PLANNING COMPLETE STREETS
FOR AN AGING AMERICA

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AARP’s Public Policy Institute (PPI) informs and stimulates public debate on the issues we face as we age. Through research, analysis, and dialogue with the nation’s leading experts, PPI promotes development of sound, creative policies to address our common need for economic security, health care, and quality of life.

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PPI INNOVATION ROUNDTABLE
FOR AN AGING AMERICA

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For several years, AARP has encouraged states to implement the Federal Highway Administration’s roadway engineering guidelines for older drivers and pedestrians. More recently, AARP has endorsed the planning concept Complete Streets. Complete Streets are those that are designed for the safety and comfort of all road users, regardless of age and ability. Naturally, this definition should extend to the needs of older road users. But does it in practice? And do the engineering solutions offered for older drivers work for pedestrians and bicyclists, the major focus of the Complete Streets movement?

The AARP Public Policy Institute (PPI) embarked upon this project to discover the nexus between these two, as of yet, distinct areas of research and practice. To accomplish this PPI formed an interdisciplinary team of planners, engineers, and policy advocates to review the safety research and offer both policy and design recommendations that can be used by engineers, planners, and citizen advocates in their quest to build safe, more livable streets for everyone.

The next several years mark unprecedented opportunity to affect our built environment. The Federal Highway Administration (FHWA) is updating its Highway Design Handbook for Older Drivers and Pedestrians; local and state governments in ever-increasing numbers are adopting Complete Streets policies; and Congress is considering Complete Streets bills simultaneously with hearings on highway safety in anticipation of reauthorization of surface transportation legislation. This research report and accompanying design document are designed to stimulate new understanding and thinking that will lead to better streets for all Americans.

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**KEY RESOURCES FOR ROADWAY DESIGNERS**

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- FHWA Manual on Uniform Traffic Control Devices for Streets and Highways (MUTCD)
- AASHTO Guide for the Development of Bicycle Facilities
- AASHTO Guide for the Planning, Design, and Operation of Pedestrian Facilities
- ITE Guidelines for Design and Safety of Pedestrian Facilities
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BACKGROUND

A critical component of livable communities for people of all ages is residents’ ability to get where they need to go, whether by car, public transportation, bicycle, wheelchair, or foot. Yet many American streets are designed primarily for the motorist, with the goal of enabling vehicles to move as efficiently as possible. It is difficult for nondrivers of all ages and abilities to navigate many of our nation’s communities, especially those located in automobile-oriented suburban areas. Furthermore, many of the nation’s major thoroughfares in commercial areas are congested and confusing to navigate even for drivers because of complicated intersections and a clutter of signs, entrances, and bottlenecks. The human cost of this is significant. It exacerbates the social and physical isolation of nondrivers, not to mention the dangers imposed upon all road users.

Complete Streets initiatives present an opportunity to improve the nation’s travel options. A Complete Street is safe, comfortable, and convenient for travel by automobile, foot, bicycle, and transit, regardless of age and ability. The focus of Complete Streets initiatives has been to encourage local, regional, and state planning agencies to change policies and procedures so that multimodal accommodations are a routine part of project development. The aim is to “right the balance” in a transportation system that is currently tilted toward automobiles.

Despite the goal to be inclusive, an inventory conducted for this study found that less than one-third of the 80 state and local Complete Streets policies explicitly address the needs of older road users. An online survey of more than 1,000 transportation planners and engineers revealed that nearly two-thirds do not yet consider the needs of older users in their multi-modal planning. This study encourages transportation planners and decision makers to build upon the principles of Complete Streets to address the specific needs of older drivers and pedestrians. Adoption of these principles ultimately improves the safety for all road users.

SAFETY ON AMERICA’S STREETS IS A MAJOR CONCERN FOR OLDER ADULTS

In a poll conducted for this study, 40 percent of adults age 50 and older reported inadequate sidewalks in their neighborhoods. More sobering, nearly 50 percent reported they cannot cross main roads close to their home safely. Half of those who reported such problems said they would walk, bicycle, or take the bus more if these problems were fixed.
These concerns are borne out by statistics showing older adults are more likely to be victims in both motor vehicle and pedestrian fatalities.

THE OLDER ROAD USER IS THE CUSTOMER OF THE FUTURE

Over the coming decades, the number of older Americans (ages 65 and up) is expected to increase. Estimates from the U.S. Census Bureau indicate older adults represented 12 percent of the total population in 2005. By 2025, this number will more than double to about 62 million, or 18 percent of the population (nearly one in five Americans). We also know that older Americans are more active and are driving more than ever before, and that one in four U.S. drivers will be age 65 and older. Clearly, the older road user is the customer of the future.

Aging is a highly individual process. Challenges that frequently affect people’s mobility as they age include the following: declining vision, decreased physical fitness and flexibility, decreased ability to focus attention, increased reaction time. Policies and design practices that explicitly recognize these changes will better serve a growing segment of the nation’s population.

TRADITIONAL TRANSPORTATION PLANNING AND ENGINEERING PRACTICE

This report examines the evolving state of the transportation planning and design practice with regard to these issues, and offers recommendations to advance mobility and accessibility for older adults within the realms of transportation policy, planning, and engineering.

In the realm of roadway engineering and design, research and guidebooks on addressing the needs of older drivers and pedestrians have been developed by the U.S. Department of Transportation as well as national professional organizations such as the Institute for Transportation Engineers and the Transportation Research Board of the National Academies. An examination of these current design guidelines reveals conflicts between strategies that address the needs of older drivers and those that meet the needs of older pedestrians, as well as other road users.

For example, some recommendations to improve older driver safety involve widening roadway lanes in order to give them more room to maneuver. However, wider roads present a challenge for older pedestrians trying to cross the broader streets. In addition, wider roadways often make it easier for drivers to go faster, which puts pressure on older drivers who have difficulty making and executing decisions quickly, as well as putting pedestrians at a higher risk for being struck and killed by drivers. An energetic debate continues among planners and engineers on how to balance the need for capacity with the needs of nonmotorized road users at intersections. As part of this study, we explore the issue of
balancing road user needs by examining some of the intersection design recommendations made in FHWA’s *Highway Design Handbook for Older Drivers and Pedestrians* and offer some refinements for urban and suburban intersection treatments that provide better balance.

**A NEW APPROACH**

The study encourages roadway planners and engineers to employ design strategies that support older drivers and pedestrians, particularly in situations where the “status quo” design makes streets less safe for older adults. The recommendations can be summarized into the following three basic planning and design principles:

**Slow Down** - Reduce vehicle travel speeds in areas where drivers and pedestrians interact and where older drivers and pedestrians need more time to make decisions. Roadways can be reengineered for slower speeds through changes to curb radii, perceived or real lane widths, or replacement of typical intersections with roundabouts.

**Make it Easy** - Make the physical layout of the transportation network easy to navigate for older drivers and pedestrians. Some of the complexity of intersections can be removed by providing travelers a connected network of streets with lower-speed routes and intersections that are easier to maneuver.

**Enjoy the View** - Make it easy for drivers and pedestrians to notice, read, understand, and respond to visual cues and information. Reduction in the visual clutter of signs, better access management, and improvements to landscaping, signs, and lighting can make the roadway more intuitive.

**IMPLEMENTATION STEPS**

These principles can be integrated into Complete Streets policies to change the process of transportation planning so that the needs of everyone expected to use the facility are considered from the beginning. This is critical in ensuring that the needs of older travelers are considered. A broad approach that begins well before design standards are written is crucial to success. Once the basic policies are adopted, four implementation steps should be taken to ensure this comprehensive approach:

- **Develop staff skills in planning and designing for all modes.** Many planners and engineers began their careers with training that focused on the needs of automobiles, without much regard to who was driving them or to other road users. Balancing the needs of all users is a challenge, and doing so with every project requires new tools and skills.
• **Rewrite and/or refocus agency policies and procedures to serve all modes.** Many transportation agencies use transportation planning procedures focused on automobile capacity measures such as a higher level of service (a measure of congestion). They have not established a systematic way to determine all the types and modes of travelers along a corridor and to make sure their needs are met. The policy change should result in a restructuring of everyday procedures, beginning with much broader scoping processes, and new ways to decide on trade-offs.

• **Rewrite and/or adapt design guidelines to address the needs of all travelers using all modes.** This is the step most relevant to addressing the needs of older travelers, and may include new design manuals that specifically address the needs of older travelers and persons with disabilities, or they may point to current best practices manuals, such as those provided by the U.S. Access Board.

• **Collect data on all users and modes for performance improvements.** An important aspect of successful Complete Streets planning is having the tools to assess the success of new projects in meeting the needs of varied users.

Enriching Complete Streets planning processes and roadway design methods to address the principles above will advance safety and mobility for roadway users of all ages and travel modes. In addition, by adopting policies and practices that address these elements at each stage of project development—from policy to planning and design—agencies and individuals involved in the process will have a common language through which they can communicate more clearly and consistently. The results will be travel networks that better provide for the needs and safety of all users.
A critical component of livable communities is residents’ ability to get where they need to go, whether by car, public transit, bicycle, wheelchair, or foot. Yet, since the beginning of the post–World War II suburban housing expansion, streets have been designed primarily for the motorist. Too often, suburban areas lack sidewalks. Travel by bicycle is perilous, and missing or poorly designed curb cuts leave many wheelchair users unable to use the street network. Furthermore, many of the nation’s arterial roadways in commercial areas are congested and confusing to navigate for many drivers because of a clutter of signs, entrances, and bottlenecks.

As the nation’s population ages, more and more of its citizens will find it difficult to navigate the transportation network by any means. Normal aging commonly leads to changes in perceptual, cognitive, and psychomotor performance. Navigating intersections, reading the small type in road signs, following pavement markings, and making left turns are frequently cited as more challenging for older drivers than younger ones (Federal Highway Administration [FHWA], 2001; Potts, National Cooperative Highway Research Program [NCHRP], 2004). Older pedestrians may suffer decreased ability to judge the speed of cars entering an intersection and may lack the ability to run across the street. As a result, they are victims of a disproportionate number of pedestrian fatalities (FHWA, 2001).

In response to the need for safe travel for all users, a wide variety of organizations are focusing on development and implementation of policy and road design strategies that enhance safety. Complete Streets is one such approach. The name was coined by pedestrian and bicycle advocates to emphasize the importance of designing the street for all users, whether one travels by foot, bicycle, transit, or car. The focus of the Complete Streets movement has been on helping states and localities adopt new policy and procedural changes so that the entire street right-of-way is designed and operated to enable safe access for all users. Organizations as varied as America Walks, American Public Transportation Association (APTA), American Planning Association (APA), Institute of Transportation Engineers (ITE), the Natural Resources Defense Council (NRDC), and AARP have joined the National Complete Streets Coalition. These organizations helped to redefine a Complete Street as one that works for all users, regardless of age and ability.

The planning and engineering professions have developed a number of technical manuals and training programs related to Complete Streets, such as the Complete Streets webinars offered by APA; the Federal Highway Administration’s Course on Bicycle and Pedestrian Transportation; ITE’s Road Diet Handbook: Setting Trends for Livable Streets and Context Sensitive Solutions in Designing Major Urban Thoroughfares for Walkable Communities; and Guide for the Planning, Design, and Operation of Pedestrian
Facilities, by the American Association of State Highway and Transportation Officials (AASHTO). The planning and design approaches offered in these courses and manuals can undoubtedly improve the travel environment for pedestrians, bicyclists, and transit users; however, explicit attention to the unique needs of older adults has been minimal.

Publications and training that explicitly address the needs of older travelers have focused primarily on accommodating automobile drivers by designing roads and intersections to help people continue to drive safely as they age. Human factors researchers and traffic engineers have offered design guidelines for older driver safety largely within the context of this traditional engineering paradigm. In doing so, they have not questioned the long-term efficacy of this model.

RESEARCH APPROACH

AARP’s Public Policy Institute (PPI) sponsored this research to stimulate the planning and engineering community to consider more comprehensively in their studies and guidelines the needs of older drivers and pedestrians and bicyclists, and transit users of all ages. PPI’s goal is to increase the prominence of older travelers’ needs in road planning and design, and incorporate the planning for their needs into Complete Streets policies and practices. In doing so, the road environment will be safer and more user friendly for everyone—younger drivers, parents with strollers, persons with disabilities, and so on. Furthermore, by examining the design guidelines for older drivers and pedestrians recommended by the FHWA through the lens of designing for Complete Streets, PPI recommends refinements to FHWA’s Highway Design Handbook for Older Drivers and Pedestrians (FHWA Handbook).

The objectives of the project are the following:

- Elevate the importance of incorporating older driver and pedestrian safety into Complete Streets planning processes.
- Identify and suggest ways to reconcile potential conflicts between older driver safety recommendations and design measures that are consistent with Complete Streets principles.
- Provide professionals and community advocates alike with clear models and design resources for incorporating older driver and pedestrian safety into transportation planning.

The research process included the following milestones:

- A review and critique of key literature from the engineering and planning professions, particularly focusing on conflicts and gaps relevant to the needs of older drivers and pedestrians.
- An online survey of more than 1,200 state and local transportation planners and
engineers to ascertain the acceptance and implementation of Complete Streets policies and engineering practices for older driver and pedestrian safety and to receive feedback on recommendations presented in this report.

- An inventory and evaluation of 69 existing Complete Streets policies.
- A public opinion telephone survey to understand older adults’ perception of their local travel environment and potential support for Complete Streets design measures.
- A Public Policy Institute Innovation Roundtable discussion of national leaders in the planning, engineering, and advocacy arenas who reviewed research findings and provided specific feedback on policy and design solutions.

This final product synthesizes what was learned from each of the above tasks. In this chapter we have introduced the problem statement and described the research approach and outline of the report. In Chapter 2 we lay out the demographic change facing the nation and address how the normal process of aging affects driving and walking. Chapter 3 describes the traditional, post–World War II auto-oriented road planning and design framework and its evolution toward a more balanced multimodal approach. Those new to transportation planning and engineering may find this section helpful as a primer on current practice. In this chapter we discuss the Complete Streets framework and summarize what was learned from our inventory of Complete Streets policies, as well as the feedback received from the profession through the online survey. Chapter 4 lays out our policy, planning, and design recommendations that we believe will improve the safety and usability of the road network for older road users. In this chapter we summarize our review of FHWA’s Highway Design Handbook for Older Drivers and Pedestrians using a Complete Streets lens and offer recommendations for how the FHWA Handbook could be refined to better balance the needs of all users. In addition to some general comments, our summary includes specific recommendations for five intersection design treatments appropriate for urban and suburban contexts. It is the authors’ hope that by reaching beyond the existing literature and carrying out a multifaceted research approach that takes in both user perspectives and expert feedback from the field, we have been able to put forward sound recommendations that advance our thinking on designing for an aging society.
CHAPTER 2

MOBILITY FOR AGING AMERICANS

DEMOGRAPHIC PROFILE OF AN AGING AMERICA

Over the next 20 years, the demographic profile of the United States will shift dramatically. Where once the U.S. population looked like a pyramid, with many children and young people at the bottom and only a few older people at the top, today there is a more even distribution of the population.

In 2007, 12.5 percent of the U.S. population was 65 or older. The U.S. Census Bureau estimates that by 2025, the number of seniors will increase by about 70 percent, and an estimated 18 percent of the population (64 million people) will be 65 or older. The greatest of these gains will occur in the age category 65 to 74 (Bailey, 2004; Frey, 2007). Many of those over age 65 will be very old—over ages 80–85. In 26 states, more than 20 percent—one in five residents—will be over the age of 65. One in nine of those over 65 will also be over 85 (U.S. Census Bureau, 2008). In total, people ages 65 and older will account for 25 percent of U.S. drivers (AAA Foundation for Traffic Safety, 2008). The older road user is the customer of the future.

One factor affecting mobility is the presence of a disability, which increases greatly with age. Forty-two percent of the population 65 and over reported some type of long-lasting condition or a disability in 2000. Thirty-two percent of people 65 to 74 reported at least one disability, in contrast with 72 percent of people 85 and over (Gist, 2004). In many cases, having a disability forces older adults to stop driving and reduce other forms of travel.

THE IMPACTS OF INCREASING AUTOMOBILE-DEPENDENCE ON OLDER ADULTS

Older people today are substantially more mobile than their counterparts of just ten years ago, largely because of travel in personal automobiles. For the last two decades, every automobile-related travel indicator for the elderly has increased, in terms of vehicle miles, licensing, daily trips, daily miles, time spent driving, and more (Rosenbloom, 2003). According to the most recent National Household Travel Survey (NHTS), 88 percent of all trips made by older adults are as drivers or passengers in personal vehicles. When compared with previous travel surveys, the population ages 65 and older has increased its number of daily miles traveled and number of trips taken faster than any other age group (USDOT/FHWA, NHTS, 2001).

While older adults are increasingly more mobile in the automobile, their use of alternative modes has decreased. The elderly are now less likely to take public transit, and while they are more likely to walk than younger people (Rosenbloom, 2003), urban Americans over the age of 65 still make less than seven percent of their trips on foot or bicycle. This is compared
with 50–55 percent in Germany and 44–48 percent in the Netherlands, countries with strong policy and design commitments to these forms of travel. See Figure 1.

In large part, this heavy reliance on automobile travel has contributed to making it difficult to get to places on foot in many parts of the United States and, in far too many cases, unsafe. Recent public health studies have found that per mile, pedestrians in the United States are three times more likely to be killed in motor vehicle crashes than in Germany, and over six times as likely to be killed as in the Netherlands (Bailey, 2004), two European countries where driving is actively discouraged in city centers and where urban land use and transportation policy support nonmotorized travel.

According to a recent article in Public Roads Journal, both men and women are likely to live beyond the time that they can drive safely, as much as seven years for men and about ten for women (Foley, 2002). During that period, they will lose the independence of the personal automobile and become dependent on alternative transportation. Not having safe and viable transportation alternatives can contribute to increased isolation and decline. Having few opportunities to walk on a daily basis can make it more difficult for older adults to remain active, and having to give up driving puts a great strain on their ability to live independently.
By 2025, most older adults will have spent their entire life getting around by car, and in many cases, will have chosen a home in a place where the only viable transportation mode is the automobile. Many of these older adults will be baby boomers, accustomed to the convenience and flexibility of the car, but they will be hard pressed to maintain a high level of mobility if their driving abilities deteriorate. This situation, coupled with, on average, better health and physical conditions than in the past, means that as more older adults live longer, active, and independent lives, they will require travel for work, shopping, health services, etc., for a longer period of time.

Increased mobility for the older adult population comes with greater risks. While older drivers are among the safest users of the nation’s roadways, the cohort of those 75 and older do experience higher crash rates per mile driven, and are more likely to be seriously or fatally injured in their crashes due to their increased frailty (Lyman et al., 2001; Li et al., 2003). Older pedestrians also face high risks when navigating streets. In 2007, older adults accounted for 14 percent of all traffic fatalities, 14 percent of all vehicle occupant fatalities, and 19 percent of all pedestrian fatalities (Traffic Safety Facts, 2007).

THE INFLUENCE OF LOCATION ON MOBILITY

The population of older adults is exploding in suburban and exurban counties around large metropolitan areas such as Denver, Atlanta, Washington, D.C., and Dallas. Several nonmetropolitan counties, such as the picturesque parts of Colorado, Idaho, and Wyoming, are also experiencing large increases (Frey, 2007). Although some of these fast-growing regions are beginning to promote more compact suburban development that can be served by public transportation services, the predominant development pattern continues to be lower density, residential subdivisions and auto-oriented commercial corridors. Over the coming decades, increasing numbers of baby boomer retirees and active older adults who settle in these areas, attracted by amenities, such as scenic vistas and outdoor recreation, may become stranded in their homes if they can no longer drive.

The ability to live closer to daily destinations is an important factor in maintaining mobility among
older people who cannot drive or whose driving is limited. People 65 and over living in areas where houses are built closer to shops and services are less likely to stay home on a given day, and are more likely to use public transportation and walk to get around. For example, in the Philadelphia metropolitan area, which features many high-density, walkable neighborhoods, only a third (35 percent) of nondrivers ages 65 and over stay home on a given day. In comparison, over half (53 percent) of older nondrivers in the sprawling Los Angeles metropolitan area stay home on a given day (Bailey, 2004). A study of Northern Virginia suburbs outside Washington, D.C., found that older adults ages 75 and older living in walkable, mixed-use areas took 20 percent more trips each week than their counterparts living in traditional suburbs characterized by a separation of uses, wide, fast roads, and expansive surface parking lots. And while the great majority of these older adults reported having driven in the past month (70 percent), 25 percent of them also reported having used fixed-route public transportation for a portion of their trips compared to just 14 percent of their suburban counterparts living in more sprawling areas (Lynott, 2006).

For older adults living in rural areas, and who must travel on higher-speed roads, the challenges are even greater. Research conducted by the National Highway Traffic Safety Administration (NHTSA) shows that residents of rural areas have a much greater propensity for involvement in fatal highway crashes than their urban counterparts. Although 21 percent of the U.S. population lives in rural areas, they account for 57 percent of all fatal crashes (NHTSA, 2005).

**THE EFFECT OF PHYSICAL LIMITATIONS ON MOBILITY**

Aging is a highly individual process, and physical and cognitive changes occur at different rates. Because of the diversity in how age affects individuals, many older adults will continue to drive safely well into their retirement years. Nonetheless, a few common functional limitations can affect the ability to drive safely: vision declines, physical fitness and flexibility diminish, the ability to focus attention decreases, and the time necessary to react to unexpected circumstances increases. Some of the same declines in physical function that affect older drivers affect them as pedestrians too. For example, common hip and leg impairments such as arthritis can limit walking comfort and distance. Loss of limb strength, flexibility, sensitivity or range of motion, and reduced ability to rotate the head and neck all can make walking more challenging or impossible.

Several organizations have researched the effects of such changes on a person’s mobility. The Federal Highway Administration, in its *Travel Better, Travel Longer* handbook, summarizes the interaction between the changes in physical health and driving and walking abilities (U.S. Department of Transportation, 2003):

**Declining vision** - Roadway signs and pavement markings become less legible, and curbs, barriers, pedestrians, and other drivers are more difficult for older drivers to see. This is
particularly problematic at night, when low lighting and glare from headlights interfere with vision.

**Decreased physical fitness and flexibility** - Older drivers have difficulties turning their heads to rapidly scan to the left and right at intersections and look over their shoulders for lane changes, as well as backing up. Older people may also have trouble with activities that require quick physical movements such as abrupt turns. Additionally, many older adults walk more slowly than the current *Manual on Uniform Traffic Control Devices for Streets and Highways* (MUTCD) recommendation of 1.2 meters (m) (4’) per second used for timing how long the clearance interval should be on the signal to allow a pedestrian to reach the far side of the street.

**Decreased ability to focus attention** - Older drivers may find it difficult to sort through and prioritize the large amount of ever-changing information that must be absorbed during roadway use, from signs, signals, and pavement markings to avoiding conflicts with pedestrians, bicyclists, and other drivers. This can be especially problematic in new or complicated situations, such as navigating a temporary traffic control zone or an unfamiliar area.

**Increased reaction time** - Older drivers are often slower to respond to traffic control devices and to changes in traffic or roadway conditions that are unexpected or contrary to expectations.

These four common limitations are particularly troublesome in specific traffic situations, such as left turns and temporary traffic control zones. Research has shown that intersections present some of the most difficult challenges for older drivers (FHWA, 2001; Morena, 2008; Government Accountability Office [GAO], 2007). In fact, a leading sentence in FHWA’s *Highway Design Handbook for Older Drivers and Pedestrians* (FHWA Handbook) states that “the single greatest concern in accommodating older road users, both drivers and pedestrians, is the ability of these individuals to negotiate intersections safely.”

Navigating intersections requires the ability to make rapid decisions, react quickly, and accurately judge speed and distance: skills that commonly diminish through the natural aging process. Coupled with increased frailty, these factors lead to increased older driver involvement in fatal crashes at intersections. In 2001, 50 percent of all older driver fatalities in 2001 occurred at intersections (TRIP, 2003). Since intersections also generally present the highest overall potential for pedestrian/vehicle conflicts, problems with older driver safety at these locations are also of concern when considering pedestrian safety for people of all ages.

Roads can be engineered to address the visual, fitness, and cognitive challenges commonly experienced by older adults. The next chapter discusses the planning and engineering professions and how older driver and pedestrian safety can be addressed using a Complete Streets planning framework.