JUST FOR THE HEALTH OF IT: A WALKABILITY STUDY IN ROME, GEORGIA

by

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ABSTRACT

Although obesity and asthma are on the rise and incidences could be reduced through physical activity and walking to school, many children do not have that choice since sidewalks do not currently connect with their home. The purpose of this thesis is to conduct a thorough investigation into the connections between the built environment and human health to determine how design and planning for pedestrian use can create exercise opportunities for children. Walking and other forms of active transportation would lead to further public health benefits by reducing the use of automobiles, thus diminishing air and noise pollution and the overall level of traffic danger. An in-depth study of Anna K. Davie Elementary School in Rome, Georgia was performed and recommendations for improvements were made to help make the opportunity for children to develop healthier practices a reality.

INDEX WORDS: Walkability, Health, Safe Routes to School
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CHAPTER 1: INTRODUCTION

As a young child growing up in central Iowa, I walked to school almost every day. From kindergarten through fifth grade, we lived just a few blocks away from Northwood Elementary so I often walked by myself. After moving across town and switching to a new school approximately one-quarter mile from my home, I enjoyed spending time with three friends and my younger sister as we walked to school every day. While this social time before and after school was something I enjoyed as a child, I was also benefiting from the regular daily exercise.

Children today, more than ever, require improved opportunities for exercise as a result of our nation’s increasing obesity problems. In the United States, prevalence of obesity has more than tripled since 1970 among children and more than doubled among adolescents (Okie, 2005). Asthma is also increasing in frequency, and children are at risk of becoming part of a traffic accident. It is disturbing that these problems are on the rise, and this thesis aims to help give children the chance to walk to school by making it a safer and healthier choice.

Although walking to school is one way for children to incorporate physical activity into their days, many children do not have a choice to walk or cycle to school because the built environment does not provide a safe and inviting connection between home and school. Such things as uncontrolled intersections and roads without sidewalks force pedestrians to interact too closely with dangerous traffic.

The purpose of this thesis is to conduct a thorough investigation into the connections between the built environment and human health to determine how design and planning for pedestrian use can create exercise opportunities for children. Walking and other forms of active
transportation would lead to further public health benefits by reducing the use of automobiles, thus diminishing air and noise pollution and the overall level of traffic danger. An in-depth study, including a walkability assessment conducted with local health professionals and city planners, and a survey of parents and teachers was performed and recommendations that could be applied in other locations were provided. The school chosen for this study was Anna K. Davie Elementary School in Rome, a city of 31,000 residents in northwest Georgia. The solutions provided for this school will help make the opportunity for children to develop healthier practices a reality.

There have long been connections made between humans and their surroundings. Chapter two focuses on the history of connections between health and the built environment, specifically in Frederick Law Olmsted’s Central Park and Jens Jensen’s Chicago city parks.

The current state of children’s health in the United States is explored further in Chapter three, with the current obesity epidemic, asthma concerns, and traffic safety issues depicted in detail.

Safe Routes to School programs around the country and International Walk to School Day events may begin to provide a solution to these problems. Chapter four takes a look at precedent case studies in Ontario, Canada, Marin County California, and the Bronx, New York.

Chapter five includes information about city and county health in Rome and Floyd County, Georgia, and discusses current neighborhood conditions around the school. Conclusions from a parent and teacher survey are reported, and results of a walkability assessment by local health professionals are described.

In addition, planning recommendations and design sketches are revealed in chapter six. These changes have great potential to positively impact a great number of children on their
commute to and from school. It is through these improvements that we can increase knowledge, awareness, and potential benefits to children’s health.
CHAPTER 2: HISTORY OF HEALTH IN LANDSCAPE ARCHITECTURE

Health has been considered a component of landscape architecture for many years, perhaps since the very beginning of the profession itself. Frederick Law Olmsted, considered the “father of landscape architecture,” saw connections between the health of the mind and body and the physical environment. Jens Jensen, best known for his park designs in Chicago in the early twentieth century, also considered these connections in his work. Although these two famous designers did not have scientific research to support their thoughts, today these connections between the physical environment and public health are being researched and proven true. The built environment does indeed affect our health – both physical and psychological aspects of it. Since the profession of landscape architecture has an inherent influence on the environment, landscape architects have a significant influence on public health and the walkability of our towns and cities.

Asthma rates have more than doubled from 1980 to 1995, from 2.3 million to 5.5 million children affected (Bates, 1995-1). Since the 1970’s the prevalence of obesity in the US has more than tripled among children aged 6 to 11 and has more than doubled among children aged 2-5 and adolescents between 12 and 19 (Okie, 2005). The leading reason parents give for restricting their children’s unaccompanied travel is traffic danger (Frumkin, Frank, & Jackson, 2004). With obesity, asthma, and traffic fatalities currently on the rise, it is of utmost importance for designers to take health into account when planning public spaces.

This chapter will trace the history of health in landscape architecture and the built environment from the early days of American cities to the present because in order to move
forward, it is necessary to first look back to see what happened in the past. It is a history that unfolded against a backdrop of profound changes in public health conditions and in the patterns of city development. This history set the stage for current trends in relation to the connections between health and the landscape, growing out of current land use patterns and mounting concern for public health and welfare in our country.

The evolution of health in the urban context is a complicated one. Frumkin, Frank, & Jackson (2004) write that:

Infectious diseases dominated the health profile of early cities, which did without clean water, sewage treatment, and trash collection. Sanitary improvements during the nineteenth century controlled many of these threats, but at the same time, industrialization introduced the threats of pollution. And as urban populations grew in waves during the nineteenth and twentieth centuries, sometimes at a dizzying pace, cities became foci of concentrated poverty, social dislocation, and crime.

From the beginning, health was one of the great appeals of America and the pursuit of fresh air and land was one of the main reasons Europeans immigrated to America. After living in crowded, filthy cities, Europeans found the fresh air, open spaces, pure water, lack of disease, and freedoms offered in America attractive. However, as cities in the United States also became crowded and diseases such as cholera and yellow fever began to spread, people began to question urban living. In the year 1849 a minister from Indiana wrote, “There is something radically wrong in the construction of our cities and villages. The Creator never designed that man should be deprived of air, and light of heaven. Imperfect ventilation, impure water, and a crowded population, necessarily induce fevers and pestilence” (Frumkin, Frank, & Jackson, 2004). As people began to recognize that the conditions in the built environment of the city were negatively affecting their health, a push toward the rural aesthetic took place. The countryside was seen as a clean, pristine place for health living, and was in fact healthier. Country children died at much lower rates than city children (Frumkin, Frank, & Jackson, 2004).
The impetus for the creation of parks and open spaces within the urban environment was due, in part, to the recognition of urban filth that came with the publication of Jacob Riis’s book, How the Other Half Lives, which showed pictures of the dreadful living conditions present in New York’s tenements. This concrete proof of the dire circumstances in parts of the city led New York’s city inspector, in his 1860 report, to note that “[t]he causes of this excessive mortality [in some parts of the city]…are readily traceable to the wretched habitations in which parents and children are forced to take up their abode…where each cooks, eats, and sleeps in a single room, without light or ventilation, surrounded with filth, an atmosphere foul, fetid, and deadly” (Frumkin, Frank, & Jackson, 2004, p. 53). It was recognized that those dirty and offensive places were the ones where disease was most frequently present.

To combat these conditions, Frederick Law Olmsted (Figure 2.1), who was the head of the United States Sanitary Commission during the Civil War, suggested the idea of parks as the “lungs of the city.” In order to counteract the negative effects of the urban environment and bring the positive effects of the countryside to city dwellers, these open spaces were created within the city as places for people to relax and breathe fresh air that was cleansed by the trees (Fig 2.2).
As one of the early proponents of the park for both mental and physical health, Olmsted designed areas of Central Park in 1858 specifically for this purpose. Beveridge and Rocheleau (1995) write, “[Olmsted’s] emphasis on the psychological effects of scenery gave his design principles a firm base . . . Not aesthetic theory but the very health of the human organism became the touchstone of his art.” Olmsted paid particular attention to the different forms of recreation that were to be made available in Central Park. Aesthetically pleasing spaces gave minds and nerves a rest from the frantic rush of city life. Olmsted was aware that active recreation areas, including open areas, a pond for boating and skating (Figure 2.3), and informal trails for hikers or riders, were absent elsewhere in Manhattan so he made them available in Central Park (Fabos, Milde, & Weinmayr, 1968). Olmsted made the sweeping prediction that the park would “be more convenient for exercise than any other metropolitan pleasure-ground” (Roper, 1973). The connection between exercise and health and the environment of the city were very important to Olmsted. He was concerned with the artificial environment and increasingly difficult pace of
Figure 2.3  Skating in Central Park, 1865 (Olmsted, 1928)

Figure 2.4  Bicycle riders in Central Park (New York City Department of Parks and Recreation, 1985)

Figure 2.5  Running event in Central Park, 1984 (New York City Department of Parks and Recreation, 1985)
urban life, but he also had faith in the future of the city. Improved conditions of the city in the
nineteenth century, primarily due to improved planning and more open spaces for fresh air and
sunlight, were at the root of his faith. Olmsted wrote that the landscape was able to “refresh and
delight the eye, and through the eye, the mind and spirit” (Beveridge & Rocheleau, 1995). As
one of the first landscape architects to pay attention to health in regard to urban form, Olmsted
remains an inspiration to city planners and park designers to this day.

Another well-known landscape architect, Jens Jensen, was also inspired by Olmsted’s
principles in his design of Chicago’s city parks. As Olmsted did, Jensen also made connections
between health and the environment of the city, writing in A Greater West Park System that

Figure 2.6  Aesthetically pleasing places in
Central Park were important for mental
relaxation. (New York City Department of
Parks and Recreation, 1985).
“more parks mean more health to a greater number of people” (Eaton, 1964). The value of rural life on human health remained an important aspect of his designs, and in his view the city remained a crowded place that destroyed human nature (Grese, 1992). Jensen had a strong “desire to bring to the city dweller a message of the country outside his city walls” (Eaton, 1964). In order to do this, Jensen designed naturalistic park spaces, using native plant species and rejecting imported species in order to create a pure Illinois landscape to create healthy places for
Like Olmsted, Jensen also had faith in the future of the city, believing that “it will not be at all surprising if the city of tomorrow excludes the automobile. Today the automobile rules, and it destroys the parks as gathering places for the multitudes. Urban travel to the downtown areas of the large metropolis will be taken care of by public conveyance, and the art of walking will come back as a healthy necessity” (Jensen, 1939). Additionally, Jensen made connections between the health of hospital patients and their surroundings. Although he did not have scientific research to support his beliefs, Jensen thought that “if those in charge of hospitals saw the importance of gardens where the convalescent might while away the hours amongst flowers and growing things, they would do much toward helping a speedy recovery of the patient” (Jensen, 1939). Today, researchers have found that even without spending time in the landscape, views of the landscape are also important. Of 300 people asked to visualize a healing environment, every environment cited incorporated nature in some respect. (Marcus & Barnes, 1999). Surgical recovery patients who had views of natural scenery instead of a brick wall had shorter hospital stays by almost a day. The patients with natural scenery views also took two-thirds fewer pain medications and received two-thirds fewer negative evaluation comments from nurses (Georgia Forestry Commission, 2001).

In addition, spending time in the landscape is also important for health. Ninety-five percent of people interviewed about places they seek out when stressed reported a positive change in mood after spending time outside (Marcus & Barnes, 1999). Healing gardens, which are thought to provide hospital patients with relief from physical symptoms, stress reduction, and improvement in the overall sense of well-being, can provide space for people to connect with the environment. These types of gardens were first associated with healing in Europe during the Middle Ages when monasteries ministering to the sick and mentally ill incorporated a courtyard
where patients were allowed to commune with nature (Marcus & Barnes, 1999). Through time
the tradition of spending time in a garden or courtyard diminished. However, even at the end of
the nineteenth century and into the early twentieth century, it was considered good practice to put
patients still in their hospital beds out into sun porches and roofs for exposure to fresh air and
sunshine. Especially in the treatment of tuberculosis, the “fresh air regimen” was widely adopted
and practiced in the healing of patients with the disease. Physicians considered tuberculosis a
disease resulting from a sedentary lifestyle and an unfit environment and “after 1882, with the
recognition that tuberculosis was a contagious disease…the roles of rest, diet, a positive attitude,
and exercise increased” in the treatment of the disease (McBride, 1998, p. 28). Sanatoriums
designed for tuberculosis patients often emphasized sunlight and scenic views for patients in
order to promote optimism and strengthen the body. Great importance was placed on walks over
the trails on sanatorium grounds for physical activity and connections to the natural environment.
Even graduated programs from rest to manual labor in such jobs as forestry work, road building,
gardening, and mowing lawns promoted exercise and connection to the landscape for
tuberculosis patients. Farming was also used as a form of therapy in some institutions (McBride,
1998). Two medical developments, however, dramatically changed the way tuberculosis was
treated: the discovery of the germ theory of disease and the identification of the tuberculosis
bacteria. After antibiotic treatment was discovered, spending time at sanatoriums was no longer
considered the best treatment option for patients, and they were instead treated in sterile and
barren hospitals similar to those built today.

Although landscape architects designing sanatoriums and those designing parks, such as
Olmsted and Jensen, made important connections between the built environment and human
health, they were not the only ones to make these associations. Doctors and other health officials
of the time also saw this relationship. Reading a paper before the American Social Science Association in 1870, Olmsted noted “that New York physicians were prescribing time in Central Park as routine treatment for their patients” (Grese, 1992). In 1897, twenty-one physicians responded to a survey by the American Park and Outdoor Association that attempted to learn whether the physicians noted any connection between the presence of urban parks and the general health of the surrounding population. In response, most physicians observed that although no objective study had been done on the subject, parks and open spaces had positive influences on health in general (Grese, 1992).

After the invention of the car, it became easier for people to travel between urban centers and more rural areas. Transportation allowed cities to sprawl as it became easier for individuals to commute to the city for work from their residences in outlying areas of the city. People continued to build in rural areas because they were still perceived to be healthier than inner-city living (Dean, 2003). There has been increasing emphasis placed on the aspects of our environment that affect health, recognizing that urban form does influence health, and more research has been completed that demonstrates this relationship. Significant associations between the sprawl index of a city and minutes walked, obesity, body mass index (BMI), and hypertension have been established, showing that when a city sprawls, residents walk fewer minutes per day and have higher rates of obesity, BMI, and hypertension than people living in more compact built environments (Ewing, Schmid, Killingsworth, Slot, & Raudenbush, 2003). Their study reveals that “urban form could be significantly associated with some forms of physical activity and some health outcomes.” An increasing body of evidence supports this conclusion, and thus it is apparent that urban form and human physical health are associated. Frank and Engelke (2001) write that there is a “current lack of emphasis on the
interdependencies between built form and overall quality of life, as measured by health, safety and welfare considerations.” It is time for landscape architects to take current research into account and consider health as a component of the landscape when designing for the public.

Inspired by Olmsted’s and Jensen’s influences, today researchers are finding increasing evidence that aspects of our environment affect human health. Although health has been recognized in the landscape for many years, the way in which it has been viewed has changed dramatically. From sanitation of urban spaces and using open space and fresh air to cure disease, to using the built environment to cue walkability and combat obesity, the landscape and human health are directly connected today, as they have been throughout history. Much research has focused on the relationship between adult health and the built environment. In chapter two, we will take a closer look at how children’s health can be affected by their surroundings.
CHAPTER 3: CURRENT STATE OF CHILDREN'S HEALTH IN THE U.S.

Changes that have been made in the built environment are affecting the health of everyone in the United States, and children in particular. The combination of low density, low land use mix, low connectivity, and automobile dependence present in our communities is reducing physical activity. This high dependence on vehicles is contributing to air pollution problems and creating dangerous traffic situations. Walking and other forms of active transportation benefit public health by reducing the use of cars, which not only diminishes air and noise pollution but also increases the level of safety from traffic risks. By making our streets safer places to walk, bike, and exercise, millions of overweight children are encouraged to walk to school and other destinations, thus gaining the benefits of healthful exercise and exposure to nature in their daily lives.

This chapter will focus on three aspects of children’s health—asthma, obesity, and safety—which stem from America’s dependence on the automobile. These three issues have been closely studied in recent years and are associated with changes that have occurred in the built environment. There are certainly other health issues that can be related to the built environment such as mental health and depression, heart disease, and diabetes, but the three mentioned have been selected because of their prominence in the literature.

Children’s health

Asthma. Asthma is a complex disease, and is generally caused by a genetic predisposition to respiratory problems followed by an environmental exposure that exacerbates the symptoms.
Recently, asthma rates have been increasing. Between 1970 and 1986, prevalence of asthma in 6-11 year olds increased from 4.8% to 6.7% (Bates 1995-1). Since then, rates have more than doubled from 1980 to 1995, from 2.3 million to 5.5 million children affected. Most of the epidemiologic data relate the worsening of asthma rates to changes in pollutant levels.

Air pollutants have been documented to be associated with a wide variety of adverse health impacts in children, especially aggravation of asthma, lowered lung function in polluted regions, and increased sickness and school absenteeism rates (Bates, 1995-2). Since children breathe air rapidly, have narrow airways, and inhale more air relative to their body weight than do adults, their developing lungs are susceptible to any environmental exposures that may impede lung growth (Litman, 1999). For example, children play outside where ozone and other pollutant levels are highest, often at times of the day when ozone levels are at their peak (Bates, 1995-2). Two pollutants, ozone and particulate matter, are especially important in relation to lung health. Exposure to both has been linked to impaired lung growth in children (Jackson & Kochtitzky, 2001). The first of these pollutants, ozone, causes both short-term and long-term lung damage in children. Children’s respiratory symptoms, medication use, school absenteeism, emergency room visits and hospitalization all increase within a day or two of peak ozone levels (Litman, 1999). In the summer of 1990, Grady Children’s Hospital in Atlanta reported a 37% increase in visits for asthma after 6 days when the ozone level exceeded 0.11 parts per million, and another study of seven hospitals in New Jersey over a five-year period reported comparable results (Bates, 1995-2). Even at very low levels, ozone provokes airway inflammation in the lungs (Bates, 1995-1). Fine particulate pollution (particles less than 10 micrometers in size), the other form of pollution that is linked with children’s health, has been shown to be related to increased emergency visits for asthma, increased medication use, increased symptoms, and
increased hospital admissions for asthma (Bates, 1995-1). School absences in grades 1-6 from 1985-1990 have been significantly associated with levels of particulate matter (Litman, 1999).

Automobile use has been shown to be the source of these pollutants. Cars and trucks, especially diesel vehicles, are common sources of particulate matter (Litman, 1999). In fact, children attending school within 100 meters of a freeway reported wheeze, cough, runny nose, and doctor-diagnosed asthma significantly more often than children without this exposure (Bates, 1995-2). According to Jackson and Kochtitzky (2001), in 1997, on-road vehicles accounted for about 58 percent of carbon monoxide emissions in the United States, nearly 30 percent of nitrogen oxides, roughly 27 percent of volatile organic compounds, and about 9 percent of particulate matter. Nitrogen oxide and volatile organic compounds contribute to ground-level ozone pollution, which is known as smog. When the Atlanta Olympic Games in 1996 brought about a 22.5% reduction in auto use, asthma admissions to emergency rooms and hospitals also decreased by 41.6%, but other non-asthma medical events during the same time period remained steady (Jackson & Kochtitzky, 2001).

As indicated, many studies have demonstrated the connection between air pollution and the significant doubling of asthma cases. However, precise evidence of a direct causal link between air pollution and asthma has so far been inconclusive. Nevertheless, in view of the general increase in exposure to air pollutants, children’s health risks associated with increasing automobile use cannot be ignored.

**Obesity.** Physical activity in American children has declined as children walk or bicycle less and increasingly rely on cars for transportation. A trend away from active leisure pursuits and recreational sports has also been evident, and sedentary entertainment, including the use of television, video games, and computers, has increased (Williams et al., 2002). Between 1985 and
1992, the average distance walked in a year by a child aged 0-14 declined by 20% from 247 miles to 197 miles (DiGuiseppi, Roberts & Li, 1997). In Georgia, a survey was completed that reviewed the commute for children in nearly 1,000 households. Of these, 43.3% were driven to school, 48.9% rode a bus, and only 4.2% walked on most days of the week (Frumkin, Frank, & Jackson, 2004).

With the diminishment of physical activity has come the increase in obesity problems among American youth. Approximately 15% of the nation’s children are currently obese, and an additional 15% are considered “at risk” of becoming obese, following the trend of increasing obesity in U.S. adults (Figures 3.1-3.3). Since the 1970’s the prevalence of obesity in the US has more than tripled among children aged 6 to 11 and has more than doubled among children aged 2-5 and adolescents between 12 and 19 (Okie, 2005). This trend is of particular concern because being overweight in childhood and adolescence is associated with increased risks of

![Figure 3.1 Obesity trends among U.S. adults, 1985 (Jackson & Kochtitzky, 2001)
hypertension, adverse lipid profiles, type II diabetes, and early atherosclerotic lesions (Williams et al., 2002). In adulthood, people who remain seriously overweight have elevated rates of heart disease, diabetes, high blood pressure, high cholesterol, asthma and other breathing disorders, cancer, liver, and gallbladder disease, arthritis, and depression (Okie, 2005).
To determine levels of obesity, researchers use body mass index (BMI) to determine whether a person’s weight, after being adjusted for height, falls within the range of weights considered to be healthy. Adults who have a BMI of 30 or higher are considered “obese” and those with a BMI between 25 and 29 are considered “overweight.” “The situation is complicated [for children] by the fact that as long as a child is growing, his or her BMI is a moving target: it changes continually as height and weight change. For this reason, in children, obesity is defined as a BMI that is higher than the 95th percentile for children of the same age and gender” (Okie, 2005, p. 11). This means that a child is considered obese if 95% of children of the same age have lower BMI’s, while only 5% have higher.

Obesity in adults is the number two preventable cause of death in the US, second only to tobacco use. If the obesity epidemic is not halted quickly, obesity may soon overtake smoking as the nation’s leading cause of preventable death. The Centers for Disease Control and Prevention published an updated estimate in 2004 that placed the annual toll of obesity and inactivity at 400,000 deaths per year. Researchers have already documented worrisome changes in the hearts and arteries of obese children, including thickening of the walls of carotid arteries in children as young as 9 years old (Okie, 2005).

As physical activity rates have declined and obesity rates have risen among children, Americans are constantly being persuaded to find ways to get more exercise. If combining physical activity with an already-necessary commute to school can be encouraged and achieved, the United States will be well on its way toward changing lifestyles for the better and reducing unhealthy obesity rates in children.

Safety. Safety is another important aspect of children’s health in the United States. If an area is perceived to be unsafe, children will not walk there, either because parents will not allow
them or the children themselves choose not to. The leading reason parents give for restricting their children’s unaccompanied travel is traffic danger (Engwicht, n.d.). Unsafe areas prevent children from walking and they miss an opportunity to experience the many health benefits of physical activity. In 1999, only 19% of parents reported that their children had ever walked to or from school, and just 6 percent reported that their children biked to school at least once a week during the preceding month (Frumkin, Frank, & Jackson, 2004).

On average, a pedestrian is killed in a traffic accident every 97 minutes, and most pedestrian crashes in 1996 occurred in urban areas (71%), at non-intersection locations (77%), in normal weather conditions (88%), and at night (65%) (Bicycle Federation of America, 1998). Over 2/3 of those pedestrian fatalities were males, while children and older adults face the greatest risks because of their typical pedestrian characteristics. As shown in Figure 3.4, children generally have poor depth perception in determining distance from a car and are unable to properly judge its speed. Older adults are unable to move across streets as quickly as younger people, and as they begin to lose vision and hearing, they become less aware of approaching vehicles.

A mile of walking or biking is also more dangerous than a mile of driving. In 2001, while each traveling a distance of one mile, a pedestrian was 23 times more likely to be killed and a bicyclist was 12 times more likely to be killed than an occupant of a car. (Frumkin, Frank, & Jackson, 2004).

Despite these trends, child deaths from injury declined 34% between 1985 and 1992 (DiGuiseppi, Roberts, & Li, 1997). A large portion of this decline in pedestrian and cycling deaths, however, seems to have been achieved at the expense of children’s walking and cycling activities. More children are now riding in cars than walking to school and are therefore not at
risk as pedestrians (Roberts, 1993). In 1970 more than two thirds of all Americans walked or biked to school, but in 2003 that number dropped to approximately ten percent (Thomas, 2003). These changes in travel patterns may save children from injuries and death due to traffic fatalities, but exact a considerable price in terms of future health problems.

Children are not only hit by cars while walking to school or other destinations, either. Playing in streets, especially in urban areas, is also a common way in which they are exposed to traffic hazards. Most pedestrians are killed by cars on neighborhood streets, the streets where people live and walk, and where children play (Bicycle Federation of America, 1998). It is evident that pedestrian safety is often a traffic issue secondary to the convenience of the motorized vehicle.

Safety is not only an issue for children when walking or biking and crossing streets. There is also a concern for children as victims of crime such as kidnapping. When neighborhood
residents are aware of normal day-to-day activity in the neighborhood, they are more likely to notice and take action when there is unusual activity taking place. In a Dayton, Ohio case study, traffic calming reduced neighborhood crime by 25-50% and encouraged residents to get to know their neighbors and become more involved in community activities, making the neighborhood safer. A survey of residents found that many knew their neighbors better and were more involved in community activities after these changes (Litman, 1999).

Safety cannot be ignored because it touches areas of all other risks to children’s health. If areas are unsafe, there are no opportunities to walk nor possibilities for people to leave their cars at home to reduce air pollution. Since safety is a common barrier to parents allowing children to walk to school, it is an important issue to address in planning.

**Relationship between children’s health issues and the built environment**

The built environment presents both opportunities for and barriers to participation in physical activity, thereby influencing whether or not people exercise. However, the built environment is not the only reason for health problems. Race, gender, and socioeconomic status have all been shown to play a role, but the specifics of those variables are beyond the scope of this thesis. The built environment is just one factor in the equation, but it is undoubtedly involved.

Sprawl, a term used to describe a pattern of development which is characterized by low density growth, separated land uses, automobile dominance, and little public space, has been implicated for numerous problems in our society, including the decline of public health. Evidence is mounting that this automobile-oriented land use reduces transportation choice, adversely affects air quality and safety, and discourages physical activity (Bicycle Federation of
Sprawl is also dangerous for pedestrians since much of the planning for new towns and cities concentrates on automobile transportation. A study in Atlanta showed that as that city sprawled in recent years, the pedestrian fatality rate increased even as the national rate declined slightly (Frumkin, Frank, & Jackson, 2004). Because of the way sprawling cities and towns are planned, with destinations in a variety of widespread locations, car use has become the norm. Even for shorter trips, the embedded custom of getting in the car has become routine. Zoning practices implemented in recent years often distinctly separate land uses, detaching residential and commercial development. Because these services are divided from the areas where people live, it often seems easier to get in the car to run errands than to walk. Americans use their cars for 66% of all trips up to a mile long and for 89% of all trips between 1-2 miles long (Robert Wood Johnson Foundation, n.d.).

There is a clear relationship between the degree of sprawl present in a community and the amounts of walking people do there. More sprawl is associated with less walking and less leisure-time activity, which in turn has led to the rising rate of childhood obesity (Kreyling, 2001). However, it is important to note that sprawl does not fully explain the inactivity that plagues American children. Dietary changes such as super-size portions of fast food that are high in calories, behavioral changes such as more time spent in front of the television and computer, and programmatic changes such as cutbacks in school-based physical education all contribute. Yet the inability to walk or bike to school or to other destinations aggravates the situation.

Some aspects inherent in the design of sprawling cities are major deterrents to walking: lack of sidewalks, narrow walkway widths, missing curb cuts, poorly constructed walking surfaces, difficult street crossings that are too wide or too fast, inadequate bridge design that leaves pedestrians no place to walk, physical features such as rivers, railroad tracks, and major
arterial streets that lack pedestrian crossings, inadequate facilities for access to transit services, high-speed and high volume traffic adjacent to schools, parks, shopping, and residential areas, and inadequate sidewalk maintenance including snow removal and repair.

Experts have identified several factors that are important in people’s decisions to walk or bike. These include safety factors, attractiveness of the streetscape, the presence of destinations for walking, and the presence of a continuous route and traffic safety for bicycling (Frumkin, Frank, & Jackson, 2004). Partly because of sprawl, these features have declined in the built environment.

Although researchers have yet to pinpoint exactly which aspects of the built environment contribute most to rising rates of obesity, many studies have implicated the design of the built environment in this public health issue. Both individual and neighborhood characteristics are significant predictors of how a person perceives the pleasantness and availability of physical activity opportunities in his or her neighborhood (Jackson and Kochtitzky, 2001). People who report having access to sidewalks are 28% more likely to be physically active than those who believe they do not have adequate access to sidewalks (Robert Wood Johnson Foundation, n.d.). Several specific design features that were felt to “meet pedestrian’s needs” also helped to predict walking patterns: continuous uninterrupted routes, multiple route choices, easily navigated topography, and crossing lights. The realization that people’s weight and overall health are influenced by the built environment is one aspect behind the new urbanism and smart growth movements, which favor planning communities in ways that both protect the environment and create neighborhoods whose local resources are easily accessible on foot and by public transportation. Walking is inexpensive, can be done by almost everyone, and can be done almost
anywhere, when the conditions are right. Planning the built environment in this way, to include walking in daily life, will certainly benefit people’s health through increased activity levels.

Current trends in traffic safety are directly related to the way the built environment has been designed. Risk factors for pedestrian injuries among children include male gender, age 5 to 9, and poverty, but also several factors that relate directly to land use and transportation decisions: high traffic volume and speed, absence of play space, on-street parking, and one-way streets (Frumkin, Frank, & Jackson, 2004). There are many ways to reduce the number of traffic fatalities involving child pedestrians, several of which will be discussed later in this chapter. However, reducing the number of trips people make by car is one option. One quarter of all trips people make are 1 mile or less, but ¾ of these short trips are made by car. In addition, almost 70% of all children’s trips are by car. Children make only 10-12% of their school trips by walking or riding their bicycles (Robert Wood Johnson Foundation, n.d.). Traffic safety engineers also need to change the focus from cars to people when planning. Current funding of pedestrian infrastructure is dismal. Since walking provides both transportation and recreation benefits, and also helps reduce the risk of injuries or deaths in motor-vehicle accidents, it therefore deserves funding from both transportation and recreation budgets. For example, it may be appropriate to devote 10% of a jurisdiction’s transportation budget and 20% of its recreation budget to pedestrian facilities (Litman, 2004).

Table 3.1  Estimated portion of U.S. roadway expenditures devoted to walking (Litman, 2004)

<table>
<thead>
<tr>
<th></th>
<th>Roadway Expenditures (billions)</th>
<th>Walking Facility Expenditures (billions)</th>
<th>Estimated Portion Devoted To Walking</th>
</tr>
</thead>
<tbody>
<tr>
<td>Federal</td>
<td>$30.8</td>
<td>$0.8</td>
<td>2.5%</td>
</tr>
<tr>
<td>State</td>
<td>$66.4</td>
<td>$0.7</td>
<td>1%</td>
</tr>
<tr>
<td>Local</td>
<td>$31.3</td>
<td>$3.1</td>
<td>10%</td>
</tr>
<tr>
<td><strong>Totals</strong></td>
<td><strong>$128.5</strong></td>
<td><strong>$4.6</strong></td>
<td><strong>3.5%</strong></td>
</tr>
</tbody>
</table>
State requirements for the remodeling of old schools and new school construction have also contributed to the problems encountered with sprawl and associated children’s health. School boards are making decisions to locate new schools in areas that limit options for walking since the sites are so far removed from the homes of the children expected to attend them. National guidelines for space requirements recommended by the Council of Educational Facility Planners International call for at least 1 acre for every 100 students plus 10 acres for an elementary school, which is more than most cities, large or small, have available near residential neighborhoods (McMahon, 2000). This forces towns to close existing schools and build larger ones on the edges of the city, where more land is readily available. For example, in Georgia, more than 100 smaller, historic, neighborhood school buildings have been closed since 1986 (McMahon, 2000). This not only poses problems for student health; parents are also affected by these changes. The average parent is confined behind the wheel of a car for 72 minutes per day, driving kids to and from school, to soccer games, birthday parties, friends’ houses and other destinations, creating more air pollution, traffic congestion, and safety issues.

Why do these problems need to be fixed, and what are some of the solutions?

Allowing children to walk to school, if conditions are right, is beneficial for them. It allows them to experience freedom and responsibility, get fresh air, get to know and connect with their neighborhood, and arrive at school alert, refreshed, and ready to start their day. Any amount of walking, at any speed, expends energy and burns calories. Because of this, walking has the potential to develop and sustain physical fitness, which is “the cardiovascular capacity and endurance for bodily work and movement in everyday life that also provides reserves for meeting exceptional demands” (Morris and Hardman, 1997, p. 307). Also, since walking is a
weight-bearing activity, it also has been shown to increase related bone strength in people of all ages (Morris & Hardman, 1997). Walking and other forms of physical activity also have an effect on children’s mental health. Children who are physically inactive tend to have lower self-esteem than active children (Okie, 2005).

The connections that children have with their surroundings in both the natural and built environments play a significant role in their lives. Although a walk to school is different from a walk in a park or a hike through the woods, it is still an opportunity for them to connect with nature. To learn about, value, and ultimately protect their world, children need to experience it fully in both its natural and built forms (Stine, 1997). Researchers have found that frequent exposure to nature and natural elements, either in a wilderness setting or as expressed in a traditional garden, can improve a person’s performance and ability to cope with disease (Phillips, 1998). Especially during middle childhood and early adolescence, evidence suggests that experiential contact with nature can have a significant impact on cognitive development (Kahn & Kellert, 2002). Even children residing in highly populated areas still encounter many opportunities for experiencing nature in ways that facilitate cognitive development. These experiences can include “direct encounters in backyards, parks, streetscapes, and more; indirect experiences through visiting zoos, natural history museums, nature centers, school programs, and so on” (Kahn & Kellert, 2002, p. 134). Few experiences in life provide children with as much opportunity for critical thinking, creative inquiry, problem solving, and intellectual development as nature does.

Changes in the built environment are essential in order to get more people, especially children, to walk and connect with their surroundings. Planning with non-motorized transportation in mind is often a characteristic of a walkable community. Traffic calming is a
common strategy used to create places that are pedestrian- and bike-friendly. Many different techniques can be used, each with its own unique traffic calming purpose and result. The techniques are summarized in Table 3.2, which discusses each type of traffic calming device, suggests whether applications of each device are best used for arterial roads or local streets, and conveys whether it reduces volume of traffic on the street or slows traffic down.

Table 3.2 Summary of traffic calming strategies and devices (Litman, 1999)

<table>
<thead>
<tr>
<th>Type</th>
<th>Description</th>
<th>Applications</th>
<th>Impacts</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Speed limits</strong></td>
<td>Reduced speed limits.</td>
<td>✓</td>
<td>Yes</td>
</tr>
<tr>
<td><strong>Speed alert, enforcement</strong></td>
<td>Radar-clocked traffic speeds displayed to drivers. Strong speed limit enforcement.</td>
<td>✓</td>
<td>Yes</td>
</tr>
<tr>
<td><strong>Vehicle restrictions</strong></td>
<td>Limiting vehicle types (trucks) or users (residents only) on specific roads.</td>
<td>✓</td>
<td>No</td>
</tr>
<tr>
<td><strong>Warning signs and gateways</strong></td>
<td>Signs &amp; gateways indicating changing road conditions, traffic calming, residential or commercial districts.</td>
<td>✓</td>
<td>Yes</td>
</tr>
<tr>
<td><strong>Speed tables, raised crosswalks</strong></td>
<td>Ramped surface above roadway, 7-10 cm high, 3-6 m long.</td>
<td>With caution ✓</td>
<td>Possible Yes</td>
</tr>
<tr>
<td><strong>Median island</strong></td>
<td>Raised island in the road center (median) narrows lanes and provides pedestrian with a safe place to stop.</td>
<td>✓</td>
<td>Yes</td>
</tr>
<tr>
<td><strong>Channelization islands</strong></td>
<td>A raised island that forces traffic in a particular direction, such as right-turn-only.</td>
<td>✓</td>
<td>Yes</td>
</tr>
<tr>
<td><strong>Speed humps</strong></td>
<td>Curved 7-10 cm high, 3-4 m long hump.</td>
<td>✓</td>
<td>Possible Yes</td>
</tr>
<tr>
<td><strong>Rumble Strips</strong></td>
<td>Low bumps across road make noise when driven over.</td>
<td>✓</td>
<td>No</td>
</tr>
<tr>
<td><strong>Mini-circles</strong></td>
<td>Small traffic circles at intersections.</td>
<td>✓</td>
<td>Possible Yes</td>
</tr>
<tr>
<td><strong>Roundabouts</strong></td>
<td>Medium to large circles at intersections.</td>
<td>✓</td>
<td>Yes</td>
</tr>
<tr>
<td><strong>Pavement treatments</strong></td>
<td>Special pavement textures (cobbles, bricks, etc.) and markings to designate special areas.</td>
<td>✓</td>
<td>Not Likely Yes</td>
</tr>
<tr>
<td><strong>Bike lanes</strong></td>
<td>Marking bikelanes narrows traffic lanes.</td>
<td>✓</td>
<td>No</td>
</tr>
<tr>
<td><strong>Curb extensions (bulbs, chokers).</strong></td>
<td>Extending curb a half-lane into the street to control traffic and reduce pedestrian crossing distances.</td>
<td>✓</td>
<td>Possible Yes</td>
</tr>
<tr>
<td><strong>“Road diets”</strong></td>
<td>Reducing the number of traffic lanes.</td>
<td>✓</td>
<td>Yes</td>
</tr>
<tr>
<td><strong>Lane narrowings, “punch points”</strong></td>
<td>Curb extensions, planters, or centerline traffic islands that narrow traffic lanes. Also called “chokers.”</td>
<td>✓</td>
<td>Not Likely Yes</td>
</tr>
<tr>
<td><strong>Horizontal shifts</strong></td>
<td>Lane centerline that curves or shifts.</td>
<td>✓</td>
<td>Yes</td>
</tr>
<tr>
<td><strong>Chicanes</strong></td>
<td>Curb bulges or planters (usually 3) on alternating sides, forcing motorists to slow down.</td>
<td>✓</td>
<td>Possible Yes</td>
</tr>
<tr>
<td><strong>2-lanes narrow to 1-lane</strong></td>
<td>Curb bulge or center island narrows 2-lane road down to 1-lane, forcing traffic for each direction to take turns.</td>
<td>✓</td>
<td>Possible Yes</td>
</tr>
<tr>
<td><strong>Semi-diverters, partial closures</strong></td>
<td>Restrict entry/exit to/from neighborhood. Limit traffic flow at intersections.</td>
<td>✓</td>
<td>Yes Possible</td>
</tr>
<tr>
<td><strong>Street closures</strong></td>
<td>Closing off streets to through vehicle traffic at intersections or midblock.</td>
<td>✓</td>
<td>Yes</td>
</tr>
<tr>
<td><strong>Stop signs</strong></td>
<td>Additional stop signs, such as 4-way-stop intersections.</td>
<td>✓</td>
<td>Possible Yes</td>
</tr>
<tr>
<td><strong>“Neotraditional street design”</strong></td>
<td>Streets with narrower lanes, shorter blocks, T-intersections, and other design features to control traffic speed and volumes.</td>
<td>✓</td>
<td>Yes</td>
</tr>
<tr>
<td><strong>TDM</strong></td>
<td>Various strategies to reduce total motor vehicle use.</td>
<td>✓</td>
<td>Yes</td>
</tr>
<tr>
<td><strong>Woonerf</strong></td>
<td>Very low-speed residential streets with mixed vehicle and pedestrian traffic.</td>
<td>✓</td>
<td>Yes</td>
</tr>
</tbody>
</table>
These improvements in safety have been shown to make a difference. In Germany and
the Netherlands, the number of pedestrian and bicyclist deaths has been drastically cut over the
past 25 years by implementing such techniques as better facilities for walking and cycling, traffic
calming of residential neighborhoods, urban design sensitive to the needs of non-motorists,
restrictions on motor vehicle use in cities, rigorous traffic education of both motorists and non-
motorists, and strict enforcement of traffic regulations protecting pedestrians and cyclists. From
1975 to 2001, total pedestrian fatalities declined by 82% in Germany and 73% in the Netherlands
(Pucher and Dijkstra, 2003).

The speed at which a car is traveling is an important factor in the risk of pedestrian death
at the time of the accident. Risk of pedestrian death in crashes rises from 5% at 20 mph to 45% at
30 mph and 85% at 40 mph. Because reduced speed is the most important factor in safety
measures, traffic calming in Dutch neighborhoods reduced traffic accidents by 20-70%, and in
Germany have reduced traffic injuries overall by 20-70% and serious traffic injuries by 35-56%
(Pucher and Dijkstra, 2003). Speed reduction also reduces air pollutants that are emitted from
cars and reduces fuel consumption in some cases (Table 3.3).

Traffic safety education needs to be further implemented in the United States.
Automobile drivers should be more highly trained to anticipate pedestrians and bicyclists.
Pedestrian and biker education, which includes training to avoid accidents with motor vehicles,
should be taught in schools.

Table 3.3 Effect of a 50 kph to 30 kph speed reduction of vehicle emissions and
fuel use (Litman, 1999)

<table>
<thead>
<tr>
<th></th>
<th>“Easy” Driver</th>
<th>“Aggressive” Driver</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carbon monoxide</td>
<td>-13%</td>
<td>-17%</td>
</tr>
<tr>
<td>VOCs</td>
<td>-22%</td>
<td>-10%</td>
</tr>
<tr>
<td>NOx</td>
<td>-48%</td>
<td>-32%</td>
</tr>
<tr>
<td>Fuel use</td>
<td>-7%</td>
<td>+7%</td>
</tr>
</tbody>
</table>
Because of the trends in obesity levels, many different groups are focusing on the importance of giving children the ability to at least get exercise while walking to and from school. The Center for Disease Control and Prevention says walking to school is more important than ever (On your feet, 2001). Cooper, Page, Foster and Qahwaji (2003) found that children who walked to school were significantly more active throughout the day, particularly after school and in the evening, than those who traveled by car. This supports walk-to-school initiatives that aim to encourage physical activity as part of the school day, including the journey to and from school. Boys who walk to school accumulate an additional 30 minutes of moderate to vigorous physical activity per day after school and during the evening compared with those who travel by car (Cooper, Page, Foster, & Qahwaji, 2003). Promoting physical activity is the first step in diminishing obesity and its associated health risks, and while there are additional methods for weight loss, physical activity is no doubt the most important factor. The European countries with the highest levels of walking and cycling have much lower rates of obesity, diabetes, and hypertension than the United States (Figure 3.5). The Netherlands, Denmark, and Sweden have obesity rates only 1/3 of American rate, while Germany’s rate is only half as high (Pucher & Dijkstra, 2003).

The built environment exerts a considerable influence on human health, and as noted in this chapter, many different factors contribute to the problems with asthma, obesity and safety that afflict children in the United States. To counter these problems, walking and other forms of active transportation can be incorporated into children’s daily routines through their walk to school. Recognizing this, the Safe Routes to School program is one strategy that promotes the development, retrofitting and maintenance of infrastructure for routes to and from school that are safe, convenient, accessible, active and enjoyable for children.
Figure 3.5 Percentage of trips in urban areas made by walking and bicycling in North America and Europe, 1995 (Pucher & Dijkstra, 2003)
CHAPTER 4: PRECEDENT CASE STUDIES

A healthy and safe approach to transportation choices and the design of infrastructure near schools is now being practiced around the country and the world. Pedestrians and bicyclists are being educated on traffic safety, sidewalks are being installed or repaired, and crosswalks are being made safer. School administrators, parents, interested citizens, and other volunteers have worked to organize programs aimed at reducing asthma, obesity, and safety problems for children while encouraging walking and other forms of active transportation on the school commute. Children are thus benefiting from these improvements.

Programs such as the Safe Routes to School program (SR2S) are being organized in cities around the United States. Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU) is a federal transportation bill that became Public Law 109-59 on August 10, 2005, and it includes $612 million for a new national Safe Routes to School (SR2S) program. This funding will provide at least $1 million per year to each of the 50 state Departments of Transportation over a five-year time period. Communities will be able to apply for and use this funding to construct new bike lanes, pathways, and sidewalks, as well as to launch education and promotion campaigns in elementary and middle schools.

Safe Routes to School (SR2S) is a program that is spreading in popularity across the United States and in other countries. It is designed to decrease traffic and pollution problems and increase the health of children in local communities by promoting active transportation to school (Nicholson & O’Neill, 1999). Incorporating this physical activity into daily routines is an easy and effective way to enhance health and well-being. It also contributes to the protection of the
natural environment by reducing reliance on energy-consuming and polluting forms of transportation.

The overall purpose of the Safe Routes to School program is to improve safety near schools in order to make it practical for children to walk to school for their health. Infrastructure improvements such as signage (Figure 4.1), crosswalks, speed bumps, and traffic signals, paired with efforts by teachers, administrators, parents, children, community leaders, police

Figure 4.1 Pedestrian signage improves safety for children walking to school (City of San Antonio Public Works, n.d.)

departments, and planning offices, allow neighborhoods to provide the best possible opportunity for students to make active transportation choices. While each program is run independently in the community, the programs all have common objectives. Their goals are to:

- Encourage students, families, and school staff to be physically active by walking and bicycling more often.
- Make streets, sidewalks, pathways, trails, and crosswalks safe, convenient, and attractive for walking and bicycling to school.
- Ensure that streets around schools have an adequate number of safe places to cross and that there is safe and convenient access into the school building from adjacent sidewalks.
- Keep driving speeds slow near schools, on school routes, and at school crossings.
- Enforce all traffic laws near schools, on school routes, and in other areas of high pedestrian and bicycle activity.
- Locate schools within walking and bicycling distance of as many students as possible, not along busy streets on the edges of neighborhoods.
- Reduce the amount of traffic around schools.
• Use trails, pathways, and non-motorized corridors as travel routes to schools.
• Provide secure bicycle parking at schools.
• Teach traffic safety skills routinely in school. (Bikes Belong Coalition, n.d.)

Since each neighborhood is unique, every SR2S program must respond to that community’s particular needs. Some of the most successful programs give children the opportunity to get to know their neighborhoods, enjoy fresh air, and arrive at school alert and ready to start the day.

However, many of the SR2S programs throughout the United States and around the world have faced similar challenges in addition to their similar goals. Some of the obstacles these programs have overcome is a lack of coordination between walking and biking efforts, a severe lack of funding for infrastructure improvements even after plans have been made, reluctance from schools, teachers, and administrators to take on extra projects, and the habitual car use and perception that cars are the safest and most convenient way to travel to school. There is also a fast turnover of trained teachers who leave the field. Retraining new teachers becomes an additional burden on the program. In addition, data collection in most SR2S programs is not a high priority. More effort often goes into planning events that encourage walking, designing infrastructure improvements, and creating interest in the program, but without data collection, schools are often left wondering if their efforts have had the intended positive effects.

International Walk to School Day (IWALK), an effort to encourage walking in addition to the Safe Routes to School Program, began in 1994 in Great Britain when several schools in Hertfordshire County piloted the program during their summer term. Popularity has grown and spread throughout the world, with a total of 37 countries participating in 2005 (Pedestrian and Bicycle Information Center, n.d.). The goal of IWALK is to bring forth positive and permanent change in communities throughout the world to make walking safer for children and reduce dependence on automobiles for transportation. By promoting walking just one day or week in a
year, International Walk to School Day can raise awareness about the many positive health, safety and environmental benefits that can be gained from regular walking.

This chapter will introduce three case studies in cities that have made significant efforts to improve walking and bicycling routes to school. Two of the case studies employ the Safe Routes to School program in the United States, the Marin County, California Safe Routes to School Program and The Bronx, New York Safe Routes to School Program, while the third, the Ontario Walkability Study focuses on community efforts and participation in International Walk to School Day. The Marin County program was one of the first well-established efforts in the United States and is often used as a guide for other schools interested in beginning this program in their community. Their particular focus on data collection aided in demonstrating the effectiveness of the program. The Bronx program did not need to convince students to walk to

![Figure 4.2](image-url) International Walk to School Day event in Cedar Falls, Iowa (International Walk to School, 2004)
school; 85% of their student population already walked, a similar situation to Anna K. Davie Elementary in Rome, Georgia. Their main focus was making infrastructure improvements and increasing safety for the students who were already walking. The Ontario study reveals an extensive collaboration of efforts throughout the community and uses many unique methods to encourage children to walk. The following case studies, while each unique to their community, also employ successful methods to provide opportunities for healthy living. By taking a closer look at previous work in this area, we can prove that walking to school is an effective strategy for reconnecting students of all ages and backgrounds with their surroundings and increasing health benefits.

**Marin County, California Safe Routes to School Program**

One of the Safe Routes to School programs that concentrated heavily on data collection was in Marin County, California. Marin County is a suburban area north of San Francisco with a population of 247,000, including about 35,000 school-aged children. Demographics from the U.S. Census data shows that there are 84% white, 11% Hispanic or Latino, 3% black or African American people who make up the dominant racial communities. There are a number of small,
older communities and a lot of rural areas and open spaces, and the county averages 476 people per square mile (United States Census Bureau, 2000).

After a traffic study showed that 21% of morning congestion consisted of adults driving children to school, Marin County Bicycle Coalition (MCBC) introduced the concept of Safe Routes to School with its associated benefits of reduced traffic, cleaner air, and healthier children (United States Department of Transportation, 2004). In 1999 two local residents began working to increase the number of Marin County school children walking and biking to school and started to raise support for the SR2S program. In August 2000, MCBC received a grant for a demonstration project in Marin County. That preliminary project has grown to include 21 schools with nine more schools organizing their own SR2S projects as of 2004. During the 2000-2001 school year, the program served about 3500 students in 9 schools (7 public and 2 private); by the 2001-2002 school year 4665 students in 15 schools (12 public and 3 private) were enrolled; and in the 2002-2003 school year, 7609 students in 21 schools (17 public and 4 private) participated (Staunton, Hubsmith, & Kallins, 2003).

Marin County SR2S operates with only four paid staff. One of the two founding members is the program director, and the other works several hours a week supervising and promoting the program. A full-time educator is employed to develop the program’s school curriculum and oversee classroom education (Figure 4.4), and a traffic engineer assists in identifying and creating safe routes for participating students. In addition, the program requires each school to nominate a volunteer team leader prior to their entry into the program.

Through data collection, SR2S has been able to show that the pilot school’s transportation modes shifted, which has helped to raise support for the program and led to its growth in Marin County (Table 4.1). Modes of transportation were determined by student
Figure 4.4 Lesson for Marin County students concerning Safe Routes to School and traffic safety (International Walk to School, 2004)

Figure 4.5 International Walk to School event participants (International Walk to School, 2004)
Table 4.1 Shift in transportation modes at pilot schools in Marin County, California (United States Department of Transportation, 2004)

<table>
<thead>
<tr>
<th>Transportation Mode</th>
<th>Percent Before (Fall 2000)</th>
<th>Percent After (Fall 2001)</th>
<th>Percent After (Spring 2002)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Walk</td>
<td>14%</td>
<td>17%</td>
<td>23%</td>
</tr>
<tr>
<td>Bike</td>
<td>7</td>
<td>12</td>
<td>15</td>
</tr>
<tr>
<td>Bus</td>
<td>6</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Carpool</td>
<td>11</td>
<td>15</td>
<td>21</td>
</tr>
<tr>
<td>Drive Alone</td>
<td>62</td>
<td>53</td>
<td>38</td>
</tr>
</tbody>
</table>

surveys during the first two years of the program. For three successive days in the fall and then again in the spring, students were asked how they got to school that morning and results from the three days were averaged. The surveys reveal an increase in walking, biking, and carpooling in the participating public schools during the first 2 years. From fall 2000 to spring 2002 surveys were conducted at a number of schools throughout Marin County. In fall 2000, 1743 students participated from 6 of the 9 schools involved in the program, and in the spring of 2001 that number increased slightly to 1756 students at those six schools. In fall 2001, 2097 students participated at 7 of 15 schools, and spring 2002 there were 1611 students surveyed at 7 schools. To conduct the surveys, volunteers visited classrooms at the schools for three consecutive days and asked students how they got to school that morning. Survey results showed that between fall 2000 and spring 2002 there was a 64% increase in the number of children walking, a 114% increase in the number of students biking, a 91% increase in the number of students carpooling, and a 39% decrease in the number of students arriving by private car carrying only one student (Staunton, Hubsmith, & Kallins, 2003).

With persistent, organized efforts, summarized in Table 4.2, the SR2S program in Marin County was able to overcome many of their challenges, including reluctance by teachers and
staff to take on additional work, convincing school administrators that SR2S is worthwhile, working with Public Works staff not trained in bicycle and pedestrian issues, and recruiting and retaining crossing guards. The program is making an important difference to participating communities by enhancing health, reducing traffic congestion, and helping build a greater sense of community. Future goals in Marin County include expanding and perfecting the data collection process and analysis using professional statisticians, evaluating the effectiveness of each individual program activity, analyzing transportation modes by travel distance, assessing health outcomes such as improved physical fitness, having closer surveillance on travel-related injuries, and measuring changes in traffic congestion.

Table 4.2 – Activities of the Safe Routes to School Program: Marin County, California, 2000-2002

Mapping Safe Routes to School
- Town-wide programs to identify and create safe routes for walking and biking to each school
- Volunteers walk the routes and report findings to the group documenting routes for their school
- Findings pooled on a master map
- Solutions to make walking and biking safer are designed (sidewalks, improved pedestrian signage and crossings, a pedestrian bridge, extension of existing bike trail, bike lanes, etc.)
- Funds for needed traffic infrastructure changes are obtained through grant applications, public presentations leading to donations, and local government funds

Walk and Bike to School Days
- All schools participate in “International Walk to School Day” (beginning of October), but many schools have scheduled monthly or even weekly “Walk to School Days”
- Many schools provide drinks and treats to children walking or biking to school
- “Staging Areas” are established where students who live too far away can be dropped off and then walk the rest of the way to school
- Some schools also encourage children to take school buses rather than travel by private vehicles

Frequent Rider Miles Contest
- Children are issued “tally cards” with 20 possible points per card
- Children earn 2 points for walking or biking and 1 point for taking the bus or carpooling
- At 20 points, children get a small prize and can enter a raffle for larger prizes
- Children are encouraged to submit multiple cards for the raffle during the contest period

Classroom Education
- Safety training is provided through videos, discussion, presentations and hands-on “bicycle rodeos.” A toolkit developed by the program and available to all participating schools, includes curriculum guidelines for teaching pedestrian and biking safety
- Using age-appropriate, local examples, children were taught about transportation choices and the environment, physical activity for health, the power of community involvement, and the interrelatedness of all species and habitats
- In one middle school, children produce their own videos on “the role bicycles play in society”  

(cont’d next page)
Table 4.2 (cont’d) – Activities of the Safe Routes to School Program: Marin County, California, 2000-2002

Walking School Buses and Bike Trains
- Organized groups of children that walk and bike together are called “walking school buses” and “bike trains,” respectively. These groups allow parents to share the responsibility of supervising children’s trips and provide the children with a group to travel with.
- Geographic mapping systems showing the homes of the participating children facilitate establishment of these walking and biking groups. Some schools posted these geographic maps along with parent contact information to facilitate formation of “walking school buses” and “bike trains”

Newsletters and Promotions
- Throughout the year, the volunteer team leaders at each school are supplied with template flyers, fact sheets, posters, and newsletters (newsletters are also mailed to elected officials, town staffers, and other interested parties)
- Local newspapers have run feature articles about the program
- The program uses an e-mail list serve, an e-mail distribution list, and a Web-site
- An annual countywide forum is held to welcome new schools to the program and allow participating teams of volunteers at all schools to meet and talk with one another

Networking and Presentation on the State and National Level
- Safe Routes to School staff have been invited speakers at numerous state and national conferences
(From American Journal of Public Health)

The Bronx, New York Safe Routes to School Efforts

The Bronx is an extremely dense area of New York City, and with a population of over 1.3 million people and a surface area of just 42 square miles, almost 32,000 people live in each square mile of the district. Demographic data show that the Bronx is 30% white, 36% black or African American, and the remaining population is a varied mix of other races (United States Census Bureau, 2000). Twenty-five percent of the population is 15 or younger, and over 85% of children in the Bronx, New York currently walk to school. In 1995-1997, however, the Bronx had New York’s highest rate of pedestrian fatalities and injuries (United States Department of Transportation, 2004).

To begin addressing the problem and make active transportation safer for children, Transportation Alternatives, an advocacy organization for pedestrians and bicyclists, started Bronx Safe Routes to School in 1997. Efforts began with community leaders nominating a number of schools to be included in the program. From that initial list, project staff chose several
Figure 4.6   Children crossing the street on their way to school in the Bronx, New York, 2005 (http://www.transalt.org)

schools to concentrate on in developing support among parents, teachers, and administrators.

Parents and children were surveyed about their walking routes and hazards along those routes were mapped. In addition, Geographic Information Systems (GIS) crash data from the city and state was used to identify intersections with clusters of crashes involving child pedestrians. Detailed traffic plans were then developed for the New York City Department of Transportation (DOT) to design and build. So that new engineering measures would be appropriate and there would be broad support and funding for the program, Bronx SR2S staff encouraged parents, principals, police, DOT, and other local traffic engineering talent to contribute to the planning process. After acquiring funding from the Governor’s Traffic Safety Committee and from Federal TEA-21 402 funds, the group created several changes in the built environment and installed traffic-calming measures to make walking routes safer. The project has grown to include 38 schools, targeting 33,540 students. The traffic-calming techniques, including improved signage (Figure 4.7), re-striped crosswalks (Figure 4.8), and numerous speed bumps (Figure 4.9), have reduced pedestrian deaths and injuries along school walking routes in
Figure 4.7  Improved signage for pedestrians has led to fewer injuries and deaths (http://www.seenobjects.org)

Figure 4.8  Example of highly visible pedestrian crosswalk markings (http://www.pps.org)
the Bronx. The New York City DOT has also launched a new School Safety Engineering Division in 2000 that began a $2.5 million project to improve safety around all 1,359 NYC elementary schools.

In addition to safer routes for children, residents near the schools have also benefited from having safer places to walk and bicycle. Although there was initially some public resistance to slowing down traffic, the successful efforts of the Bronx SR2S program have improved public and political acceptance of traffic-calming measures and made walking safer for children in the Bronx.

**Ontario Walkability Study**

With a population of more than 12 million, Ontario is home to about 1 in 3 Canadians. Eighty percent live in urban centers, largely in cities on the shores of the Great Lakes. Ontario has over 2.1 million residents of minority status, and around 25% of the population is under the age of 19 (Statistics Canada, 2001).
Greenest City, an environmental advocacy organization in Ontario, Canada, began the Active and Safe Routes to School program (ASRTS) as an endeavor to increase walkability near schools. The program stemmed from major concern over poor air quality caused by motor vehicle emissions. Sustainable transportation was recognized as a possible solution, but Greenest City knew it was something that would require more effort than simply switching auto-dependency to cleaner vehicles. Realizing that technology based solutions must be paired with strategies for encouraging non-motorized forms of transportation to help solve health problems for inactive children, Canadians have implemented this exceptional school-based program.

Active and Safe Routes to School began in 1996 with just 3 pilot schools. They are now working with over 150 schools to educate children, teachers, parents, health professionals, police, transportation planners and the media about the benefits of active transportation. Collaboration among volunteers, Greenest City, five traffic engineers, 10 different police divisions, and 25 public health nurses has led to their success.

During International Walk to School Day 2000, Greenest City worked with community partners to develop a Walkability Survey for Ontario’s elementary school children. This survey was modeled after the Partnership for a Walkable America’s “Walkability Checklist” (See Appendix B) and was intended to establish current and preferred modes of travel to school, gather province-wide data on community walkability, and help support neighborhood efforts to become more walkable. More than 400 Ontario schools participated in the International Walk to School Day 2000, and over 78 schools completed the surveys for a total of 6,369 valid surveys.

Results showed that 61.2% of students usually use active transportation on the way to school, with 57.7% walking with friends, a parent/adult or by themselves, and 3.5% riding bicycles. Another 27.5% are driven by an adult. Although 61.2% already use active
transportation on the way to school, an additional 11% said that they would prefer to walk or cycle to school instead of driving, for a total of 45.4% preferring to walk and 26.8% preferring to ride a bicycle (O’Brien, 2001).

Other efforts of ASRTS have included education and encouragement materials such as flyers, brochures, certificates, reports, and surveys (See Appendix C). Curriculum information was offered to teachers to incorporate active transportation into the school day, and several events were designed to encourage walking. One of these is the walking school bus (Figure 4.10), where parents take turns supervising groups of kids walking to school together. On Walking/Wheeling Wednesdays, children are encouraged to make a special effort, at least one day of the week, to use active transportation on their commute to school (Figure 4.11). The Kilometer Club is for kids who want to be active during the school day but cannot walk to school. Instead, they are offered the opportunity to complete laps around the school track. The Trans-Canada walking challenge is another way children were encouraged. After keeping track

Figure 4.10 In an effort to help encourage walk to school efforts, parents and children walk in large groups to promote traffic safety (International Walk to School, 2004)
Figure 4.11 Children are encouraged to either walk or bike on Walking/Wheeling Wednesdays to promote active transportation in Ontario (http://www.transport2000.org)

of the number of miles they walk to school each day, those miles were shown on a chart that demonstrated the equivalent of how far across Canada they walked. Neighborhood walkabouts that were held so parents, neighbors, and other interested individuals could survey areas near the school to determine if they were safe for walking also aided in ASRTS efforts.

Effects have been impressive. Up to 80% of students in some schools walk to school on Walking/Wheeling Wednesdays. Forty-four Toronto schools completed neighborhood walkabouts, which resulted in some kind of traffic safety change being made at each school. Each year from 1998-2001, reduction of emissions in Toronto because of walking to school equaled 73 metric tons (United States Department of Transportation, 2004).

These case studies are only a small percentage of the progressive work being done to make healthier lifestyle choices available for children. There are schools all over the country and around the world that have made an effort to increase walkability for the children who attend
them. From participation in Walking School Bus efforts to infrastructure improvements and traffic safety education, these children are learning with excitement and enthusiasm the health and safety lessons that are so valuable for their emotional and physical development. It is from the outstanding models described above that lessons are learned and points proven. Several of these ideas can be looked to for inspiration when applying safety and design principles to Anna K. Davie Elementary School in Rome, Georgia. From these examples, it is clear that a coordinated and community-wide effort is necessary for successful program. Finding ways to obtain support from teachers and parents, community leaders, city planners, and other interested parties and securing dedicated volunteers are key points to getting a program started in Rome. In addition, education and encouragement programs to involve the children and provide incentives for walking are also important. Surveys show that children would like to walk to school to gain the health benefits of fresh air, exercise, and responsibility for their actions; it is up to the adults in a community to make those dreams a reality.
CHAPTER 5: CASE STUDY OF ANNA K. DAVIE ELEMENTARY SCHOOL

This chapter will introduce the planning and concepts behind design proposals in the neighborhood surrounding Anna K. Davie Elementary School in Rome, Georgia. Current health conditions in Floyd County will be examined first, and then the methodology for obtaining information will be explained. An analysis of the data will be summarized, and the following chapter includes recommendations for infrastructure improvements to make walking and other forms of active transportation a safer option for children in the area.

Current state of health in Rome and Floyd County, Georgia

In order to more accurately assess conditions at Anna K. Davie elementary school in Rome and make specific recommendations for improvement, it is necessary to first analyze health data available for the state of Georgia and Floyd County. This section of Chapter 5 will take a closer look at Rome’s location, consider available health information relevant to walkability recommendations at Anna K. Davie Elementary, and present information specific to Georgia that relates back to overall children’s health in the United States, discussed in Chapter 3.

The city of Rome is in Floyd County (Figures 5.1 and 5.2), located in northwest Georgia. In 2000 the overall population of Floyd County was 90,565, with 81.3% white, 13.3% black, and 5.4% of other origins (Table 5.1). Within the county in 1999, 14.4% of people lived below the poverty level, and nearly one third (28.5%) of people did not complete high school education. Slightly less than one quarter of residents in Floyd County are under 18 years of age (24.6%), and 14,868 students are enrolled in public schools in Floyd County. Table 5.2 shows the
Figure 5.1 Location of Floyd County within the state of Georgia

Figure 5.2 Location of Rome within Floyd County, Georgia (Northwest Georgia Health District 1.1, 2000)
Table 5.1  Floyd County population distribution by age and race, 1998 (Northwest Georgia Health District 1.1, 2000)

<table>
<thead>
<tr>
<th>Age Group</th>
<th>White Male</th>
<th>White Female</th>
<th>White Total</th>
<th>Black Male</th>
<th>Black Female</th>
<th>Black Total</th>
<th>American Indian/Eskimo Total</th>
<th>Asian and Pacific Islander Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;5</td>
<td>2,164</td>
<td>2,081</td>
<td>4,242</td>
<td>638</td>
<td>555</td>
<td>1,193</td>
<td>8</td>
<td>72</td>
</tr>
<tr>
<td>5-9</td>
<td>2,164</td>
<td>2,099</td>
<td>4,263</td>
<td>625</td>
<td>639</td>
<td>1,264</td>
<td>13</td>
<td>70</td>
</tr>
<tr>
<td>10-19</td>
<td>4,740</td>
<td>4,478</td>
<td>9,218</td>
<td>2,510</td>
<td>2,125</td>
<td>2,435</td>
<td>20</td>
<td>117</td>
</tr>
<tr>
<td>20-44</td>
<td>12,174</td>
<td>12,040</td>
<td>24,214</td>
<td>2,465</td>
<td>2,923</td>
<td>5,388</td>
<td>67</td>
<td>313</td>
</tr>
<tr>
<td>45-64</td>
<td>8,263</td>
<td>9,099</td>
<td>17,362</td>
<td>1,421</td>
<td>1,421</td>
<td>2,442</td>
<td>38</td>
<td>125</td>
</tr>
<tr>
<td>&gt;65</td>
<td>4,211</td>
<td>6,876</td>
<td>11,087</td>
<td>785</td>
<td>1,230</td>
<td>13,882</td>
<td>28</td>
<td>41</td>
</tr>
<tr>
<td>TOTAL</td>
<td>33,713</td>
<td>36,682</td>
<td>70,395</td>
<td>6,444</td>
<td>7,436</td>
<td>13,882</td>
<td>174</td>
<td>738</td>
</tr>
</tbody>
</table>

Table 5.2  Percent of total enrollment by race/ethnicity for public schools in Floyd County (Northwest Georgia Health District 1.1, 2000)

<table>
<thead>
<tr>
<th>Race/Ethnicity</th>
<th>Floyd County School System</th>
<th>Rome City School System</th>
<th>Georgia Schools</th>
</tr>
</thead>
<tbody>
<tr>
<td>Black</td>
<td>4.1%</td>
<td>48.1%</td>
<td>37.8%</td>
</tr>
<tr>
<td>White</td>
<td>92.5%</td>
<td>40.0%</td>
<td>55.7%</td>
</tr>
<tr>
<td>Hispanic</td>
<td>2.0%</td>
<td>7.7%</td>
<td>3.3%</td>
</tr>
<tr>
<td>Asian</td>
<td>0.4%</td>
<td>2.3%</td>
<td>2.0%</td>
</tr>
<tr>
<td>American Indian</td>
<td>0.4%</td>
<td>0.1%</td>
<td>0.1%</td>
</tr>
<tr>
<td>Multi-Racial</td>
<td>0.7%</td>
<td>7.7%</td>
<td>1.0%</td>
</tr>
</tbody>
</table>

The racial/ethnic make-up of students in Floyd County schools and Rome City schools compared to data from the entire state of Georgia. Rome city schools have a slightly higher black, Hispanic, Asian, and multi-racial population and a lower white population than the rest of the state of Georgia.
Top causes of death in Floyd County, with numbers indicating death rate per 100,000, include cardiovascular disease (231.8), lung cancer (76.2), all other cancer (110.1), and stroke (69.8) (United States Census Bureau, 2000). Those causes of death all share risk factors that can be modified through healthy lifestyle changes such as physical activity, ending tobacco use, and improving nutrition habits. The top cause of death in people ages 1-19 of all genders and races is motor vehicle accidents (Figures 5.3 and 5.4), with a death rate of 15.3 per 100,000 (Leading causes of death in youth, Georgia, 2002). The average rate per 100,000 for the state of Georgia is 12.5 (Northwest Georgia Public Health, 2005).

Of 19 different health districts in Georgia, data from the Northwest Georgia Public Health District, which includes Rome and Floyd County, shows that 24.7% of people in the district are obese (adults with a BMI equal to or greater than 30), 12.6% have diabetes, and 29.6% are physically inactive (Northwest Georgia Public Health, 2005). Only one in four Georgians are regularly active. As Figure 5.5 shows, in Floyd County, 22% of adults are regularly active, 33% are irregularly active, and 46% are inactive (Bricker, et al., 2001).

![LEADING CAUSES OF DEATH FOR AGES 1-9 YEARS OLD RATES FOR ALL RACES IN FLOYD COUNTY & GEORGIA](image)

Figure 5.3 Leading causes of death for ages 1-9 in Floyd County and Georgia (Northwest Georgia Health District 1.1, 2000)
Figure 5.4  Leading causes of death for ages 10-19 in Floyd County and Georgia (Northwest Georgia Health District 1.1, 2000)

Figure 5.5  Regularly active adults by county in Georgia, 1999 (Bricker, et al., 2001)
Behavior risk factors, including physical inactivity, can be estimated through market research, and statistics are used to describe consumer habits of the American public. Compared to the average American, marketing data shows that residents of Floyd County are:

-25% less likely to hike
-23% less likely to jog
-10% less likely to walk
-5% less likely to swim
-21% less likely to lift weights
-13% less likely to do aerobics
-10% less likely to golf
-23% less likely to play softball
-18% less likely to play tennis and
-32% more likely to hunt (Northwest Georgia Health District 1.1, 2000).

In Georgia, Table 5.3 shows the percentages of Georgia residents participating in various categories of exercise. In children, the Georgia Student Health Survey was carried out in 2003 by the Georgia Department of Human Resources, Division of Public Health in cooperation with the Georgia Department of Education and surveyed schools across the state. In the survey, 28% of students described themselves as slightly or very overweight and just 41% of Georgia students participated in at least 20 minutes of vigorous physical activity for at least three days of the week.

<table>
<thead>
<tr>
<th>ACTIVITY</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Walking</td>
<td>38</td>
</tr>
<tr>
<td>Indoor conditioning activities</td>
<td>17</td>
</tr>
<tr>
<td>Recreational activities</td>
<td>17</td>
</tr>
<tr>
<td>Jogging</td>
<td>10</td>
</tr>
<tr>
<td>Home maintenance activities</td>
<td>6</td>
</tr>
<tr>
<td>Team sports</td>
<td>6</td>
</tr>
<tr>
<td>Water or snow activities</td>
<td>2</td>
</tr>
<tr>
<td>Racquet sports</td>
<td>2</td>
</tr>
</tbody>
</table>
As Figure 5.6 shows, between eleven and fourteen percent of students were found to be overweight (Georgia Department of Human Resources, 2005c). Daily eating and nutrition habits were also surveyed. Just 17% of students in Georgia ate five or more servings of fruit and vegetables per day, and only 13% drank three or more glasses of milk per day. In addition, 42% of students in Georgia were found to have watched three or more hours of television per day on an average school day. (Georgia Department of Human Resources, 2003a).

Asthma is also a problem among Floyd County’s children, as rates of hospitalization for asthma in Floyd County are significantly higher than the average Georgia state rate of hospitalization (Figure 5.7). In 2000, approximately 11% (210,000) of Georgia’s children ages 0-17 had asthma. Over 88,000 children with asthma missed 540,000 days of school due to disease-related symptoms, averaging slightly more than 6 days of missed school attendance per child (Mellinger-Birdsong, Powell, & Iatridis, 2000). Black males and females have slightly higher rates of asthma than white males and females, and males in general have a higher risk of asthma than females (Figure 5.8).
Figure 5.7  Georgia counties with high asthma hospitalization rates, 1998-1999. Floyd County has an asthma rate significantly higher than the state rate of asthma (Mellinger-Birdsong, Powell, & Iatridis, 2000)

Figure 5.8  Percent of children ages 0-17 with asthma by race and gender in Georgia, 2000 (Mellinger-Birdsong, Powell, & Iatridis, 2000)
This section has described the ways in which Rome and Floyd County face similar health problems to the rest of the nation. Children suffer from increasing rates of asthma and obesity and risk of death due to traffic dangers is also a threat to their overall well-being. The remainder of this chapter will focus on one elementary school in Rome, Anna K. Davie Elementary, and will first determine how the neighborhood surrounding the school may be contributing to child health problems through a walkability assessment and teacher and parent surveys. Design solutions will then be offered in the following chapter, which will be specific to Anna K. Davie, but the ideas can be applied at elementary schools across the nation.

Methodology

The purpose of this study is to assess current physical conditions in the neighborhood surrounding Anna K. Davie and evaluate adult opinions in regard to current walkability conditions. It focuses on the responses of teachers, administrators, and parents at the school to questionnaires (included in Appendix A), and on the qualitative analysis of the physical environment by a group of health professionals, city planners, and school administrators in Rome, Georgia. This research should accomplish the following goals:

- Assess current conditions to help define objectives for neighborhood design improvements
- Record current conditions in order to chart future progress
- Use survey forms to determine current perceptions of the area for walking safety
- Determine where teachers and parents at the school believe improvements should be made
- Determine what ideas those people familiar with the area have for its improvement for the safety of children walking to school

The instruments for this study include the “Walkability Checklist” from Partnership for a Walkable America (Appendix B) and a series of surveys specifically targeted to teachers or parents of students at Anna K. Davie Elementary School (Appendix A). Information gleaned
from these assessment tools will be compiled and summarized in the Results section below, and will be used to provide possible solutions to the walkability problems that were encountered. From this information, an in-depth study of one school, solutions that could possibly be applied to other schools will be set forth, bringing the opportunity for all children to develop healthier practices closer to reality.

On March 7, 2006, the Walkability Checklist and an overall neighborhood assessment was completed with a group of health professionals and a city planner in Rome to determine how “walkable” the neighborhood is surrounding Anna K. Davie Elementary. At 7:30 a.m., the group met at the front doors of the school. Participants proceeded to walk outward to observe walkability conditions along Cherokee Street, which runs east and west directly from the east side of the school (Figure 5.9). This street was chosen for the assessment because it connects several major roads along which many students walk on their way to and from school each day. The group stopped frequently to discuss present conditions. Participants were given a packet of information including the Walkability Checklist (Appendix B), one sheet describing the main factors to be considered in regard to walkability for students, information about the route to be walked, and researcher contact information. Although an adult perspective on the sidewalk and “walkability” conditions may be different than a child’s perceptions, the training and experience of the health professionals and planners who participated is nonetheless invaluable. Notes on these conditions and photographs of physical infrastructure were taken and will be summarized in the Results section.

The questionnaires were completed with the help of the school principal, who selected, at random, ten teachers and ten parents of students at Anna K. Davie to complete the remaining
questionnaires in March, 2006. Results from the surveys will be examined more closely in the following section.

**Results**

Ten surveys from parents of students at Anna K. Davie were filled out. Parents were chosen as the target group because they are the dominant decision-makers in children’s lives. Children represented were 5 boys and 5 girls ranging in grade levels from Kindergarten to 4th grade. Four of these students lived within ¼ mile or less, two lived ¼ to ½ mile from the school, three lived ½ to 1 mile away, and one student lived over 2 miles from the school (Figure 5.10). Forty percent of the children represented were driven to school every day (Table 5.4). Thirty percent carpool every day, and 20% walk every day. The remaining children use a combination of commuting methods on the way to school in the morning. In the afternoon, transportation methods change. The majority of students walk home in the afternoon, with 30% walking every day and 40% walking at least 2 to 3 times per week. Other students use a combination of biking, carpooling, or are picked up by a bus that transports them to the local Boys and Girls Club after school. Sixty percent of parents have concerns about traffic safety along the routes to school. Some comments about specific locations include the following:

“People drive on these streets too quickly.”

“In the morning the front side of the school could be a lot more organized as well as more concern for the cars speeding and being congested. In the afternoon on Hardy the car traffic could be more organized, especially for the safety of the children.”

“Nixon traffic needs to be one way during school hours. Speeding cars need to be monitored by police on Nixon and Hardy.”

“Grover and Nixon, sometimes Wilson.”

“Branham and Hardy – a lot of cars drive too fast”
Table 5.4  Number of parents responding to survey question about how their children get to school in the morning and come home in the afternoon

<table>
<thead>
<tr>
<th></th>
<th>Every day</th>
<th>2-3 times per week</th>
<th>Once a week</th>
<th>Occasionally</th>
</tr>
</thead>
<tbody>
<tr>
<td>Walk</td>
<td>2</td>
<td>2</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Bike</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Driven</td>
<td>4</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Carpool</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bus</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Every day</th>
<th>2-3 times per week</th>
<th>Once a week</th>
<th>Occasionally</th>
</tr>
</thead>
<tbody>
<tr>
<td>Walk</td>
<td>3</td>
<td>4</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Bike</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Driven</td>
<td></td>
<td>3</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Carpool</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bus</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Parents who drive their children to school were asked why they make that choice. The top three responses included “Safety,” “High speed vehicles,” and “Bad weather.” One parent wrote, “I drop him off because it is safer, people are careless, and I pick him up [after school].” Other reasons given are included in Figure 5.11. Parents said that they would allow their children to walk if children were accompanied by other children or parents, if there was safety training for the children, if cars were slowed down, and if walking paths were separated from traffic. When asked which one of these elements they would most like to see implemented, parents most often responded that they would most like to see paths separated from traffic.

A majority of the teachers surveyed said that there were streets and sidewalks around the school that needed improvement for the health and safety of students at Anna K. Davie Elementary. Most comments about this question were general, mentioning that many streets needed improvements including sidewalks and speed controls, and the two-way stops at several
intersections in the area needed to be upgraded to 4-way stops. A drop-off and pick-up area for parents driving their children to school was also suggested.

On average, teachers estimated that 78% of students regularly walked to school and most said that the children enjoyed walking because of the freedom, the opportunity to be outside, and the chance to spend time with friends. Those that said children did not enjoy using active modes of transportation cited inclement weather. Most teachers have not received comments or complaints about current to/from school transportation methods, but the 40% that had received complaints mentioned the absence of a school bus and safety of students in the surrounding neighborhood. Seventy percent of teachers said that “traffic slowing” was the improvement that most needed to be implemented at Anna K. Davie, and the other two most common responses were “walking paths separated from traffic,” and “safety training for students.”

Another method used to solicit information was the walkability assessment, which was conducted by a group of five health professionals, a Rome city planner, and an experienced volunteer. The route walked is shown in Figure 5.9 and was approximately 3 miles long. A variety of information was gleaned from this effort. General information about the school and surrounding neighborhood will be discussed first, with specific information about each section of the walk to follow.

Anna K. Davie Elementary School Information

Anna K. Davie Elementary consists of students in pre-kindergarten through the sixth grade. The school day runs from 8 am to 3 pm and there were a total of 211 students attending the school as of March 7, 2006. The school is primarily composed of African American students, with 12% Hispanic and 3% Caucasian enrollment.
Crossing Guard and Student Patrols

One adult crossing guard is stationed at the intersection of Cherokee Street and Hardy Avenue, directly next to the school. Approximately 20-25 students cross the street at this intersection on their way to school. Only a handful of students ride their bikes along this route, and none of them currently wear bicycle helmets. There are currently no students who use wheelchairs at Anna K. Davie Elementary. The crossing guard is stationed at her post from 7:15-8:00 a.m. and again from 2:30-3:15 p.m., but exact hours are flexible when there are more students traveling through the intersection. There are currently four student patrols that help students cross the streets. Two student patrols are located in front of the school to aid in the drop-off/pick-up area along Nixon Avenue. Another student is assigned the intersection of Cherokee Street and Branham Avenue. The fourth student patrol is located at Cherokee Street and Pennington Avenue. Funding for student patrols is being cut next year, so there will only be three student patrols and one adult crossing guard during the 2006-2007 school year.

Parking

There are three parking locations for teachers, administrators, staff, and visitors near the school (Figure 5.12). Near the front door there are approximately 10 pull-in spaces near the front entrance of the school. Across from these spaces, west of Nixon Avenue, there is a gravel parking lot that could accommodate at least 25 cars. In addition, there is a small extension of Cherokee Street between the main school building and the gym that can accommodate at least 10 additional cars. On-street parking is also allowed on the streets surrounding the school. Several professionals and planners noted that the pull-in spaces along Nixon Avenue and the extension of Cherokee were potentially dangerous because cars were forced to reverse in order to pull out of
the spaces. With many children in the area and limited visibility when backing up a car, other options should be considered.

Neighborhood Information

Neighborhood characteristics are important to note as part of a walkability assessment because they are part of the overall experience of walking. It was clear that the areas surrounding Anna K. Davie Elementary could use some more care from residents. Litter and broken glass were abundant, and empty alcohol bottles and beer cans were present. There seemed to be a dump for large items and trash on the southeast side of the Cherokee-Harper intersection. This neighborhood is located within Census Tract 15 in Rome, and has a higher percentage of renter-
occupied units than owner-occupied homes, which has remained steady in both the 1990 and 2000 census surveys (Table 5.5). In contrast, the city of Rome has a slightly higher percentage of owner-occupied units than renters, and over the state of Georgia the percentage of owner-occupied units is considerably higher than the percentage of rented units. Several groups of loiterers were observed at approximately 9:30 am, and the neighborhood, especially the area south of Cherokee Street, is known to have problems with methamphetamine and a recent drive-by shooting, as well as other forms of crime. South Rome is located in Patrol Sector 4, designated by the Rome Police Department, which is split between the South Rome neighborhood and Downtown Rome. As shown in Figure 5.13, Anna K. Davie Elementary is located within Sector 4B. The number of felony crimes reported within Sector Four have actually dropped from 1999-2002 by almost 15%, but those statistics do not include two of the most serious crimes reported in the neighborhood, prostitution and substance abuse (South Rome

### Table 5.5  Number of housing units occupied by owner vs. renter in South Rome compared to the City of Rome and Floyd County (South Rome Redevelopment Corporation, 2003)

<table>
<thead>
<tr>
<th>Location</th>
<th>Total Units</th>
<th>Occupied Units</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Owner</td>
<td>Renter</td>
<td>Owner</td>
<td>Renter</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Total</td>
<td>%</td>
<td>Total</td>
<td>%</td>
<td>Total</td>
</tr>
<tr>
<td>South Rome</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1990</td>
<td>1537</td>
<td>1330</td>
<td>87%</td>
<td>615</td>
<td>46%</td>
<td>715</td>
<td>54%</td>
</tr>
<tr>
<td>2000</td>
<td>1285</td>
<td>1171</td>
<td>91%</td>
<td>547</td>
<td>47%</td>
<td>624</td>
<td>53%</td>
</tr>
<tr>
<td>City of Rome</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1990</td>
<td>13099</td>
<td>12008</td>
<td>92%</td>
<td>6170</td>
<td>51%</td>
<td>5838</td>
<td>49%</td>
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<tr>
<td>2000</td>
<td>14508</td>
<td>13320</td>
<td>92%</td>
<td>7060</td>
<td>53%</td>
<td>6260</td>
<td>47%</td>
</tr>
<tr>
<td>Floyd County</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1990</td>
<td>32821</td>
<td>30518</td>
<td>93%</td>
<td>20186</td>
<td>66%</td>
<td>10332</td>
<td>34%</td>
</tr>
<tr>
<td>2000</td>
<td>36615</td>
<td>34028</td>
<td>93%</td>
<td>22731</td>
<td>67%</td>
<td>11297</td>
<td>33%</td>
</tr>
</tbody>
</table>

Source: 1990, 2000 Census
Figure 5.13  Map showing Rome Police Department patrol sectors (South Rome Redevelopment Corporation, 2003)

Table 5.6  Number of felony crimes reported in Rome, Georgia, 2002, in each patrol sector. Anna K. Davie Elementary is located in Sector 4 (Rome Redevelopment Corporation, 2003)

<table>
<thead>
<tr>
<th>Incident Type</th>
<th>Sector 2</th>
<th>Sector 3</th>
<th>Sector 4</th>
<th>Sector 5</th>
<th>Sector 6</th>
<th>Totals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Homicide</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Rape</td>
<td>4</td>
<td>1</td>
<td>5</td>
<td>2</td>
<td>1</td>
<td>13</td>
</tr>
<tr>
<td>Robbery</td>
<td>19</td>
<td>8</td>
<td>11</td>
<td>13</td>
<td>15</td>
<td>66</td>
</tr>
<tr>
<td>Assault/Battery</td>
<td>118</td>
<td>83</td>
<td>139</td>
<td>171</td>
<td>174</td>
<td>685</td>
</tr>
<tr>
<td>Residential Burglary</td>
<td>89</td>
<td>48</td>
<td>49</td>
<td>65</td>
<td>62</td>
<td>313</td>
</tr>
<tr>
<td>Commercial Burglary</td>
<td>29</td>
<td>7</td>
<td>22</td>
<td>26</td>
<td>26</td>
<td>110</td>
</tr>
<tr>
<td>Theft</td>
<td>558</td>
<td>347</td>
<td>244</td>
<td>544</td>
<td>212</td>
<td>1905</td>
</tr>
<tr>
<td>Auto Theft</td>
<td>36</td>
<td>19</td>
<td>18</td>
<td>24</td>
<td>25</td>
<td>122</td>
</tr>
<tr>
<td>Arson</td>
<td>6</td>
<td>0</td>
<td>2</td>
<td>3</td>
<td>2</td>
<td>13</td>
</tr>
<tr>
<td>TOTALS</td>
<td>859</td>
<td>513</td>
<td>490</td>
<td>848</td>
<td>517</td>
<td>3227</td>
</tr>
</tbody>
</table>
Redevelopment Corporation, 2003). Five large dogs were observed within two blocks of the school. Two were loose with no owner in sight, and three were enclosed in a fenced yard with a “Beware of Dog” sign posted near the sidewalk. At least two vacant houses were observed along Cherokee Street. There are 1285 total living units in South Rome, and in 2000, 114 (9%) of them were vacant (United States Census Bureau, 2000). It was noted that the neighborhood could use some more landscaping, especially trees, flowers, and grass.

Safe Routes to School Sidewalk and Intersection Safety Assessment

Cherokee Street runs east and west from the east side of Anna K. Davie elementary to South Broad Street. There is a sidewalk only on the north side of the street, and on-street parking is allowed on both sides of the street.

At the Cherokee-Hardy intersection, there is a visible crosswalk marking on all four sides of the juncture, and a raised crosswalk on the east side, next to the school (Figures 5.14 and 5.15). There is no sidewalk to connect to the crosswalk markings on the southeast side of the intersection. An adult crossing guard is stationed at this intersection in the morning and afternoon. There are no ramps from the sidewalk to the street for students on bicycles or disabled local residents.

Cherokee Street and Branham Avenue is a two-way stop intersection. North-South traffic has the right of way, and many students must cross this traffic from east to west on their way to school. There are no crosswalk markings in the east-west direction at this intersection, but there are markings from north to south. The northwest corner ramp of this intersection is in need of repair. Drivers observed at this intersection were driving too fast. This intersection is supervised by a student patrol in the morning and afternoon when students need to cross in the east-west direction to get to school.
Figure 5.14  Visible crosswalk markings at intersection of Cherokee Street and Hardy Avenue (Lisa Smart)

Figure 5.15  Raised crosswalk at intersection of Cherokee Street and Hardy Avenue (Lisa Smart)
Along Cherokee Street between Branham Avenue and Pennington Avenue, there is no buffer between the sidewalk and the road. At the Cherokee-Pennington intersection, there are crosswalk markings on three sides of the intersection, but they are not very visible. There are also ramps on three of the four corners, but crosswalk markings and ramps are needed on all four sides. This is another two-way stop intersection with north-south drivers again receiving the right of way. Many drivers observed at this intersection were speeding. This intersection is also controlled by a student patrol in the morning and afternoon when students need to cross in the east-west direction to get to school.

At Cherokee Street and Harper Avenue, there is no student patrol to help children cross the street in the morning and afternoon. There are two stop signs, this time for north-south traffic, and crosswalk marking stripes are located in an east-west direction. There are ramps, but not on every corner, and Harper Avenue has no sidewalks at all.

On Cherokee between Harper Avenue and South Broad street, there is a mudslide occurring as the result of a failed retaining wall which covers half of the sidewalk. At the intersection of Cherokee and Broad, there is a stop sign for traffic on Cherokee, but none along Broad Street. This is a major thoroughfare between downtown and South Rome, and cars travel quickly down this street. Several students who walk to Anna K. Davie live in an apartment complex on the east side of Broad Street, and must cross this busy road which has no crosswalk, no signs to indicate the presence of pedestrians, no crossing guard, and is at least two blocks away from any safe street crossing location near a stoplight. There is little signage along this busy road that indicates there is even a school in the vicinity. Along South Broad Street south of Cherokee Street, there is no buffer between the fast-moving traffic and pedestrians.
West Forest Street has sidewalks on both sides of the street, but there were three cars parked on the sidewalks. Since there was no buffer between the sidewalk and the street, our walkability assessment group naturally converged in the middle of the narrow street because it was easier than dodging the parked cars and light poles that punctuated the sidewalk. The sidewalks on W. Forest ended at Harper Street and as we continued on Forest to the west, three- to four-foot drainage ditches took the place of sidewalks. These ditches were lined with trash and empty alcohol bottles.

Similar trends continued to be observed for the remainder of our session. Generally, areas near the school were pleasant and for the most part were safe for children to walk through, but conditions got progressively worse the further we moved away from school grounds. Very little signage indicated that there was a school in the area, which needs to be improved, as do the streets which lack sidewalks. Site photographs and their locations along the walking route are shown in Figures 5.16 through 5.28.
C. View south along Nixon Avenue

Figure 5.16  Site photographs at Anna K. Davie Elementary School (Lisa Smart)
D. View north along Nixon Avenue near pull-in teacher parking

E. View east toward school showing bike rack

F. View east through school breezeway

Figure 5.17 Site photographs at Anna K. Davie Elementary School (Lisa Smart)
G. View from Hardy Avenue west through breeze-way

H. View east along Cherokee Avenue from extension

J. South along Hardy Avenue

Figure 5.18  Site photographs at Anna K. Davie Elementary School (Lisa Smart)
Figure 5.19  Site photographs at Anna K. Davie Elementary School (Lisa Smart)
Figure 5.20 Site photographs at Anna K. Davie Elementary School (Lisa Smart)
Q. Southeast at intersection of Cherokee and Pennington

R. East at intersection of Cherokee Street and Pennington Avenue

S. East along Cherokee Street

Figure 5.21 Site photographs at Anna K. Davie Elementary School (Lisa Smart)
T. View west toward Anna K. Davie Elementary

U. View east on Cherokee Street

V. View east at intersection of Cherokee and Harper

Figure 5.22  Site photographs at Anna K. Davie Elementary School (Lisa Smart)
Figure 5.23 Site photographs at Anna K. Davie Elementary School (Lisa Smart)
Figure 5.24  Site photographs at Anna K. Davie Elementary School (Lisa Smart)

Z. View east on Cherokee across S. Broad Street

AA. View north along S. Broad Street from Cherokee Street intersection

BB. South on Broad St. from Cherokee intersection
Figure 5.25  Site photographs at Anna K. Davie Elementary School (Lisa Smart)

CC. Vacant lot south of school along Nixon Ave.

DD. Pedestrian sign on ground south of school on Nixon Ave.

EE. Sidewalk blocked with trash along Nixon Ave.
Figure 5.26  Site photographs at Anna K. Davie Elementary School (Lisa Smart)
LL. New curb ramp at northwest corner of intersection

Figure 5.27 Site photographs at Anna K. Davie Elementary School (Lisa Smart)
MM. Group of health professionals speaking with crossing guard at Cherokee-Hardy intersection

NN. Group of health professionals looking south along Branham Avenue

OO. Branham-Cherokee intersection looking southeast

Figure 5.28 Site photographs at Anna K. Davie Elementary School (Lisa Smart)
CHAPTER 6: DESIGN RECOMMENDATIONS

Although there was some conflicting information gathered on exactly how many students used active forms of transportation on their way to and from school between parents and teachers, data shows that students are walking to school and that parents and teachers are concerned about their safety. Based on the results in the previous chapter, there are several suggestions that could be implemented to make improvements in the neighborhood surrounding Anna K. Davie Elementary.

Program elements

Neighborhood Clean-Up. Because of the excessive amount of trash on the sidewalks, in yards, and along ditches near the school, a neighborhood clean-up day could have a significant impact on the community. The majority of people living in this neighborhood are renters, and renters are notorious for being less likely than home owners to take care of their surroundings. However, by making the area a nicer place to live, it becomes a more inviting place to spend time walking. The more people there are on the streets, the safer those streets become for children on their way to school.

Education. Although adding another subject to the already demanding loads that teachers must face, it is an essential element of creating safe routes to school. It is important that a combination of efforts at home and at school are implemented since the number one reason parents of children at Anna K. Davie Elementary drove their children to school was because of traffic safety issues. Similar to several precedent case study schools mentioned in Chapter 4, it
may take cooperation between school administrators, teachers, parents, and volunteers to realize this important part of a Safe Routes to School program in Rome.

**Incentives.** In addition, when students are given the opportunity to walk, they must have the motivation to do it. Programs could be organized such as a “Walk Across Georgia,” similar to Ontario’s “Walk Across Canada” program mentioned in chapter four and noted in Appendix C. Although a walking school bus has been done in the past at Anna K. Davie Elementary School, it is important to continue such efforts on a regular basis, whether it is every month or every week. The recruitment of interested and energized volunteers is crucial in this process.

**Design elements**

**Intersections.** All intersections within two blocks of the school should be converted to four-way stops. Drivers are passing through these intersections too quickly and need to be reminded in some way that children are passing through on their way to school. There are several options available that will serve this purpose, including raised pedestrian crosswalks (Figure 6.1), raised pedestrian tables (Figures 6.2 and 6.3), neck-downs or bulb-outs (Figure 6.4 and 6.5) and striped crosswalks that are easily visible to car traffic. Additional methods for traffic calming were summarized in Table 3.2. Georgia law states that cars must yield to pedestrians in crosswalks, and marked crosswalks can help make this more apparent. In addition, roundabouts or traffic circles are starting to gain in popularity in the United States and have successfully calmed traffic in several cities across the country (Figure 6.6). Seattle, Washington garden clubs hold an annual traffic circle garden competition throughout the city, which has served as incentive for people to keep their neighborhood and local traffic circles looking nice. A similar program could be started in Rome.
Figure 6.1  Example of raised crosswalks connecting sidewalks on all four sides of the street

Figure 6.2  Example of pedestrian table raised intersection at four-way stop intersection
Figure 6.3 Pedestrian table raised crosswalk on the University of Georgia campus, Athens, Georgia (Lisa Smart, 2006)

Figure 6.4 Plan view drawing of pedestrian bulb-outs to allow visibility and safety at intersection crossings
Figure 6.5  Pedestrian crosswalks in downtown Rome, Georgia incorporate pedestrian refuge, bulb-outs along the sidewalk for visibility, pronounced crosswalk markings, and adequate pedestrian signage (Lisa Smart, 2006)

Figure 6.6  Example of traffic calming through installation of a roundabout at the intersection of Cherokee Street and Pennington Avenue
**Traffic Calming.** Speed bumps are another option for traffic calming, especially on streets like Pennington Avenue and Branham Avenue that children cross on a regular basis (Figure 6.7). Speed bumps would be particularly useful if they were placed just prior to major pedestrian corridors, such as Cherokee Street. Chicanes may also be an important addition to infrastructure improvements in the area (Figure 6.8 and 6.9). By diverting traffic from its linear movement patterns and forcing it to move around a barrier, chicanes provide a successful traffic calming technique.

**Sidewalks and Ramps.** Every street within a half-mile radius of Anna K. Davie Elementary School should have a sidewalk on at least one side of the street, preferably both sides. At connections with intersections, sidewalks should have a ramp down to street level to accommodate disabled people and people on bicycles. Existing sidewalks that do not have ramps to street level need to have this implemented.

![Figure 6.7](image)  
**Figure 6.7**  Example of speed bumps installed along Cherokee Street to slow traffic and increase pedestrian safety
Figure 6.8  Plan view of an installed chicane for traffic calming. By forcing cars to move from side to side instead of in a straight path, they are forced to slow down.

Figure 6.9  Photograph of an installed chicane for traffic calming (www.transalt.org)
Pedestrian Signage. There is very little signage in the area indicating that there is a school zone nearby, and few visible pedestrian signs along the routes that children walk to school. These signs need to be added to the neighborhood. Neon green signs are being used more often than the tired yellow pedestrian signs that have been used for many years because neon green is noticed more often. Flashing lights attached to pedestrian signs (Figure 6.10) can also aid in visibility and catch the attention of drivers.

Figure 6.10  Flashing pedestrian crossing signs in neon green catch the attention of drivers to make crossing safer (Lisa Smart, 2006)
Buffers from Traffic. Pedestrians often feel more comfortable walking along a street that provides some kind of barrier, such as trees, from passing traffic. Parents of children at Anna K. Davie mentioned the need for a barrier of this kind, and installing one along Cherokee Street would improve safety. With a safer way to get to school, more parents may be encouraged to let their children walk along this route (Figure 6.11).

![Figure 6.11 Trees can provide a buffer from street traffic](image)

Guide to Walkable Streets. In addition to the possibility of safety training being provided at the school, students would benefit from the production of a “Safe Routes to School” map. This map could include information about the location of all neighborhood sidewalks and help guide students to the routes that have been deemed safe.

Teacher Parking Areas. Currently teacher parking is available in three locations, including the gravel parking lot, pull-in parking along Nixon Street, and parking along the
Cherokee Street extension (Figure 5.12). Suggested changes consist of converting the pull-in parking along Nixon Street to a one-way drop-off/pick-up location for parents and buses and encouraging use of the gravel parking lot (Figure 6.12). This would eliminate the need for teachers to back up as they leave school, which creates a potentially dangerous situation when there are small children behind the car. The Cherokee Street extension could be converted to a small cul-de-sac, which would provide a turn-around point and also eliminate any need for driving in reverse near the school. There is ample parking available on the streets surrounding the school.

Figure 6.12  Map of proposed changes to parking near the school
The recommendations provided, summarized with suggested locations in Figure 6.13, were designed to provide a starting point for improvements to take place at Anna K. Davie Elementary and its surrounding neighborhood. The ideas are not exhaustive, yet they are sufficient to provide a safe walking environment that will allow children a chance to participate in physical exercise along their route to school. These ideas can also be applied in other areas of Rome to promote walking for people of all ages, and can be used in other towns and cities across the United States to promote a healthy and active lifestyle where walking is an obvious and important part of neighborhood planning.
Figure 6.13  Design recommendations applied to Cherokee Street near Anna K. Davie Elementary School
CHAPTER 7: CONCLUSIONS

Although landscape architecture and planning are distinctly different fields of study than public health, they are ultimately very closely related. From Olmsted’s design for Central Park to changes implemented in Marin County, California, when planned for and designed correctly, a public space attracts people to it. The very idea of attracting people outside to help them stay active and healthy is key to this thesis because the more people use a space, the more it attracts additional users. Our environments have a very subtle but distinct affect on our decisions to participate in outdoor activities, and our nation is in desperate need of recreation opportunities.

One important aspect of the many challenges surrounding this type of work is helping people understand why the changes in the built environment need to happen. The body of information on connections between health and the landscape is quickly growing, but there is still much work to be done.

In addition, there are other challenges during the implementation process. Already overworked teachers often have to stretch to find the time to incorporate lessons about traffic safety or the importance of physical activity and walking. These lessons should be an integral part of learning for every child. Money for infrastructure changes to improve walking environments is also often lacking. In addition, the volunteers needed to conduct research into the positive changes that infrastructure improvements are sometimes unavailable, which makes it harder to get more money for further improvements in the future.

There is an opportunity at Anna K. Davie Elementary School to successfully incorporate a program for walking health and safety. The goal of this thesis was not to provide a
comprehensive plan for each neighborhood intersection and street, but instead to provide a series of recommendations that will enhance health and promote active transportation along healthy and safe routes to school. The recommendations offer examples of what can be achieved in the environment to positively affect children’s health and safety. It is essential that children, teachers, administrators, and other users of pedestrian areas are involved in the process of planning for pedestrian improvements in Rome. Since they are in the beginning stages of planning for safer routes to school, Anna K. Davie Elementary also has the opportunity to evaluate the success of their changes through data collection and user feedback from the very beginning of the process, both in terms of the health levels of students and the numbers of students using active transportation. This information will be an important factor in paving the way for future improvements, not only for other schools in Rome and throughout Georgia, but also for schools and neighborhoods across the United States.

The ideas and concepts put forth in this thesis concerning healthy walking environments for both children and adults provide a small sample of possible improvements that could be made. Each enhancement to the built environment to make pedestrians feel safer and encourage their participation in an active lifestyle is a step in the right direction.
REFERENCES


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http://www.gov.on.ca/ont/portal/!ut/p/.cmd/cs/.ce/7_0_A/.s/7_0_252/_s.7_0_A/7_0_252/_l/en?docid=004172


http://www.sprawlwatch.org/health.pdf


1. Is your child a boy or a girl? Boy_______ Girl_______

2. What grade is your child in?

3. What is the approximate distance from your home to the school? (please circle one)
   a. ¼ mile or less
   b. ¼ to ½ mile
   c. ½ to 1 mile
   d. Between 1-2 miles
   e. Over 2 miles

4. How does your child usually travel to school? (check the appropriate boxes below)

   **TO SCHOOL IN THE MORNING**
<table>
<thead>
<tr>
<th></th>
<th>Every day</th>
<th>2-3 times per week</th>
<th>Once a week</th>
<th>Occasionally</th>
</tr>
</thead>
<tbody>
<tr>
<td>Walk</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bike</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Driven</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Carpool</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bus</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

   **FROM SCHOOL IN THE AFTERNOON**
<table>
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<th>Every day</th>
<th>2-3 times per week</th>
<th>Once a week</th>
<th>Occasionally</th>
</tr>
</thead>
<tbody>
<tr>
<td>Walk</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bike</td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Driven</td>
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<td></td>
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</tr>
<tr>
<td>Carpool</td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Bus</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

5. Do you feel that the school provides a safe place to store bikes? Yes____ No____

6. Do you have concerns about traffic safety along the routes to school? Yes____ No____

7. Please elaborate (include specific streets or intersections that are a problem)

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
8. If you drive your child to school, why do you make that choice? (please circle all that apply)

1. Safety
2. Drop off on the way to work
3. Sidewalks (lack of or incomplete)
4. Child is too young
5. Child would not obey safety rules
6. Carrying projects or musical instruments
7. Safe place to cross the street
8. Lack of safe place to store bikes
9. Paths are incomplete or not wide enough
10. Other

11. Convenience
12. Too far to walk
13. High speed vehicles
14. Bad weather
15. Backpacks too heavy
16. Tardiness
17. Scary people
18. No biking or walking route maps
19. Unfriendly dogs

10. Would you allow your child to walk or bike if: (circle all that apply)
   1. Accompanied by other children
   2. Accompanied by other parents
   3. Provide route maps
   4. Crossing guards more effective
   5. Safety training for students
   6. Improved sidewalks and bike paths
   7. Cars slowed down
   8. Secure bike storage was available
   9. Paths were separated from traffic
   10. Other ________________________ (please describe)

11. Which of the options mentioned in Question 10 above would you most like to see implemented (please choose 3):

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________

Comments:
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________

Thank you for taking the time to complete this survey.
WALKABILITY AT ANNA K. DAVIE ELEMENTARY SCHOOL
ROME, GEORGIA
QUESTIONS FOR TEACHERS

1. Are there any streets or sidewalks near the school that need to be improved for the health or safety of the students who go to school here or the teachers who teach here?
   ________ Yes  _________ No
   a. What are some of those places? (please describe street names or intersections)
      ______________________________________________________________________
      ______________________________________________________________________
   b. What could be done to improve them?
      ______________________________________________________________________
      ______________________________________________________________________

2. In your opinion, what percentage of children use active modes of transportation, such as walking or biking, to get to school every day? ________%

3. In your opinion, do the children enjoy using active modes of transportation?
   ________ Yes  _________ No
   Why or why not?
   ______________________________________________________________________
   ______________________________________________________________________

4. Do you receive any comments or complaints about to/from school transportation processes?  ________ Yes  _________ No
   If yes, please describe some of those comments:
   ______________________________________________________________________
   ______________________________________________________________________

5. Which of the following most need to be implemented at Anna K. Davie? (please choose up to three)
   1. Groups organized to walk children to school safely
   2. “Safe Route” maps provided to families
   3. More effective crossing guard program
   4. Safety training for students
   5. Improved sidewalks and bike paths
   6. Traffic slowing
   7. Secure bike storage
   8. Walking paths separated from traffic
   9. Other _________________________ (please describe)

Please write any additional comments you may have on the back of this paper.
Thank you for taking the time to complete this survey.
APPENDIX B: WALKABILITY ASSESSMENT FORM
Take a walk and use this checklist to rate your neighborhood's walkability.

**How walkable is your community?**

**Location of walk __________________________**

**Rating Scale:**

1. Did you have room to walk?
   - Yes  
   - Some problems:
     - Sidewalks or paths started and stopped
     - Sidewalks were broken or cracked
     - Sidewalks were blocked with poles, signs, shrubbery, dumpsters, etc.
     - No sidewalks, paths, or shoulders
     - Too much traffic
     - Something else __________________________
   
   **Locations of problems: __________________________**
   
   **Rating:** (circle one) __________________________
   
   1 2 3 4 5 6

2. Was it easy to cross streets?
   - Yes  
   - Some problems:
     - Road was too wide
     - Traffic signals made us wait too long or did not give us enough time to cross
     - Needed striped crosswalks or traffic signals
     - Parked cars blocked our view of traffic
     - Trees or plants blocked our view of traffic
     - Needed curb ramps or ramps needed repair
     - Something else __________________________
   
   **Locations of problems: __________________________**
   
   **Rating:** (circle one) __________________________
   
   1 2 3 4 5 6

3. Did drivers behave well?
   - Yes  
   - Some problems: Drivers...
     - Backed out of driveways without looking
     - Did not yield to people crossing the street
     - Turned into streets without looking
     - Drove too fast
     - Sped up to make it through traffic lights or drove through traffic lights
     - Something else __________________________
   
   **Locations of problems: __________________________**
   
   **Rating:** (circle one) __________________________
   
   1 2 3 4 5 6

4. Was it easy to follow safety rules?
   - Could you and your child...
     - Yes  
     - No
       - Cross at crosswalks or where you could see and be seen by drivers?
       - Stop and look left, right and then left again before crossing streets?
       - Walk on sidewalks or shoulders facing traffic where there were no sidewalks?
       - Cross with the light?
   
   **Locations of problems: __________________________**
   
   **Rating:** (circle one) __________________________
   
   1 2 3 4 5 6

5. Was your walk pleasant?
   - Yes  
   - Some unpleasant things:
     - Needed more grass, flowers, or trees
     - Scary dogs
     - Scary people
     - Not well lighted
     - Dirty, lots of litter or trash
     - Dirty air due to automobile exhaust
     - Something else __________________________
   
   **Locations of problems: __________________________**
   
   **Rating:** (circle one) __________________________
   
   1 2 3 4 5 6

---

**How does your neighborhood stack up? Add up your ratings and decide.**

1. ______ 26-30 Celebrate! You have a great neighborhood for walking.
2. ______ 21-25 Celebrate a little. Your neighborhood is pretty good.
3. ______ 16-20 Okay, but it needs work.
4. ______ 11-15 It needs lots of work. You deserve better than that.
5. ______
   
   **Total** 5-10 It's a disaster for walking!

---

Now that you've identified the problems, go to the next page to find out how to fix them.
APPENDIX C: SAMPLE EDUCATION AND ENCOURAGEMENT MATERIALS

Materials used for education of parents, teachers, and students for International Walk to School day in Ontario, Canada are included in Appendix C (http://www.saferoutestoschool.ca)
CROSS CANADA WALKING MAP

Use the Cross Canada Walking Map as a motivation for students to walk to and from school. Here are the official highway distances between major Canadian cities:

<table>
<thead>
<tr>
<th>FROM</th>
<th>TO</th>
<th>DISTANCE IN KM</th>
</tr>
</thead>
<tbody>
<tr>
<td>St. John's, Newfoundland</td>
<td>Charlottetown, P.E.I.</td>
<td>1294</td>
</tr>
<tr>
<td>Charlottetown, P.E.I.</td>
<td>Halifax, Nova Scotia</td>
<td>232</td>
</tr>
<tr>
<td>Halifax, Nova Scotia</td>
<td>Fredericton, New Brunswick</td>
<td>346</td>
</tr>
<tr>
<td>Fredericton, New Brunswick</td>
<td>Quebec City, P.Q.</td>
<td>586</td>
</tr>
<tr>
<td>Quebec City, P.Q.</td>
<td>Montreal, P.Q.</td>
<td>270</td>
</tr>
<tr>
<td>Montreal, P.Q.</td>
<td>Toronto, Ontario</td>
<td>539</td>
</tr>
<tr>
<td>Toronto, Ontario</td>
<td>Thunder Bay, Ontario</td>
<td>1384</td>
</tr>
<tr>
<td>Thunder Bay, Ontario</td>
<td>Winnipeg, Manitoba</td>
<td>715</td>
</tr>
<tr>
<td>Winnipeg, Manitoba</td>
<td>Saskatoon, Saskatchewan</td>
<td>829</td>
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<tr>
<td>Saskatoon, Saskatchewan</td>
<td>Regina, Saskatchewan</td>
<td>257</td>
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<tr>
<td>Regina, Saskatchewan</td>
<td>Calgary, Alberta</td>
<td>764</td>
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<tr>
<td>Calgary, Alberta</td>
<td>Edmonton, Alberta</td>
<td>299</td>
</tr>
<tr>
<td>Edmonton, Alberta</td>
<td>Vancouver, British Columbia</td>
<td>1244</td>
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<tr>
<td>Vancouver, British Columbia</td>
<td>Victoria, British Columbia</td>
<td>66</td>
</tr>
<tr>
<td>Victoria, British Columbia</td>
<td>Whitehorse, Yukon Territory</td>
<td>2763</td>
</tr>
<tr>
<td>Whitehorse, Yukon Territory</td>
<td>Yellowknife, North West Territories</td>
<td>2704</td>
</tr>
<tr>
<td>Yellowknife, North West Territories</td>
<td>Iqaluit, Nunavut</td>
<td>2200</td>
</tr>
</tbody>
</table>

It's 7428 kilometres from St. John's Newfoundland to Vancouver, British Columbia.
STUDENT TRAVEL LOG

Name: ___________________  School: ___________________

Grade: ________  I live _____ blocks from the school

REMEMBER: Be safe when you walk—always walk with friends or a responsible adult. When walking to and from the school remember Elmer The Safety Elephant’s poem:

Look all ways
Before you cross the street
Use your eyes and ears
Before you use your feet

Mark off the days you walk to school and home. If your school has a Kilometre Club, fill in the number of kilometres you complete each week.

<table>
<thead>
<tr>
<th>Date</th>
<th>Yes, I walked to school</th>
<th>Yes, I walked home from school</th>
<th># kilometres I completed in the Kilometre Club</th>
</tr>
</thead>
<tbody>
<tr>
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</tbody>
</table>

Students who participate regularly in the Walk to School program or the Kilometre Club, or both, can send their completed Travel Logs to (local Health Unit) and we will send you a certificate of achievement!
Congratulations!

For your participation in Walk to School Days

"It's really cool, to walk to school. You are totally cool, so KEEP WALKING!"

Signature

Date

Title

Greenest City

Walking for a better atmosphere
Walk for Adventure All Week!
MORE IDEAS TO TAKE YOU AROUND THE WORLD

Go Globe Trotting!
- There are 30 countries participating in International Walk to School Day, from six continents: Argentina, Australia, Belgium, Brazil, Canada, Chile, Croatia, Cyprus, Denmark, France, Germany, Greece, India, Ireland, Israel, Italy, Mexico, Namibia, New Zealand, Saudi Arabia, South Africa, South Korea, Spain, Switzerland, United Kingdom, United States, Wales and Zambia.
- Visit a new continent each day. Highlight participating countries in North America, South America, Asia/Australia, Africa, Europe. Display images of each continent’s wildlife at special greeting stations, fly its flags, play its music. Learn something about each place visited: languages, cultures, habitats, dress, food, movies, etc. Link to classroom curriculum in Science, Social Science, Art and Music.
- Invite members of the community from different parts of the world to take a role/participate.

Walk Around the World!
- Use JWALK to kick-off a ‘walk around the world’ via the equator throughout the school year. Walkers can be assigned a kilometre amount each time they walk to and from school. Place a map of the world in the school hallway to track progress.

Theme Days
Monday: Best Routes to School
Identify the best route from home to school or part way and mark these on maps to post at school or at home. Organize a treasure hunt that highlights safety signage such as Neighbourhood Watch, community meeting places, signs in a variety of languages, plants that overwinter here, those that only grow all year somewhere else. Add to the adventure by choosing items unique to your school’s neighbourhood.

Tuesday: Colour Our World
Focus on visibility to prepare for the shorter days in Canada. Learn about Southern Hemisphere countries experiencing the opposite season. Encourage families to wear bright, reflective clothing, backpacks, strollers, and bikes. Decorate the school zone with brightly coloured ribbon, tape, and/or balloons.

Wednesday: Walk as Friends Around the World
Provide recognition for parent helpers and refreshments for families at school. Invite friends from the neighbourhood, members of the community who have moved to Canada from other countries. Invite a neighbourhood musician to perform. Invite local service groups or senior’s organizations to help at greeting stations or to talk with students about how they once traveled to school. Many seniors’ centres have walking groups you could invite to walk with families.

Thursday: Wheels Around the World
Provide examples of helmets for small wheel transportation. Publicize the idea: ‘Brains are Soft. Helmets are Hard. Use Both’. Organize a bike rodeo. Have a decorated bike and small wheels parade. Invite local bike safety experts such as police bike patrollers, bike shop staff, or bike instructors. Share safety information about “Big Wheels,” school bus safety during pick-up/drop off times. Invite your local transit providers to participate.

Footloose Friday: Decorate Your Feet!
Encourage decorated feet for a footloose parade to or at school! Organize a special assembly to recognize student and adult crossing guards, community police, student council organizers, teacher organizers, parent volunteers, etc. Distribute draw prizes, cool treats for students, or certificates.