guard Training Program," Prepared for the Florida Department of Transportation, State Safety Office under Project #PS-99-08-17-01, Contract AG575, October 1999.

Strauss, R.S. and Pollack, H.A. (2001). Epidemic increase in childhood overweight, 1986-1998. JAMA, 286(22), 2845-2848.

Sustrans. (n.d.). Retrieved electronically from http://www.sustrans.org/default.asp?sID=1095412985125&pID= on February 11, 2005.

T.A. Bulletin. (2004). "Huge win for T.A., Kids, City! DOT unveils Major Safe Routes to School Program 32 Schools to be Traffic Calmed in '05."

Torres, A., and Rigby, M. (2004). "Safe Routes to School" Planning Commissioners Journal 56: 6.

Transportation Alternatives. (2002). "The 2002 Summary of Safe Routes to School Program in the United States." Available online at http://www.transact.org/PDFs/sr_2002.pdf

Transportation Alternatives. (2001). "Safe Routes to School: The Bronx" Retrieved electronically from http://www.transalt.org/campaigns/school/ on January 17, 2005.

Transportation Research Board and the Institute of Medicine. (2005) "Does the Built Environment Influence Physical Activity? Examining the Evidence." Washington, D.C. Transportation Research Board Special Report Number 24.

Tsai, J., and Miller, M. (2005). "Integrated Planning for School and Community." TRB Mtg. CD-ROM paper #05-0558.

Tsai, J. (2005). Director of the Institute for Transportation Research and Education, North Carolina State University. Telephone Interview held April 25, 2005.

Twaddell, H. (2004). "Safe Routes to School" Planning Commissioners Journal 56:14-15.

U.K. Department of Transport. (1990). Children & Roads: A Safer Way. London: DOT.

US Department of Transportation and the National Highway Traffic Safety Administration. (2002). Safe Routes to School.

Usher, Angela. (2005). "School Capacity Planning in Palm Beach County." Presentation at the Florida Growth Management Workshop.

Valle, B. D. (2003). "My School is a Smart Growth Honor School: State School Construction Policy." Maine State Planning Office. Speech at the State of the States on Smart Growth Conference, Burlington, VT. October 9, 2003. Available at http://www.maine.gov/spo/landuse/techassist/speeches/schools/index.php

Weihs, J. (2003). ISSUETRAK: State Acreage Policies. Council for Educational Facilities Planners, International (CEFPI). Available online at http://www.cefpi.org/research.html

Williams, K.M., and Seggerman, K.E. (April 2004). Model Regulations and Plan Amendments for Multimodal Transportation Districts. State of Florida Department of Transportation National Center for Transit Research. Final Report BC-137-47. Retrieved electronically from http://www.dot.state.fl.us/planning/systems/sm/los/pdfs/MMTDregs.pdf on April 10, 2006.

Winerip, Michael. (2004). "Making Leaps, but Still Labeled as Failing." New York Times: April 28, 2004. Retrieved electronically from http://www.nytimes.com/2004/04/28/education/28education.html?ex=1398

571200&en=086d69baf2271576&ei=5007&partner=USERLAND on May 2, 2005.

Winters, P.L. Cleland, F., Mierzejewski, E., and Tucker, L. (December 2001). Assessing Levels of Service Equally Across Modes. Florida Department of Transportation. Report No. BC353 RPWO #15. Retrieved electronically from http://www.dot.state.fl.us/planning/systems/sm/los/pdfs/AssessingLOS.pdf on April 10, 2006.

ADDITIONAL REFERENCES

AAA. (1979). "The Safest Route to School." Traffic Safety Department. American Automobile Association.

Aboelata, M. (2004). "The Built Environment and Health 11 Profiles of Neighborhood Transformation" Prevention Institute.

Appleyard, Bruce S. (2004). Livable Streets for Children.

Associated Press. (2003). "Students getting out of cars, onto sidewalks. Communities revive walking to school." June 23, 2003.

Beaumont, C. a. E. G. P. (2002). "Why Can't Johnny Walk to School." Washington D.C, National Trust for Historic Preservation: 53.

Bingler, S., Quinn, L., and Sullivan, K. (2003). "Schools as Centers of Community: A CITIZEN'S GUIDE FOR PLANNING AND DESIGN." National Clearing House for Educational Facilities. Knowledge Works Foundation. Washington D.C. Available electronically at http://www.edfacilities.org/pubs/scc_Cover_page_Table_of_Contents.pdf

California Department of Health Services. "Safe Routes to Schools." Available at http://www.dhs.ca.gov/walk2school

The Center for Sustainable Transportation. (2004). "Kids on the Move in Halton and Peel" The Center for Sustainable Transportation, Mississauga, Ontario retrieved electronically from http://www.cstctd.org/english/docs/Kids%20on%20the%20Move%20in%20Halton%20and%20Peel%20final%20report.pdf on January 23, 2005.

Center for Urban and Regional Studies. (2003). The University of North Carolina at Chapel Hill. "Good Schools- Good Neighborhoods- The Impacts of State and Local School Board Policies on the Design and Location of Schools in North Carolina.".

Chung, C. (2002). "Using Public Schools as Community Development Tools: Strategies for Community Based Developers." Fellowship Program for Emerging Leaders in Community and Economic Development.

City of Rockville. (2003). "Maryland Pedestrian and Bicycle Safety Education Program Teacher's Guide." Department of Recreation and Parks.

Cooner, S., Fitzpatrick, K., Wooldridge, and Ford, G. (2003). "Traffic Operations and Safety at Schools: Recommended Guidelines." Texas Transportation Institute.

Council of Educational Facility Planners International. (2004). "Schools for Successful Communities: An Element of Smart Growth." United States Environmental Protection Agency.

Dowling, R. (June 2001). Florida Intrastate Highway System Multi-modal Corridor Level of Service Analysis. Final Report No. P990081. Retrieved electronically from http://www.dot.state.fl.us/planning/systems/sm/los/pdfs/MMLOSfihs.pdf on April 10, 2006.

Environmental Land Management Study Committee, State of Florida (ELMS). (1992). Building Successful Communities: Final Report. Tallahassee, FL: State of Florida.

Ernst, M. (2004). "Mean Streets 2004 How Far Have We Come?" Surface Transportation Policy Project.

EPPI. (2001). Effect of Travel Modes on Children's Cognitive Development. Evidence for Policy and Practice. Institute for Education, University of London.

Ewing, R. (n.d.). "Pedestrian and Transit Friendly Design: A Primer for Smart Growth". Smart Growth Network. Based on a manual prepared for the Florida Department of Transportation and Published by the American Planning Association.

Ewing, R. and Hodder, R. (n.d.). "Best Development Practices: A Primer for Smart Growth." Smart Growth Network. Based on a book prepared for the Florida Department of Community Affairs and published by the American Planning Association.

Fillmer, J. "No easy path creating sidewalks for new school. Officials struggle with who funds Wilson's Creek infrastructure." News Leader.

Florida Department of Community Affairs. (2002). "Primer on School Planning and Coordination." Division of Community Planning.

Florida Department of Transportation. (2003). "Strategic Highway Safety Plan" State Safety Office. Go for Green.(2000) "Go for Green in Canada Millennium Year Special Review 1992-September 2000" retrieved electronically from http://www.goforgreen.ca/resources/pdf/Millennium%20Roll-Up.PDF on March 15, 2005.

Gurwitt, R. (2004). "Edge-ucation." Congressional Quarterly, Inc.

Guttenplan, M., Davis, B., Steiner, R., and Miller, D. (March 2004). Florida Department of Transportation. Paper No 03-2997. Retrieved electronically from http://www.dot.state.fl.us/planning/systems/sm/los/pdfs/MMLOScm.pdf on April 10, 2006.

Guttenplan, M., Landis, B.W., Crider, D., and McLeod, D.S. (2001). Multi-Modal Level of Service (LOS) Analysis at a Planning Level. TRB Paper No. 01-3084. Retrieved electronically from http://www.dot.state.fl.us/planning/systems/sm/los/pdfs/MMLOS.pdf on April 10, 2006.

ICBC Road Safety. (1998). "Safe Crossings- Guidelines for School Crossings Programs" Ministry of Transportation and Highways, Province of British Columbia.

Kauth, A. (2002). "New Schools for Older Neighborhoods. Strategies for Building our Communities Most Important Assets." Local Government Commission.

Kennedy, R. and McMullen, A. (2003). "Safe Routes to School Programs across the Nation." Alexandria Health Department and City of Alexandria.

Kiesewetter, J. (2004). "Walk to School? Not in Fairfield. No sidewalks, no buses means more traffic." The Enquirer. Cincinnati, OH. August 23, 2004.

Kouri, C. (1999). "Wait for the Bus: How Lowcountry School Site Selection and Design Deter Walking to School and Contribute to Urban Sprawl." Terry Institute of Public Policy Duke University.

Landis, B.W., Vattikuti, V.R., Ottenberg, R.M., Petritsch, T.A. (November 2002). Intersection Level of Service: The Bicycle Through Movement. Sprinkle Consulting, Inc. Florida Department of Transportation. Retrieved electronically from http://www.dot.state.fl.us/planning/systems/sm/los/pdfs/BLOSTM.pdf on April 10, 2006.

Landis, B.W., Vattikuti, V.R., Ottenberg, R.M., McLeod, D.S., and Guttenplan, M. (2000). Modeling the Roadside Walking Environment: A Pedestrian Level of Service. TRB Paper No. 01-0511. Retrieved electronically from http://www.dot.state.fl.us/planning/systems/sm/los/pdfs/pedlos.pdf on April 10, 2006.

Landis, B.W., Vattikuti, V.R., and Brannick, M.T. (n.d.) Real-Time Human Perceptions: Toward a Bicycle Level of Service. Transportation Research Record 1578: 119-126. Retrieved electronically at

http://www.dot.state.fl.us/planning/systems/sm/los/pdfs/BLOSTRB.pdf on April 10, 2006.

Manian, S.K.R. (2004). Pedestrian and Bicycle Safety and Conversion of Car Trips to Pedestrian or Bicycle Trips for School Children. Gainesville, University of Florida.

Matthews, M.H. (1992). Making Sense of Place: Children's Understanding of Large-Scale Environments. Savage MD: Barnes & Noble.

McMillan, T.E. (2004). "Dissecting the relationship between urban form and active travel: what really 'drives" behavior?" ACSP 2004; 3/7/2005.

McMillan, T., Phillips, K., and Seeley, A. (2005). "Safe Routes to School through Safe Communities: Results of a Community Planning Grant Program in California. Active Community Environments Project of the Institute for Health and Aging and the California Department of Health."

Morris, M. (2004). Rethinking Community Planning and School Siting To Address The Obesity Epidemic. NIEHS Conference on Obesity and the Built Environment: Improving Public Health through Community Design, Washington, D.C.

National Association of Realtors. (2005). "Smart Growth for Better Schools."

National Center for Bicycling and Walking. "Safe Routes to School-Pledging Safe Communities for Our Children." Retrieved electronically from http://www.bikewalk.org/assets/pdf/SR2S_pledge.pdf on May 3, 2005.

National Safe Kids Campaign. (2004). "Kids at Crossroads. A National Survey of Physical Environment and Motorist Behavior at Intersections in School Zones."

National Safe Kids Coalition. (2002). "Report to the nation on child pedestrian safety". Retrieved electronically from http://www.safekids.org/tier3_cd.cfm?content_item_id=7551&folder_id=680 on April 29, 2005.

Oak Kim, M. (2004). "Rendell signs tough school speed law." Philadelphia Daily News. Retrieved electronically from http://www.philly.com/mld/philly/news/breaking_news/10373499.htm on December 28, 2004.

O'Brien, C. (2004). "Planning Transportation for and with Children: Good News for Pedestrians and Cyclists." NCBW Forum Article.

Ontario Home Builder's Association. (2004). "Places to Grow, Better Choices Brighter Future." Ontario Discussion Paper. Retrieved electronically from http://www.homesontario.com/pdfs/ohbaresponse.pdf on November 15, 2005.

Partnership for a Walkable America. "Safe Routes to School Program Legislation and Funding" Available online at http://www.walktoschool-usa.org/funding/index.cfm.

Pekow, C. "Walk On. More children are using foot power to get to school." SafeRoutes to School Press Release. Retrieved from http://www.saferoutestoschools.org/Pressroom/WalkOn.htm on November 30, 2004.

Pierce, N. (2003). "Millions for New Schools, How Well Spent?" Washington Post Writers Group.

Phillips, R., Karachepone, J., and Landis, B. (March 2001). Multi-Modal Quality of Service Project. Florida Department of Transportation Contract #BC205.

Prado, M. (2004). "IJ Readers weigh in on idea of tax for Safe Routes to School." Marin Independent Journal.

Redmon, T. (2004). Pedestrian Safety Campaign. U.S. Department of Transportation. Federal Highway Administration. Accessed electronically at: http://safety.fhwa.dot.gov/local_program/pedcampaign/index.htm

Safe Routes to School. (n.d.). "The Marin County Bicycle Coalition Pilot Test New Safe Routes to School Curriculum" Retrieved electronically from http:// www. saferoutestoschools.org/Pressroom/MVCurriculum.htm. on November 17, 2004.

Simon, S. (2004). Real Estate Hunters Go Old School. LA Times. Los Angeles.

Simril, R. (2002). "A New Strategy for Building Better Neighborhoods." New Schools Better Neighborhoods.

Smart Growth Network. (2002). "Getting to Smart Growth: 100 Policies for Implementation." International City/ County Management Association. Available electronically at: http://www.smartgrowth.org/pdf/gettosg.pdf

Sota, N., and Parra, N. (2004). "Let's not overlook safe routes to school." San Bernardino Sun.

Steiner, R., and Crider, L. (1999). "Safe Ways to School: Combining Resources at the State, County, and Local Level to Improve Safety to Schools." University of Florida.

Systems Planning Office Florida Department of Transportation (November 2003). Multimodal Transportation Districts and Areawide Quality of Service Handbook. Retrieved electronically from http://www.dot.state.fl.us/planning/systems/sm/los/pdfs/MMTDQOS.pdf on April 10, 2006.

Tench, M. (2003). "New School Symbol of Renewal Orchard Park makes diligent work pay off." Globe.

T.A. Magazine. (2000). "From the Bx to Cal: the word on the street is "Safe Routes to School." p. 7.

T.A. Magazine. (1998). "Bronx 'Safe Routes to School' Campaign Blazes new path." p. 12-13.

T.A. Magazine. (1999). "DOT Commissioner Supports Safe Routes to School." p. 12.

T.A. Magazine. (2003). "Safe Routes to School Where Art Thou?" p. 9.

T.A. Magazine. (2001). "The Bronx Safe Routes to School Passes Torch to DOT." p. 15.

T.A. Bulletin. (2005). "Huge win for T.A., Kids, City! DOT unveils Major Safe Routes to School Program 32 Schools to be Traffic Calmed in '05."

T.A. Magazine. (2004). "Why Safe Routes?" p. 27.

T.A. Magazine. (2004). "Safe Routes Must Use Street Design to Encourage Walking." p. 13.

T.A Magazine. (2004). "T.A. Bronx Program Shows the Way." p. 11.

T.A. Magazine. (2004). "Safe Routes to School Timeline." p. 12.

Transportation Alternatives. "Safe Routes to School Program Overview." Available electronically at www.transalt.com/campaigns/reclaiming/saferoutes3.html.

Transportation Alternatives. "The 2001 Summary of Safe Routes to School Program in the United States." Available online at http://www.transalt.org/campaigns/reclaiming/SRTSRepFinal.html.

Transportation Research Board. (2002). "The Relative Risks of School Travel- A National Perspective and Guidance for Local Community Risk Assessment". Special Report 269. Transportation Research Board. Washington D.C. 2002.

U.S. Department of Transportation. (2000). "'Safe Routes to School' Demonstration Program to Receive NHTSA Funding." Retrieved electronically from http://www.dot.gov/affairs/nhtsa3300.htm on November 30, 2004.

US Department of Transportation and the National Highway Traffic Safety Administration. (2002). Safe Routes to School.

United States Environmental Protection Agency. (2003). "Travel and Environmental Implications of School Siting."

U.S. Newswire. (2004). "Anti-Obesity Program Fattens Budget Deficit." National Desk. Washington.