

**LIVING OUTSIDE THE BOX:
SUSTAINING THE LIFELONG COMMUNITY THROUGH
UNIVERSAL DESIGN**

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**LIVING OUTSIDE THE BOX:
SUSTAINING THE LIFELONG COMMUNITY THROUGH
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To my peers, colleagues, family, friends, and professors

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SUMMARY

We all want to live in a healthy community. Each of us has his or her own image of what such a community should look like. That image is shaped, in part, by our reaction to the communities in which we now live or used to live. However we often take for granted the elements of communities that enable and sometimes disable many of us to remain active in a community for a lifetime. For older residents, a lifelong community would include elements that help them to maintain independence and quality of life. The physical characteristics of a community often play a major role in facilitating our personal independence. In order to combat the growing challenges and health concerns facing the American lifestyle this research proposes a set of design guidelines that promote sustainable lifelong communities that are universally designed for people of all ages and levels of physical ability.

The purpose of developing a set of universal design guidelines for lifelong communities is to alleviate many of the physical barriers and challenges that prevent some Americans from active involvement in the community. The methods employed to develop these guidelines were based on literature review and analysis. This research was incorporated into a new body of practical standards that was tested against a real life community in Decatur, Georgia. The resultant guidelines are presented with the intention of becoming a usable guide for planning agencies such as the Atlanta Regional Commission and other local and national community design facilitators.

CHAPTER 1

INTRODUCTION

Why Design Universal Lifelong Communities?

Universal design is the design of products and environments to be usable by all people, to the greatest extent possible, without the need for adaptation or specialized design. –Ron Mace .

When applied to the design of communities Universal Design provides a broader focus on the factors and design features that make mobility and usability attainable by all of its potential users. Universal Design offers a way to ensure that communities will support the needs of their inhabitants for a lifetime, rather than inhabitants having to constantly change themselves or their communities as their needs change over their lifetime. Universal Lifelong Communities become safe, livable, accessible places for individuals of all ages, free of the types of barriers that all too often isolate older adults from others in the community and diminish quality of life for all.

1.1 The Importance of Lifelong Communities

A Lifelong Community is one that best serves the full spectrum of its entire population. In order to maintain social, economic, and political vitality, a physical community is largely dependent on mobility. A Lifelong Community encourages mobility through a safe pedestrian environment that provides easy access to important elements that positively affect our daily lives. These elements include: community-based services and activities, grocery stores and other

customer friendly businesses, a mix of housing types designed for the continuum of life, accessible transportation options, nearby health centers and recreational facilities.

1.2 Promoting Lifelong Communities

In 2007 the Atlanta Regional Commission (ARC) developed the Lifelong Communities Initiative as a comprehensive effort to help communities in the metro Atlanta area respond to a changing population and its diverse needs. The Lifelong Communities Initiative evolved from the work of the Aging Atlanta Partnership which was funded in 2002 by the Robert Wood Johnson Foundation Community Partnerships for Older Adults program. This initial work sought to challenge assumptions and pilot unconventional ways of meeting community needs while emphasizing partnership to create substantial and sustainable change. The Lifelong Communities Initiative included the development of programs, policies and funding that allow all people to remain in their homes and communities as long as they desire.

The Lifelong Communities initiative was based on the premise that it is not possible to meet the needs of the growing older adult population with supportive programs or innovations in healthcare alone, but rather requires rethinking the way we plan for and regulate the built environment. In February 2009 ARC sponsored a Lifelong Communities Charrette that brought together healthcare, aging, mobility, transportation, accessibility, architecture, planning and design experts to explore the challenges of creating Lifelong Communities in the largely suburban landscape where most of the aging population lives. The goal of this interdisciplinary team was to help create concepts that address how communities must be planned and designed to

meet the needs of the nation's rapidly growing older population. The charette was centered around seven core planning principles: connectivity, pedestrian access and transit, neighborhood retail and services, social interaction, varied dwelling types, opportunities for healthy living and consideration for existing residents.

1.3 Developing Universal Design Standards for Lifelong Communities

Building upon the foundation of ARC's initiative, this research aims to provide standards that will encourage more active living among people of all ages by prioritizing integrated land use, mobility and transportation in the design of pedestrian-friendly, connected and safe communities. Places that are designed to be safe, appealing, enjoyable, and convenient provide people with an incentive to get out of their "boxes" and become active in the community. These places become attractions, like a shady shopping street with universally designed benches and sidewalks, or a park that supports a range of active and passive uses for people of all ages and abilities. Pedestrian-friendly amenities like shade trees, comfortable places to sit, water fountains, waste receptacles, good views, and adequate lighting all attract people to a public space. Unfortunately, in neighborhoods where vehicles dominate and environmental barriers make it difficult to simply traverse down the street. Having a set of Universal Design Standards provides a practical means to foster this type of active participation and community involvement. They aid in the design of barrier-free, sustainable, socially interactive and connected environments for all people regardless of age or physical ability.

1.4 The Problem Statement

Environmental research suggests that the design of some communities can make it difficult for children and adults to be physically active.¹ Suburban streets often lack sidewalks and many schools are located in close proximity to multi-lane highways and other traffic hazards.² Inappropriately designed communities can also discourage and possibly even endanger people with disabilities.³ Poor community design can make it difficult for people to remain independent and involved in the community around them throughout a lifetime.⁴ A limited mix of housing types can be a challenge to aging within the same community; poorly designed sidewalks can be a personal safety concern to certain users; and physical barriers can divide and isolate people within communities.^{5,6} These and other environmental factors contribute to low physical activity levels among Americans.² The time spent traveling in automobiles and within the confines of isolated dwellings, keeps many Americans living inside the proverbial box in sprawling suburbs.⁷ While there are many resources amongst varied independent interest groups that promote walk-ability, healthy living, accessibility and sustainability in community design, there is a general lack of guidance on how communities should be designed to be appealing, safe, usable by people with diverse physical abilities. In particular, little direction exists to facilitate mobility and transportation features within the design of the community at large nor to define the proximity and connectivity of its essential land use features.

1.5 Purpose Statement

The public rights-of-way accommodate many transportation activities, including walking, bicycling, public transit, and automobile travel. It harbors important architectural elements, such as traffic signals, transit stops, sidewalks, seating and street lights that support those activities. Each of these functions has specific design needs and constraints. In most cities the variety of functions is administered by people in several agencies, both inside and outside the city. In the past, conflicts between the design needs of competing functions occasionally have produced conditions that discourage pedestrian travel.

To combat the growing challenges and health concerns facing the American lifestyle and provide some guidance this research proposes a set of Universal Design guidelines that promote sustainable lifelong communities for people of all ages and levels of physical ability. The goal of these Universal Design standards for lifelong communities is to alleviate many of the physical barriers and challenges that prevent some Americans from active involvement in the community. These principles will serve as a guide for city planners, engineers, designers, developers and other interested parties that will encourage a radical shift in community planning and design that emphasizes the importance of inclusivity, mobility, and longevity in neighborhoods where healthcare, commercial businesses, civic/social services and housing are well integrated into a lifelong community.

1.6 Specific Aims

These guidelines are presented with the intention of becoming a usable guide for planning agencies such as the Atlanta Regional Commission and other regional community design facilitators. There are three main goals that this research hopes to accomplish:

- 1) To design communities that encourage a healthy and active lifestyle for all people regardless of age or physical ability;
- 2) To design safer communities that reduces the potential for accidental deaths and injuries due to environmental risks.
- 3) To improve mobility and community involvement by integrating universal design principles into the practice of urban planning and design.

It is expected that through the development of these guidelines a more diverse and inclusive attitude about the "American Ideal" will prevail, an attitude that recognizes that sustainable lifelong communities require the active participation of all its members.

CHAPTER 2

BACKGROUND AND LITERATURE REVIEW

Why Develop Universal Design Standards for Lifelong Communities?

Sustaining a lifelong community requires changing the way all of us, especially local governments, developers and design professionals think, plan and design communities. Nonetheless while any form of change can be difficult, changing development patterns, local policy and community expectations can be particularly challenging. Therefore it is important to consider the critical factors that indicate a need for Universal Design Standards for Lifelong communities. One area of concern these guidelines must address is that poor community design can contribute to the lack of physical activity and obesity trends amongst the American population.⁸ Other factors to consider are the environmental obstacles that often limit and sometimes inhibit certain individuals from actively engaging in daily activities and participating in the community. These factors not only impact the general public perception of disabled persons but the rapidly growing aging population that is affected by the lack of available services and features necessary to remain independent and age in place in their existing homes and communities. Limited Housing choices also present a hurdle to overcome with Universal Design standards that provide diverse options for people of all ages and abilities.

2.1 Lifestyle and Healthy Living Factors

2.1.1 Contributors to Lack of Physical Activity and Increased Obesity

During the past four decades, the obesity rate for children ages 6 to 11 has more than quadrupled (from 4.2% to 17%), and it has more than tripled for adolescents ages 12 to 19 (from 4.6% to 17.6%)^{9,10} Regular physical activity can reduce the risk for obesity and help people lead longer, healthier lives. Yet studies show that less than half of U.S. children and adolescents meet the recommended guidelines of at least 60 minutes of daily moderate-to-vigorous physical activity.¹¹⁻¹³ The same studies indicate that less than 10 percent of adults in the U.S. get the recommended 30 minutes of moderate-to-vigorous physical activity per day.¹⁴⁻¹⁶

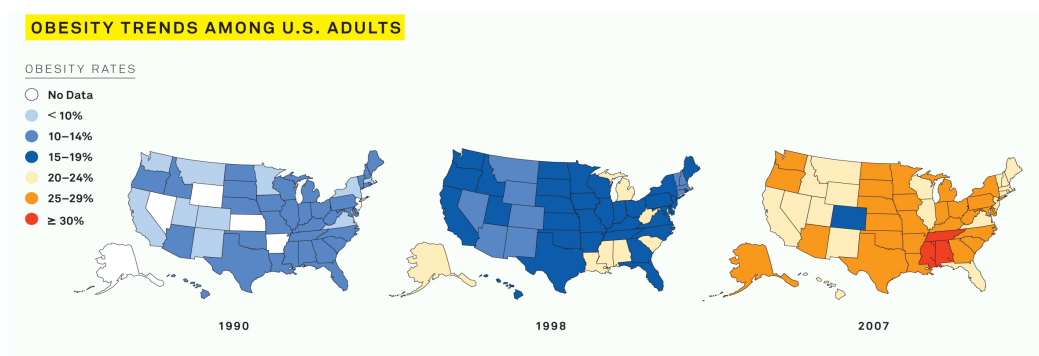


Figure 1: Defines obesity as a Body Mass Index (BMI) ≥ 30 , or 30 lbs overweight for a 5'4" person.

Source: CDC Behavioral Risk Factor Surveillance System

While Walking and bicycling for daily transportation are important sources of physical activity, research has also shown that they have declined dramatically over the past few decades. Between 1977 and 1995, the number of all walking trips decreased by 32 percent, and there was

a similar decrease in trips made by adults walking to work.¹⁷ Adults walk for only 21.2 percent of trips that are one mile or less, and children walk for only 35.9 percent of trips to school that distance.¹⁸ Reversing the decline in rates of walking and biking for transportation, especially for short trips, presents a major opportunity for improving health among children, adolescents and adults.

2.1.2 Environmental Sources for Increasing Physical Activity and Combating Obesity

Many health and planning officials believe that neighborhoods designed with shops and schools within walking distance of homes, plus a network of bike paths and sidewalks can help children and adults be more physically active.^{1,19} and less likely to be overweight or obese.²⁰ Neighborhoods designed to be walk-able are recommended by the Surgeon General²¹ and Institute of Medicine²² for curbing the obesity epidemic, but many zoning laws, development regulations and transportation policies make it challenging to create communities that facilitate walking and biking.

Regular physical activity increases longevity, well-being, helps children and adults maintain a healthy weight, and can reduce the risk for obesity and its related health consequences.²³ Research indicates that the capacity of America's parks could be further leveraged to promote opportunities for helping diverse populations achieve recommended physical activity levels. There is a growing body of evidence concerning the role of parks in shaping active lifestyles across a variety of study populations, including children, seniors, lower-income families, specific racial and ethnic groups and other populations at high risk of being inactive.²⁴ Park proximity is associated with higher levels of park use and physical activity

among a variety of populations, particularly youth.^{25, 26} Within parks, people tend to be more physically active on trails, at playgrounds and at sports facilities.^{27,28}



Figure 2: Physically active children need to be protected from traffic hazards. Pedestrian accidents are a leading cause of injury or death for children five years and under.²⁹ Studies show that speed humps reduce the chance of child injury,^{30,31} and that it is more important to reduce speed than to reduce traffic volume³²

2.2 Environmental Factors for Social Interaction and Community Involvement

2.2.1 Isolation and Disconnectedness vs Social Interaction and Inclusivity

Like physical activity, research has shown that social interaction can play a role in alleviating depression, which is strongly linked to isolation and disconnectedness.³³ It can draw people out of the house and into community life - and it is the critical identifier of every great public space. Social interaction can be measured by public displays of affection, diversity, volunteerism, even people taking pictures and pointing out neighborhood monuments and special features. However there are a number of environmental obstacles that can often limit and sometimes inhibit certain individuals from actively engaging in daily activities and participating

in the community.³ Particularly because many environments we live in today were designed for use by the ideal six-foot, 190-pound, healthy, strong male.³⁴

This limited design model excludes a large percentage of the population and often results from a misunderstanding of the growing disability community which can benefit from a more inclusive design approach. Much of what is poorly built for people with disabilities has resulted from common misconceptions, such as:³

- People with disabilities don't go out much.
- People with disabilities don't want or need jobs.
- People with disabilities don't have families, marry, or have children, so one bedroom apartments should be sufficient.
- People with disabilities only need access to doctors' offices and other medical facilities.
- People with disabilities want to live together.
- People with disabilities are not affluent or self-sufficient, and thus are not an important part of the consumer market.

These erroneous perceptions can result in design, planning and program decisions that prohibit participation and social interaction by people with disabilities. The disability community is large. It strikes people at all income levels in equal measure. Depending on the definition used, the number of people regarded as having disabilities varies dramatically. An estimate of 36 million is the number most often quoted based on census data and surveys of government benefit programs.³⁵ Other definitions make this estimate seem quite low. For example, the marketing department of a well-known manufacturer of durable medical products estimates after 95 years

of operation that their products are sold regularly to 80 million people having some form of disabling condition. The Arthritis Foundation places the number of people having arthritic conditions capable of causing disabling conditions at 37 million alone. Some market specialists include non-disabled friends and family in the overall count of the disabled community on the theory that if facilities and services are not appropriate for the disabled person in a given environment, his or her associates will often not attend or participate in that environment either.³

The broadest definition of disability is any physical or mental impairment that substantially limits one or more of the major life activities of an individual, a record of such impairment, or being regarded as having such an impairment.³ This definition does not just include people in wheelchairs, but also people with other mobility problems related to diseases such as polio or rheumatism, people with low levels of vision, people with speech or hearing impairments, people with cognitive disabilities such as Alzheimer's Disease and Down Syndrome, and severely disabled people who may be confined to bed. It also includes people whose arthritic hands cannot grasp a doorknob, those who cannot walk up a flight of stairs due to heart disease, those with extremes of physical size who cannot enjoy a movie theater or airplane trip, and those with temporary disabilities related to, for example, sprained ankles, automobile accidents, or difficult pregnancies. The broader disability community includes not only the people with disabilities themselves, but also the caregivers who often must lift, transport, bathe, feed, or provide therapy or other support to the disabled person. Further, the disability community includes families and friends who wish to accompany people with disabilities wherever they may wish to go.

2.2.2 Barriers to Community Participation and Involvement

Activity and participation limitations can result from an almost limitless range of factors. Within the scope of this research, it is not possible to discuss the full range of potential factors that may result in activity or participation limitations for an individual. Therefore, the following discussion focuses on the most common barriers found within community environments. In general, the ability of an individual to participate in environments is influenced by two types of barriers: 1) Movement barriers; and 2) Information barriers.³⁶

A movement barrier is anything that restricts an individual's ability to physically move along or within an environment. It may limit the individual's movement from one place to the next (e.g., travel from one side of an intersection to the other), or the ability of the individual to position his or her body within one location (e.g., move the arm and hand in order to use a pedestrian actuated signal device or to get close enough to push it). The movement barrier may create a physical barrier to movement (e.g., soft, unstable surfaces), or it may result in a barrier because of the type of movement the individual is required to perform (e.g., short signal times require rapid analysis and very fast positioning and movement to cross and may not provide enough time for decision-making before crossing). Movement barriers result from a variety of factors within the environment and/or the individual. Movement barriers within the environment can occur in both natural and constructed environments.³⁶

Examples of movement barriers within the environment may include:

- Difficult terrain (e.g., steep slopes or cross slopes and soft, unstable, or uneven surfaces);

- Travel path designs that require high speed movements and/or sudden or frequent changes of direction (e.g., short signal phases that do not provide sufficient crossing time);
- Travel paths without areas for rest or shelter;
- Obstacles within the path of travel (e.g., lamp posts, benches, rocks, railings, or barrier);
- Sidewalk/trail design that exposes the user to potential hazards (e.g., unregulated at-grade crossing of a multi-lane highway);
- Environmental designs that require unusual movements or coordination (e.g., placement of pedestrian actuated signal devices in a location that cannot be accessed by all pedestrians);
- Over and under passes with stairs or steep ramps.

Movement barriers within the individual are determined by the individual's body function and structure.³⁶ Some examples of movement barriers within an individual are:

- Limited agility (e.g., ability to negotiate obstacles, steps, or curbs);
- Limited endurance (e.g., inability to increase heart rate or breathing, quick onset of fatigue, or increased energy expenditure for ambulation with crutches or canes);
- Limited speed (e.g., limited coordination or lack of strength for quick movements);

- Unpredictable movement patterns (e.g., children often go from “start” to “stop” or may change directions or plans on the spur of the moment);
- Deliberations in decision-making (e.g., people with vision impairments or older pedestrians with cognitive disabilities may take longer to start and determine when to cross).

Information barriers can restrict the individual’s ability to use information contained within the environment. An information barrier may limit the individual’s ability to: Recognize or receive information (e.g., a loss of vision and loss of hearing and vision together prevents an individual from utilizing visual signs); Understand the information received (e.g., a person with a cognitive impairment may see a flashing “WALK” or a “DON’T WALK” signal but not understand what it means; children have difficulty judging the speed of an approaching vehicle); Decide on a course of action quickly (such as, picking a gap), align themselves properly, and start to cross within the signal phase; or Act upon the information in the anticipated manner (e.g., young children believe that adults will protect them from harm, so they may ignore a stop sign for pedestrians to stop on trails or shared-use paths, even though they see and understand the sign).

Information barriers may result from factors within the environment and/or the individual. Information barriers within the environment include:

- Limited sight lines;
- Complex paths of travel;
- Inaccessible formats for pedestrian information;

- Ambiguous or unclear signs or signals;
- Information available through only one format (e.g., visual but not auditory);
- Unclear or missing information about the appropriate pedestrian path of travel;
- Decisions (e.g., selecting a gap) requiring vision.

Examples of information barriers for some individuals may include:

- Limited ability to receive information (e.g., limited vision may prevent a person from receiving visual information, and loss of hearing will prevent a person from receiving auditory information);
- Limited ability to process or understand the information received (e.g., an individual with a brain injury may see a traffic sign but be unable to understand the meaning of the text);
- Limited ability to act in accordance with information received (e.g., a person with an emotional impairment may be so overwhelmed with the desire to get to a different location that they ignore a red light even though it can be seen and understood);
- Decreased speed for processing information, making decisions, and implementing action (e.g., an individual with a cognitive or vision impairment may require more time to decide that it is safe to cross an intersection and, by then, the conditions may have changed or the light may be red for the pedestrian).

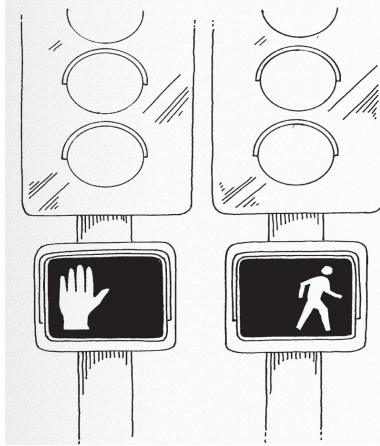


Figure 3. Pictorial symbols help people with cognitive impairments or limited English language skills to understand.

2.2.3 Overcoming Barriers In the Built Environment

Universal Design seeks to resolve the problem of barriers to accessibility and usability in the built environment that often arise for people that do not meet the physical ideal. The intent of Universal design in the built environment is to simplify life for everyone by making it usable by all people to the greatest extent. It has advanced to become a way to reconcile the artistic integrity of a design with human needs in the environment.³ Universal design seeks to accommodate the ideal, plus the majority of other users who do not fit that physical type. Universal design is the only design framework that consciously designs to accommodate differences and not similarities.³⁴

When one considers the full scope of abilities and age groups to be accommodated by a given design, the terms “barrier free” and “accessible” seem to be limited as definitions of reality. Barrier-free for someone in a wheelchair may not be for someone who is blind or deaf. The cantilevered drinking fountain, for example, which is more easily used by seated people,

often protrudes into the path of a visually impaired person, undetected by his or her cane. The auditory signals which are so helpful to the visually impaired person are, of course, inaudible to the hearing impaired person, illustrating the need for redundant cuing in some situations to increase safety. Printed signs that aid hearing impaired people are often insufficient by themselves for a mentally retarded person or a person with a learning disability.³

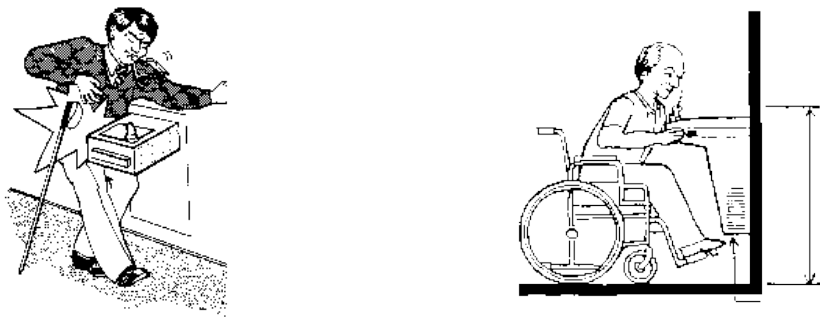


Figure 4: Problem - coolers having more than 27" clear knee space are not detectable by many blind people and may be a hazard. UD Solution – wall-hung cooler is easy to use when lower than 36" and bottom of cabinet is detectable by a blind person's long cane.

Simple "removal of barriers" does not fulfill the responsibility of designers to provide environments that can be fully interpreted and experienced qualitatively.³⁷ Architect I.M. Pei noted the need to go beyond mere access: "Spatial relationships need to be experienced. Persons with disabilities must be able to enjoy the psychological aspects of a structure, not only the individual points or planes within it". As with design objectives such as energy efficiency and fire safety, there is not one solution that will meet every design challenge. However, increased sensitivity to the full range of users for the built environment, allows for numerous decisions to be made at the conceptual design stage of communities that will enhance the functional aspects of the design for both disabled and non-disabled people.³⁸

2.2.4 Universal Design and the American Disabilities Act (ADA)

In recognition that everyone has the right to have and use pedestrian facilities these rights are supported by legislation prohibiting discrimination, such as the Americans with Disabilities Act, which prohibits discrimination on the basis of disability. The Disability Rights Movement has achieved considerable success in its effort to lobby for equal civil and environmental rights for Americans who, until recently, have been excluded on the basis of physical disability or extremes of size. The Americans with Disabilities Act requires that – in addition to education, government programs and housing – public accommodations, public transportation and telecommunications be designed and operated in such a way that people with disabilities have the same opportunities as others. However, designing for pedestrian mobility to meet the current and future needs of a changing population requires an inclusive design approach. Building pedestrian facilities now and for the future means beginning to address the needs of a broader range of users, including older a, people with disabilities, and children.³⁶

Recent innovations in technology have made it easier to specify universally designed components. As the construction and manufacturing industries respond to the aging of the population and new legal strictures, “better for everyone” and “planning ahead for your family’s needs” will begin to replace “handicapped” and “elderly” as marketing approaches.³⁹ As comfort, safety, and flexibility become more marketable, emerging technologies will continue to respond to the needs of people of all ages, abilities and sizes. This will present designers with the choice of either reluctant compliance with minimum accessibility standards, or a user-sensitive design.

2.3 Aging in Place and Social Sustainability

Social sustainability deals with systems that support people by creating safe, secure and independent communities.⁴⁰ Universal Design provides for people of varied abilities, allows for people (and sometimes whole families) to stay in their same home (aging-in-place), and enables people/families to continue living in their same community for a lifetime.⁴¹ Today people are living longer, greatly extending the period of aging that is one of the primary causes of disabling conditions.³

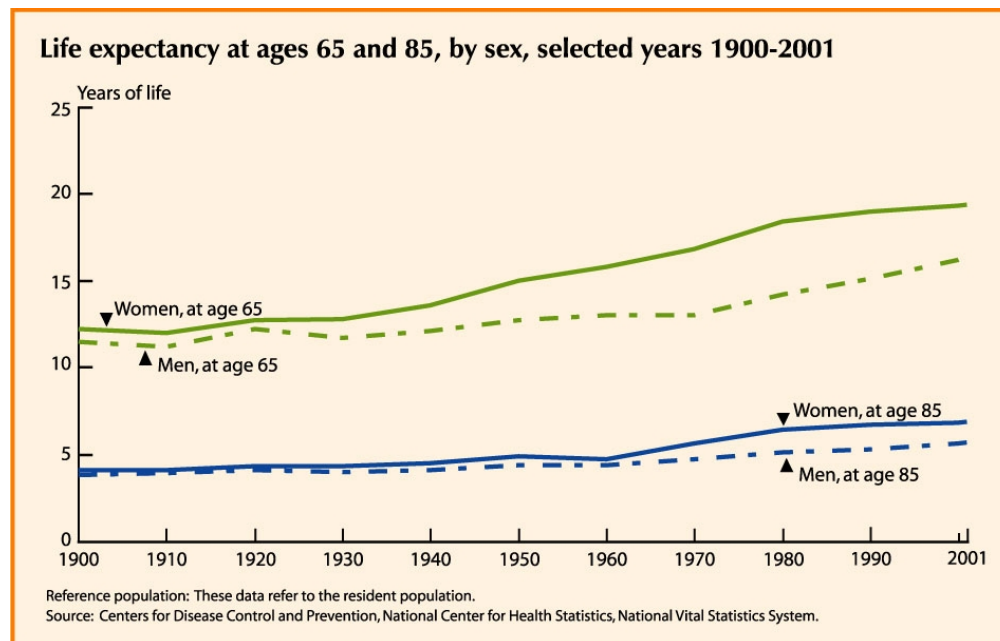


Figure 5: Life Expectancy of Men and Women in the Last Century

Sources: Centers for Disease Control and Prevention, National Center for Health Statistics, National Vital Statistics System.

Popular literature is full of information about the aging population. One study reported that 46% of the population aged 65 and over have either limited or severe disabilities.³

According to the Census Bureau, the number of Americans aged 65 and older is projected to increase 135% between 1995 and 2050. As the over-65 population increases, so does the prevalence of disability inducing disease. Loss of hearing, whether due to aging, genetic, or accidental causes is a disability. Inability to climb steps, whether caused by a stroke, broken hip, or childhood polio is a disability. By this measure, it is likely that most people will have some disabling condition if they live long enough.

The design professional, then, has a responsibility to consider the entire life span of the individual. Disability is a normal condition of life that should be taken into account in the design of lifelong communities, including housing. Designs based on a “no market” assumption will often become a self-fulfilling prophecy as people with disabilities are unable to visit inaccessible housing and businesses.³ In order for older adults to remain in the community, they must have housing choices and alternatives to the car; they must be able to become and stay active, and they need access to basic services and preventive healthcare.⁴⁰

Independence can be sustained and perhaps extended with Universal Design.³⁴ The obvious example is Aging in Place, which can be facilitated by universally designed homes and communities.⁴¹ Aging in Place supports the notion that older persons should be able to maintain a desirable lifestyle by participating in their communities, remaining independent as their health allows, having access to educational, cultural, and recreational facilities, feeling safe, and living in an inter-generational environment. This is especially true of low- to moderate-income older persons whose financial constraints limit their choices to move out of their current dwellings into exclusive retirement communities.⁴¹

When compared to financial and natural resources, human ability is arguably the most precious resource of all. Human ability is enabled, supported and encouraged by a universally designed environment that gives everyone the opportunity to participate with a minimum of outside support. Just as we must conserve our natural resources, we must also conserve our human resources. It is a waste of human potential to create environments that demand dependence when a simple change in the design of the path, space or element could allow independent use. Like “green design”, universal design must be an integral part of design programming and the imaginative design process. It cannot be left as an add-on in a minimal compliance mode. As we struggle to make the most of limited resources, the value of universal design as a tool to conserve human resources will become increasingly apparent, and its relationship to the broader goal of sustainability will become clear.⁴²

2.4 Land Conservation and Proximity to Community Resources

The U.S. Census Bureau reports that as population continues to expand rapidly, consumption of land grows exponentially, three times the rate of population growth. At this breathtaking pace, two-thirds of the development on the ground in 2050 will be built between now and then.⁴³ The way communities grow, along with how and where they grow will have a profound effect on the planet and on people. Land use and neighborhood design patterns create a particular physical reality and compel behaviors that have a significant effect on the environmental performance of a given place. Segregated land uses accessed by high-speed roadways that necessitate the use of cars have been the predominant development pattern over

the past 50 years.⁴⁴ In the United States, transportation accounts for roughly one-third of greenhouse gas emissions, a large portion of which can be attributed to personal automobile use. Burning fossil fuels for transportation increases air pollution and related respiratory diseases.⁴⁵ Automobile-oriented neighborhoods tend to be hostile to pedestrians and non-supporting of traditional mixed-use neighborhood centers.⁴⁶ Sprawling development patterns fragment habitat, endanger sensitive land and water bodies, destroy precious farmland, and increase the burden on municipal infrastructure.⁴⁷

In contrast, by placing residences and jobs proximate to each other, thoughtful neighborhood planning and development can limit automobile trips and the associated greenhouse gas emissions. Mixed-use development and walk-able streets encourage walking, bicycling, and public transportation for daily errands and commuting.⁴⁸ Compact building design supports wider transportation choices, and provides cost savings for localities.⁴⁹ Communities seeking to encourage transit use to reduce air pollution and congestion recognize that minimum levels of density are required to make public transit networks viable.⁵⁰ Local governments find that on a per-unit basis, it is cheaper to provide and maintain services like water, sewer, electricity, phone service and other utilities in more compact neighborhoods than in dispersed communities.⁵¹

Environmentally responsible buildings and infrastructure are an important component of any sustainable community, further reducing greenhouse gas emissions by decreasing energy consumption. Green buildings and infrastructure also lessen negative consequences for water resources, air quality, and natural resource consumption. Green neighborhood developments are

beneficial to the community and the individual as well as the environment.⁵¹ The character of a community, including its streets, homes, workplaces, shops, and public spaces, significantly affects the quality of life.⁵² Green neighborhood developments enable a wide variety of residents to be part of the community by including housing of varying types and price ranges.⁵³ Green developments respect historical resources and the existing community fabric; they preserve open space and encourage access to parks.⁵⁴ Green buildings, community gardens, and streets and public spaces that encourage physical activity are beneficial for public health.⁵⁵ Combine the substantial environmental and social benefits and the case for sustainable communities makes itself.

2.5 Existing Models for Community Design

Over the past decade, building owners, architects, urban designers, and planners have increasingly come to recognize the importance of creating environments that 1) encourage physical activity, 2) are sustainable and 3) are universally accessible. Changes in practice have been fostered both by market-based initiatives like LEED (US Green Building Council) and Universal Design, as well as legal mandates such as the Americans with Disabilities Act. Part of the success of these movements has derived from their ability to demonstrate to building owners the multiple benefits, both human and financial, of applying specific design strategies. Short-term incremental costs are often offset by long-term energy savings, increased productivity, enhanced egress and fire safety, reduced long-term health care costs, quality-of-life benefits, and

a healthier community.⁵⁶ Thus an active, sustainable and universally accessible built environment goes hand in hand with a healthy and diverse population.

As the field of universal design matures and expands, many are turning their attention to the broader issue of neighborhood, community and urban design. Those who live in rural areas or even typical suburban settings (even in well designed homes) can be isolated within their neighborhoods and communities for several reasons: 1) because few other homes in the area are accessible, 2) because car use may not be possible yet travel to any or all destinations require the use of a car, or 3) because the neighborhood itself lacks safe places to walk or roll.⁵⁷

2.5.1 New Urbanism and Traditional Neighborhood Design

New Urbanism is a design movement, which promotes walk-able neighborhoods that contain a range of housing and job types.⁵⁸ It arose in the United States in the early 1980s and continues to reform many aspects of real estate development and urban planning.⁷ New Urbanism is strongly influenced by urban design standards prominent before the rise of the automobile and encompasses principles such as Traditional Neighborhood Design (TND) and Transit-Oriented Development (TOD).⁵⁹ The organizing body for New Urbanism is the Congress for the New Urbanism, founded in 1993. Its foundational text is the Charter of the New Urbanism. There are 27 core design principles outlined in this charter that provide definition and structure for planning and designing the modern city.⁶⁰

The first nine principles define the “*The region: metropolis, city, and town.*”

1. Metropolitan regions are finite places with geographic boundaries derived from topography, water sheds, coastlines, farmlands, regional parks, and river basins. The metropolis is made of multiple centers that are cities, towns, and villages, each with its own identifiable center and edges.
2. The metropolitan region is a fundamental economic unit of the contemporary world. Governmental cooperation, public policy, physical planning, and economic strategies must reflect this new reality.
3. The metropolis has a necessary and fragile relationship to its agrarian hinterland and natural landscapes. The relationship is environmental, economic, and cultural. Farm land and nature are as important to the metropolis as the garden is to the house.
4. Development patterns should not blur or eradicate the edges of the metropolis. Infill development within existing urban areas conserves environmental resources, economic investment, and social fabric, while reclaiming marginal and abandoned areas. Metropolitan regions should develop strategies to encourage such infill development over peripheral expansion.
5. Where appropriate, new development contiguous to urban boundaries should be organized as neighborhoods and districts, and be integrated with the existing urban pattern. Non-contiguous development should be organized as towns and villages with their own urban edges, and planned for a jobs/housing balance, not as bedroom suburbs.
6. The development and redevelopment of towns and cities should respect historical patterns, precedents, and boundaries.

7. Cities and towns should bring into proximity a broad spectrum of public and private uses to support a regional economy that benefits people of all incomes. Affordable housing should be distributed throughout the region to match job opportunities and to avoid concentrations of poverty.
8. The physical organization of the region should be supported by a framework of transportation alternatives. Transit, pedestrian, and bicycle systems should maximize access and mobility throughout the region while reducing dependence upon the automobile.
9. Revenues and resources can be shared more cooperatively among the municipalities and centers within regions to avoid destructive competition for tax base and to promote rational coordination of transportation, recreation, public services, housing, and community institutions.

The next set of principles define the “*The neighborhood, the district, and the corridor*”

10. The neighborhood, the district, and the corridor are the essential elements of development and redevelopment in the metropolis. They form identifiable areas that encourage citizens to take responsibility for their maintenance and evolution.
11. Neighborhoods should be compact, pedestrian-friendly, and mixed-use. Districts generally emphasize a special single use, and should follow the principles of neighborhood design when possible. Corridors are regional connectors of neighborhoods and districts; they range from boulevards and rail lines to rivers and parkways.

12. Many activities of daily living should occur within walking distance, allowing in dependence to those who do not drive, especially the elderly and the young. Interconnected networks of streets should be designed to encourage walking, reduce the number and length of automobile trips, and conserve energy.
13. Within neighborhoods, a broad range of housing types and price levels can bring people of diverse ages, races, and incomes into daily interaction, strengthening the personal and civic bonds essential to an authentic community.
14. Transit corridors, when properly planned and coordinated, can help organize metropolitan structure and revitalize urban centers. In contrast, highway corridors should not displace investment from existing centers.
15. Appropriate building densities and land uses should be within walking distance of transit stops, permitting public transit to become a viable alternative to the automobile.
16. Concentrations of civic, institutional, and commercial activity should be embedded in neighborhoods and districts, not isolated in remote, single-use complexes. Schools should be sized and located to enable children to walk or bicycle to them.
17. The economic health and harmonious evolution of neighborhoods, districts, and corridors can be improved through graphic urban design codes that serve as predictable guides for change.
18. A range of parks, from tot-lots and village greens to ball fields and community gardens, should be distributed within neighborhoods. Conservation areas and open lands should be used to define and connect different neighborhoods and districts.

The last nine principles define the “*The block, the street, and the building*”

19. A primary task of all urban architecture and landscape design is the physical definition of streets and public spaces as places of shared use.
20. Individual architectural projects should be seamlessly linked to their surroundings. This issue transcends style.
21. The revitalization of urban places depends on safety and security. The design of streets and buildings should reinforce safe environments, but not at the expense of accessibility and openness.
22. In the contemporary metropolis, development must adequately accommodate automobiles. It should do so in ways that respect the pedestrian and the form of public space.
23. Streets and squares should be safe, comfortable, and interesting to the pedestrian. Properly configured, they encourage walking and enable neighbors to know each other and protect their communities.
24. Architecture and landscape design should grow from local climate, topography, history, and building practice.
25. Civic buildings and public gathering places require important sites to reinforce community identity and the culture of democracy. They deserve distinctive form, because their role is different from that of other buildings and places that constitute the fabric of the city.

26. All buildings should provide their inhabitants with a clear sense of location, weather and time. Natural methods of heating and cooling can be more resource-efficient than mechanical systems.

27. Preservation and renewal of historic buildings, districts, and landscapes affirm the continuity and evolution of urban society.

New Urbanist Communities are often described as being transit-oriented, pedestrian friendly and senior friendly. This is partly due to the mobility options possible with higher-density and mixed-use development patterns.⁵⁷ Pedestrian mobility in New Urbanist Communities are commonly designed where the origin and destination of people's trips are closer to one another.⁶¹ However this model may fall short in meeting the mobility needs of various individuals without constraining them inside the community.⁶² Another shortcoming of the design of some New Urbanist Communities is that they do not often create nearby housing opportunities for empty nesters⁶² or appropriately allocate land use to provide community services for seniors or people with various physical abilities. Thus in order to incorporate these factors into the design of the community greater attention must be given to the elements within the public domain. More focus is needed on public transportation, sidewalks and streets to make them safer and easier for older people, families with children and baby carriages, and people with disabilities who may have special needs when interacting with the pedestrian environment.⁶³



Figure 6: This typical New Urbanist mixed use development brings residential, retail, and office uses into close proximity. The apartments over the stores are accessed via elevators.

However challenging the solutions might be, surveys of numerous TND projects, indicate that achievable universal design changes are necessary. Solutions range from improved transport and access for non-drivers with varied physical abilities to increased traffic safety due to narrower streets and slower traffic and use of traffic calming devices.⁶⁴ With a little foresight, creativity, and design experimentation, New Urbanist designers could achieve Universal Design outcomes.⁵⁷

2.5.2 Smart Growth

In many U.S. Communities there is a growing concern that current trends in development, dominated by sprawl, are not beneficial for the long-term interest of our cities, existing suburbs, small towns, rural communities, or wilderness areas. While growth is

important, communities raise questions regarding the economic costs of abandoning infrastructure in the city, only to rebuild it further out. Thus Smart Growth is a movement that is spurred by demographic shifts, a strong environmental ethic, increased fiscal concerns, and more refined views of growth. The result is both a new demand and a new opportunity for Smart Growth.⁵

The features that distinguish Smart Growth in a community may vary from place to place. However, in general, Smart Growth invests time, attention, and resources in restoring community and vitality to center cities and older suburbs. New Smart Growth is more town-centered, is transit and pedestrian oriented, and has a greater mix of housing, commercial and retail uses. It also preserves open space and many other environmental amenities.

Smart Growth communities are designed around the following ten principles:

1. Create Range of Housing Opportunities and Choices

Providing quality housing for people of all income levels is an integral component in any Smart Growth strategy. Housing is a critical part of the way communities grow, as it is constitutes a significant share of new construction and development. More importantly, however, is also a key factor in determining households' access to transportation, commuting patterns, access to services and education, and consumption of energy and other natural resources. By using Smart Growth approaches to create a wider range of housing choices, communities can mitigate the environmental costs of auto-dependent development, use their infrastructure resources more efficiently, ensure a better jobs-housing balance, and generate a strong foundation of support for neighborhood transit stops, commercial centers, and other services.

No single type of housing can serve the varied needs of today's diverse households. Smart Growth represents an opportunity for local communities to increase housing choice not only by modifying their land use patterns on newly-developed land, but also by increasing housing supply in existing neighborhoods and on land served by existing infrastructure. Integrating single- and multi-family structures in new housing developments can support a more diverse population and allow more equitable distribution of households of all income levels across the region. The addition of units -- through attached housing, accessory units, or conversion to multi-family dwellings -- to existing neighborhoods creates opportunities for communities to slowly increase density without radically changing the landscape. New housing construction can be an economic stimulus for existing commercial centers that are currently vibrant during the work day, but suffer from a lack of foot traffic and consumers in evenings or weekends. Most importantly, providing a range of housing choices allow all households to find their niche in a Smart Growth community -- whether it is a garden apartment, a row-house, or a traditional suburban home -- and accommodate growth at the same time.

2. Create Walk-able Neighborhoods

Walk-able communities are desirable places to live, work, learn, worship and play, and therefore a key component of Smart Growth. Their desirability comes from two factors. First, walk-able communities locate within an easy and safe walk goods (such as housing, offices, and retail) and services (such as transportation, schools, libraries) that a community resident or employee needs on a regular basis. Second, by definition, walk-able communities make pedestrian activity possible, thus expanding transportation options, and creating a streetscape that

better serves a range of users -- pedestrians, bicyclists, transit riders, and automobiles. To foster walk-ability, communities must mix land uses and build compactly, and ensure safe and inviting pedestrian corridors.

Walk-able communities have actually been around for a while. Over the last half-century, communities worldwide have created neighborhoods, communities, towns and cities premised on pedestrian access. Within the last fifty years public and private actions often present created obstacles to walk-able communities. Conventional land use regulation often prohibits the mixing of land uses, thus lengthening trips and making walking a less viable alternative to other forms of travel. This regulatory bias against mixed-use development is reinforced by private financing policies that view mixed-use development as riskier than single-use development. Many communities -- particularly those that are dispersed and largely auto-dependent -- employ street and development design practices that reduce pedestrian activity.

As the personal and societal benefits of pedestrian friendly communities are realized -- benefits which include lower transportation costs, greater social interaction, improved personal and environmental health, and expanded consumer choice -- many are calling upon the public and private sector to facilitate the development of walk-able places. Land use and community design plays a pivotal role in encouraging pedestrian environments. By building places with multiple destinations within close proximity, where the streets and sidewalks balance all forms of transportation, communities have the basic framework for encouraging walk-ability.

3. *Encourage Community and Stakeholder Collaboration*

Growth can create great places to live, work and play -- if it responds to a community's own sense of how and where it wants to grow. Communities have different needs and will emphasize some Smart Growth principles over others: those with robust economic growth may need to improve housing choices; others that have suffered from disinvestment may emphasize infill development; newer communities with separated uses may be looking for the sense of place provided by mixed-use town centers; and still others with poor air quality may seek relief by offering transportation choices. The common thread among all, however, is that the needs of every community and the programs to address them are best defined by the people who live and work there.

Citizen participation can be time-consuming, frustrating and expensive, but encouraging community and stakeholder collaboration can lead to creative, speedy resolution of development issues and greater community understanding of the importance of good planning and investment. Smart Growth plans and policies developed without strong citizen involvement will at best not have staying power; at worst, they will be used to create unhealthy, undesirable communities. When people feel left out of important decisions, they will be less likely to become engaged when tough decisions need to be made. Involving the community early and often in the planning process vastly improves public support for Smart Growth and often leads to innovative strategies that fit the unique needs of each community.

4. Foster Distinctive, Attractive Communities with a Strong Sense of Place

Smart Growth encourages communities to craft a vision and set standards for development and construction which respond to community values of architectural beauty and

distinctiveness, as well as expanded choices in housing and transportation. It seeks to create interesting, unique communities which reflect the values and cultures of the people who reside there, and foster the types of physical environments which support a more cohesive community fabric. Smart Growth promotes development which uses natural and man-made boundaries and landmarks to create a sense of defined neighborhoods, towns, and regions. It encourages the construction and preservation of buildings which prove to be assets to a community over time, not only because of the services provided within, but because of the unique contribution they make on the outside to the look and feel of a city.

Guided by a vision of how and where to grow, communities are able to identify and utilize opportunities to make new development conform to their standards of distinctiveness and beauty. Contrary to the current mode of development, Smart Growth ensures that the value of infill and green-field development is determined as much by their accessibility (by car or other means) as their physical orientation to and relationship with other buildings and open space. By creating high-quality communities with architectural and natural elements that reflect the interests of all residents, there is a greater likelihood that buildings (and therefore entire neighborhoods) will retain their economic vitality and value over time. In so doing, the infrastructure and natural resources used to create these areas will provide residents with a distinctive and beautiful place that they can call “home” for generations to come.

5. *Make Development Decisions Predictable, Fair and Cost Effective*

For a community to be successful in implementing Smart Growth, it must be embraced by the private sector. Only private capital markets can supply the large amounts of money

needed to meet the growing demand for Smart Growth developments. If investors, bankers, developers, builders and others do not earn a profit, few Smart Growth projects will be built. Fortunately, government can help make Smart Growth profitable to private investors and developers. Since the development industry is highly regulated, the value of property and the desirability of a place is largely affected by government investment in infrastructure and government regulation. Governments that make the right infrastructure and regulatory decisions will create fair, predictable and cost effective Smart Growth.

Despite regulatory and financial barriers, developers have been successful in creating examples of Smart Growth. The process to do so, however, requires them to get variances to the codes – often a time-consuming, and therefore costly, requirement. Expediting the approval process is of particular importance for developers, for whom the common mantra, “time is money” very aptly applies. The longer it takes to get approval for building, the longer the developer’s capital remains tied up in the land and not earning income. For Smart Growth to flourish, state and local governments must make an effort to make development decisions about Smart Growth more timely, cost-effective, and predictable for developers. By creating a fertile environment for innovative, pedestrian-oriented, mixed-use projects, government can provide leadership for Smart Growth that the private sector is sure to support.

6. *Mix Land Uses*

Smart Growth supports the integration of mixed land uses into communities as a critical component of achieving better places to live. By putting uses in close proximity to one another, alternatives to driving, such as walking or biking, once again become viable. Mixing land uses

also provides a more diverse and sizable population and commercial base for supporting viable public transit. It can enhance the vitality and perceived security of an area by increasing the number and attitude of people on the street. It helps streets; public spaces and pedestrian-oriented retail again become places where people meet, attracting pedestrians back onto the street and helping to revitalize community life.

Mixed land uses can convey substantial fiscal and economic benefits. Commercial uses in close proximity to residential areas are often reflected in higher property values, and therefore help raise local tax receipts. Businesses recognize the benefits associated with areas able to attract more people, as there is increased economic activity when there are more people in an area to shop. In today's service economy, communities find that by mixing land uses, they make their neighborhoods attractive to workers who increasingly balance quality of life criteria with salary to determine where they will settle. Smart Growth provides a means for communities to alter the planning context which currently renders mixed land uses illegal in most of the country.

7. Preserve Open Space, Farmland, Natural Beauty and Critical Environmental Areas

Smart Growth uses the term “open space” broadly to mean natural areas both in and surrounding localities that provide important community space, habitat for plants and animals, recreational opportunities, farm and ranch land (working lands), places of natural beauty and critical environmental areas (e.g. wetlands). Open space preservation supports Smart Growth goals by bolstering local economies, preserving critical environmental areas, improving communities’ quality of life, and guiding new growth into existing communities.

There is growing political will to save the "open spaces" that Americans treasure. Voters in 2000 overwhelmingly approved ballot measures to fund open space protection efforts. The reasons for such support are varied and attributable to the benefits associated with open space protection. Protection of open space provides many fiscal benefits, including increasing local property value (thereby increasing property tax bases), providing tourism dollars, and decreases local tax increases (due to the savings of reducing the construction of new infrastructure). Management of the quality and supply of open space also ensures that prime farm and ranch lands are available, prevents flood damage, and provides a less expensive and natural alternative for providing clean drinking water.

The availability of open space also provides significant environmental quality and health benefits. Open space protects animal and plant habitat, places of natural beauty, and working lands by removing the development pressure and redirecting new growth to existing communities. Additionally, preservation of open space benefits the environment by combating air pollution, attenuating noise, controlling wind, providing erosion control, and moderating temperatures. Open space also protects surface and ground water resources by filtering trash, debris, and chemical pollutants before they enter a water system.

8. *Provide a Variety of Transportation Choices*

Providing people with more choices in housing, shopping, communities, and transportation is a key aim of Smart Growth. Communities are increasingly seeking these choices -- particularly a wider range of transportation options -- in an effort to improve beleaguered transportation systems. Traffic congestion is worsening across the country. Where in 1982 65

percent of travel occurred in un-congested conditions, by 1997 only 36 percent of peak travel occurred did so. In fact, according to the Texas Transportation Institute, congestion over the last several years has worsened in nearly every major metropolitan area in the United States.

In response, communities are beginning to implement new approaches to transportation planning, such as better coordinating land use and transportation; increasing the availability of high quality transit service; creating redundancy, resiliency and connectivity within their road networks; and ensuring connectivity between pedestrian, bike, transit, and road facilities. In short, they are coupling a multi-modal approach to transportation with supportive development patterns, to create a variety of transportation options.

Smart Growth directly addresses the transportation problems facing large populations of aging Americans in suburban and rural areas. These car-dependent communities increasingly restrict people who make fewer and fewer car trips as they age, effectively becoming trapped in their homes and neighborhoods (AARP 2005). Many older drivers may continue driving longer than they should—potentially endangering themselves and others. Some older drivers are then faced with two bad choices: stay at home or drive when they should not. The dispersed spatial development patterns that are so problematic for transit options that do not involve a car and that result in travel restrictions on older residents produce similar problems for children, people who temporarily or permanently are unable to drive, or those without access to cars for others reasons. As with our other examples, Smart Growth promotes higher densities, mixed uses, public transit, walking, and other non-motorized transportation possibilities—all of which work well for people with disabilities and seniors.

9. *Strengthen and Direct Development Towards Existing Communities*

Smart Growth directs development towards existing communities already served by infrastructure, seeking to utilize the resources that existing neighborhoods offer, and conserve open space and irreplaceable natural resources on the urban fringe. Development in existing neighborhoods also represents an approach to growth that can be more cost-effective, and improves the quality of life for its residents. By encouraging development in existing communities, communities benefit from a stronger tax base, closer proximity of a range of jobs and services, increased efficiency of already developed land and infrastructure, a reduced development pressure in edge areas thereby preserving more open space, and, in some cases, strengthening rural communities.

The ease of green-field development remains an obstacle to encouraging more development in existing neighborhoods. Development on the fringe remains attractive to developers for its ease of access and construction, lower land costs, and potential for developers to assemble larger parcels. Typical zoning requirements in fringe areas are often easier to comply with, as there are often few existing building types that new construction must complement, and a relative absence of residents who may object to the inconvenience or disruption caused by new construction.

Nevertheless, developers and communities are recognizing the opportunities presented by infill development, as suggested not only by demographic shifts, but also in response to a growing awareness of the fiscal, environmental, and social costs of development focused disproportionately on the urban fringe. Journals that track real estate trends routinely cite the

investment appeal of the “24-hour city” for empty nesters, young professionals, and others, and developers are beginning to respond. A 2001 report by Urban Land Institute on urban infill housing states that, in 1999, the increase in housing permit activity in cities relative to average annual figures from the preceding decade exceeded that of the suburbs, indicating that infill development is possible and profitable.

10. Take Advantage of Compact Building Design

Smart Growth provides a means for communities to incorporate more compact building design as an alternative to conventional, land consumptive development. Compact building design suggests that communities be designed in a way which permits more open space to be preserved, and that buildings can be constructed which make more efficient use of land and resources. By encouraging buildings to grow vertically rather than horizontally, and by incorporating structured rather than surface parking, for example, communities can reduce the footprint of new construction, and preserve more green space. Not only is this approach more efficient by requiring less land for construction. It also provides and protects more open, undeveloped land that would exist otherwise to absorb and filter rain water, reduce flooding and storm water drainage needs, and lower the amount of pollution washing into our streams, rivers and lakes.

2.5.3 Active Design

Active Design is grounded in the idea that the design of the built environment can have a crucial and positive influence on improving public health.⁵⁶ This notion is aptly demonstrated in

the history of New York City, where public health officials have used environmental design strategies to help combat disease since the 19th century.⁶⁵ Just as architecture and urban design were crucial to defeating epidemics like cholera and tuberculosis⁵⁶ in the past, environmental design will be an essential tool in combating the most pressing public health problem of our time, obesity, and its related chronic diseases.⁶⁶

Active design not only enhances public health but can also reinforce the goals of environmental sustainability and Universal Design. Design strategies that increase physical activity and improve health, for example, measures that promote walking and cycling over driving, stair over elevator and escalator use, and active recreation over television watching, also tend to reduce energy consumption and greenhouse gas emissions. Strategies that increase healthy eating, such as the promotion of local farmers' markets and installation of tap water drinking fountains, can also help decrease food transportation costs and reduce waste from beverage containers.

In addition, active design targets not only people able to climb stairs daily but users of all abilities, ages, and backgrounds. Building features like ramps contribute to an inclusive, universal environment while providing a non-mechanized means of vertical transport, thereby encouraging physical activity and saving energy. As these examples illustrate, a diverse, active, healthy population and a sustainable planet are synergistic. Design professionals should therefore look for points of overlap and symbiosis among active, sustainable, and universal design strategies in order to maximize the performance of their designs.

Additionally, some active design principles that might appear at first glance to be inconsistent with Universal Design. For example an emphasis on stair over elevator use can actually be complementary. Slowing down elevator door closing speeds, for example, may make elevators more usable for those with disabilities while acting as an incentive for able-bodied building occupants to use the stairs.⁵⁶ Increasing general utilization of stairs can free up elevator space for use by those with physical challenges. Widening stairs, having fewer steps per flight, and providing intermittent landings between floors also makes the use of stairs more feasible and comfortable for those who have some physical challenges, such as the elders as well as those carrying packages.



Figure 7: Photo depicting features like lighting, benches, and drinking fountains along pathways as a shared strategy of active living and universal design.

Source: GreenBranches Learning Garden, Queens Library Whitestone Branch, Queens, Horticultural Society of New York and Marpillero Pollak Architects

2.6 Transportation and Mobility

The ability to participate in community life depends on the ability to travel independently. Virtually every activity that requires people to venture outside of their homes requires the use of pedestrian travel paths, such as sidewalks and trails. People with and without impairments use a variety of methods to travel within their communities. Some people are fit and athletic, others less so. Some people rely primarily on automobiles for travel within their community, while others walk extensively, bicycle, or utilize public transportation. Most people are very familiar and comfortable with the “rules” and expectations for traveling within their community³⁶ while others may have difficulty understanding or following expected travel patterns. Children and older adults have different physical and cognitive abilities than young adults.⁶⁷ People with disabilities often utilize different methods, skills, and abilities than those generally used by people without disabilities. In these and many other ways, each individual is unique.

2.6.1 Factors that Influence Pedestrian Mobility

It is critical to ensure that sidewalks and other pedestrian pathways have appropriate width, surface, separation from motor vehicle traffic, lighting, and signage along roadways. The range of abilities among our population is also reflected in the wide variety of factors that affect the use of sidewalks and trails. Whether a particular individual, or group of individuals, can safely and effectively access a sidewalk or trail will depend on a large number of functions, such

as: Agility, Balance, Cognition, Coordination, Endurance, Flexibility, Hearing, Problem solving, Required behavior(s), Sensory processing capacity, Strength, Vision, and Walking speed.³⁶

Among any group of individuals, there will be a wide range of abilities for each of the functions that affect the usability of the sidewalk or trail. For example, vision is often required to identify signs or directional information that enhance the safety of pedestrians. Vision abilities range along a continuum from 20/20 vision to no vision. Pedestrians using sidewalks and trails may have visual abilities at any point along the continuum. The greater the range of visual abilities that can be accommodated in sidewalk or trail designs, the larger the proportion of people who will be able to safely and effectively travel on the sidewalk or trail. Therefore, it is essential that sidewalk design parameters meet the needs of all potential users across the full spectrum of abilities.

2.6.2 Benefits of the Universal Design of Sidewalks and Trails

According to the FHWA, the goal of sidewalk and trail design and construction is to ameliorate the constraints within the natural environment and to avoid constraints in the constructed environment to enable effective pedestrian travel. This guidance suggests that sidewalk and trail developers: Ensure that the environments that they design and construct do not create activity or participation limitations; and Minimize the activity or participation limitations that result from existing natural conditions.³⁶ Through a Universal Design approach activity and participation limitations can be minimized and the barriers within the constructed environment can be eliminated.

2.6.3 Public Transportation Factors

Creating safer places for pedestrians to travel along roadways can encourage more people to use transit systems. However the location and design of transit stops can significantly impact the safety and comfort of pedestrians accessing transit services. There are several considerations that are important to the location and design features of public transit stops.

Location of Transit Stops

Location can impact the convenience and safety of pedestrians accessing transit. Transit stops should be provided in locations with the safest and most convenient pedestrian access possible.³⁶ In some areas, the best transit stop location may be on private property (e.g., in a shopping mall parking lot) which may require a formal agreement between the transit agency and the property owner. The site of a transit stop should be selected considering a number of factors, including:³⁶

- *Sight lines between approaching vehicles and passenger waiting and loading areas*

Drivers and passengers waiting at stops should be able to see each other easily to ensure drivers have sufficient time to stop for waiting passengers. Similarly, passengers waiting for a transit should have a clear view of approaching vehicles so that they do not step into the roadway in front of an approaching vehicle.

- *Predominant pedestrian patterns along the roadway and at nearby intersections*

Transit stops should be positioned in locations that serve the highest numbers of pedestrians, minimize total walking distance, and reduce the number of roadway crossings for pedestrians.

- *Proximity to destinations in the surrounding area*

Transit stops should be located to reduce walking distance to key destinations. Where possible, stops serving major pedestrian generators should be located on the same side of an intersection as the destination so pedestrians do not need to cross additional streets to access the stop.

- *Ease of transfers to other bus routes*

Stops where pedestrians frequently transfer between different transit routes should be located on the same side of intersections.

- *Locations of traffic signals and other crossing facilities*

Transit stops should be located close to adequate crossing facilities to encourage pedestrians to use crossing and reduce jaywalking.

- *Locations of sidewalks and other pathways that provide access to the stop*

Transit stops should be located to take advantage of existing sidewalk and pathway infrastructure and to avoid dropping passengers off where they must walk in the roadway, on embankments, or in dirt, grass, or mud.

- *Location of access driveways*

Transit stops next to driveways can block vehicular circulation, inconvenience business owners or motorists using the driveway, and require passengers to wait in a driveway for the vehicle, elevating the potential for pedestrian/vehicle conflicts.

- *Impacts of the transit stop on other transportation modes*

Transit stop locations can impact motor vehicle, bicycle, and other users of the roadway. The needs of these other modes should be considered and balanced with the goals of optimizing service efficiency and providing safe and convenient pedestrian access.⁵⁰

Transit Stop Design

Transit stop design is more than just putting up a sign or a shelter. Many features and amenities are available to improve a passenger's experience by creating a pleasant and safe environment to wait. Transit stops should be designed to make boarding and alighting easy and safe for passengers of all abilities.

Loading Zones

There are a number of options for the configuration of on-street loading zone areas. The most common configuration is the location of stops at the curbside, (typically) adjacent to a sidewalk. Transit stops can also be located at curb extensions. Locating stops at curb extensions allows transit passengers to wait in the extension area, out of the main pedestrian flow on the sidewalk. Another option is for buses to stop in bus bays, out of the flow of traffic on the roadway. However, this may require the sidewalk to curve around the bus bay, reducing the buffer area between vehicles and pedestrians, and providing less space for signs, benches, shelters, and other amenities.

Landing Pad

A transit stop landing pad must have a firm, stable surface that is free of obstructions. It must have a minimum length of eight feet (from the curb or roadway edge) and a minimum width of five feet (in the direction parallel to the roadway).⁵³ It must also be connected to the

adjacent sidewalk network. In addition to satisfying ADA guidelines, properly designed landing pads create a safe place for pedestrians to wait away from grass, mud, and traffic.

Shelters and Other Pedestrian Waiting Facilities

A pleasant waiting area can improve a passenger's experience and increase transit usage. A wide range of passenger amenities can be installed at transit stops including shelters, seating and trash cans. Amenities at each stop should be selected based on the volume and needs of the pedestrians in the area. Seating and shelters are most often installed at stops with high volumes. Seating is also important at stops near hospitals and senior centers where passengers are less able to walk or stand for long periods of time.

Shelters can potentially cause safety problems if not properly designed. Well-designed shelters should have the following characteristics:

- Drivers should have a clear sight line to the Transit stop or shelter, so that they have sufficient time to see and stop for passengers.
- Passengers waiting at the Transit stop and in the shelter should have sufficient time to see and hail the bus, especially at Transit stops serving more than one route.
- Shelters should be transparent and well lit.

Identification and Way-finding Signs

Signage can be useful for pedestrians accessing transit stops and stations by clearly identifying routes and destinations. Pedestrians who know where they are going are less likely to be distracted and better able to focus on their personal safety while walking. Two common types of signs are identification (i.e., Transit stop and transit stop sign posts) and way-finding (i.e.,

maps and direction) signs. Identification signs should be provided at all stops and stations and they should be recognizable signs that are visible to both pedestrians and transit drivers.⁵⁷

These identification signs may also provide schedules and other information about the transit routes that serve the particular stop or station. At stations with high passenger volumes, it may be appropriate to provide signs that display real-time information about bus/train arrival times. Way-finding signs are important for providing pedestrians with directions to local destinations and information about points of interest in the area. Both maps and signposts can provide way-finding information. A transit agency may coordinate with local jurisdictions on the design, content, and installation of way-finding signs that serve a certain area, such as directional signage in a historic district.

The FHWA recommends³⁶ that signage be available and accessible to all potential passengers including those with visual impairments (through the use of audio or tactile signage) and those who cannot read English (through the use of pictogram, graphics and text in other languages).

Security at Transit Stops

Pedestrian security is a major concern at public transit stops. If passengers do not feel safe at transit stops, they will be much less likely to use transit. Several methods have been used to improve the security of transit stops and stations, including providing:

- Clear sight lines into and out of waiting areas (including shelters).
- Well lit waiting areas.
- Landscaping that does not create dead-ends or hiding places.

- Emergency call boxes.
- Video camera surveillance.
- Increased police presence.

2.7 Summary of Key Findings

Analysis of these key areas of research and background literature led to several discoveries related to the development of Universal Design Standards for lifelong communities. The first observation is that Universal Design standards must encourage healthy living for people of all ages by increasing pedestrian mobility and accessibility to parks, recreational facilities and health services and encouraging the use of mobility features within the public domain. Secondly, given the growing population of people with disabilities, it is essential for design professionals to consider the environmental barriers that might prevent people with disabilities from social interaction and involvement within the community. Removal of these barriers thus becomes an essential focal point in the design of the community mobility features.

The ability for elders to age in place and remain in the community for a lifetime is inherent in the idea Social Sustainability and is another key driver in the determination of appropriate community design standards. This research suggests that the unique needs of this growing demographic should be considered within the design of communities. This type of thought and planning goes hand in hand with land use designation and proximity of residential dwellings to the critical services and businesses essential to every member of the community.

Upon review of existing models for community design it is apparent that there is a need for further specificity for the inclusion of people with disabilities and aging seniors. Aspects of these design models prove to be helpful for establishing baseline guidelines for community design, but should be adapted to support the principle objectives of Universal Design.

One of the most critical factors to “living outside the box” is the design of transportation and mobility features within the community. The literature asserts the need for Universal Design of transportation facilities that are conveniently located, are safe and accessible for all potential users. Understanding the impact of these essential factors on community design help to guide the development of practical and usable standards that support the specific aims of this research.

CHAPTER 3

METHODOLOGY

How were Lifelong Community Universal Design Standards Developed?

3.1 Study Approach

In order to ensure that the Lifelong Community Universal Design Standards are effective and useful to various interest groups across the disciplines of architecture, planning and urban design and transportation this study employed the use of multiple research methods. The first phase of this investigation was to research design practices and strategies that enable or disable mobility, active living and sustainability in the context of a lifelong community. This phase included analysis of key research and studies that described the necessity and marketability of and technical features inherent in a Universally Designed Lifelong Community.

The second phase was to conduct a literature review of several design standards that are currently being developed and/or implemented throughout the country to promote the ideals of New Urbanism, Sustainable Design, Active Living, Smart Growth and Pedestrian-friendly communities. These sources were analyzed under the lens of Universal Design principles that helped to establish the appropriateness and inclusion of each standard into the final design guidelines.

The last phase of development of the Lifelong Community Universal Design Standards was to perform a case study in which a sample of the proposed standards was applied to an

actual community within the Atlanta metropolitan area. The purpose of undergoing this study was to evaluate the standards for their efficacy and applicability under real life conditions.

3.2 Literature Review of Existing Standards and Guidelines

As a way to identify credible sources for the development of Lifelong Community Universal Design Standards a literature review was conducted from over 50 design resources including: books, journals and scholarly publications, surveys and statistical data, City Planning and Public Policy Guides, as well as other architectural design guides. These resources were analyzed on the merits of their ability to resolve the critical design problems inherent in many community designs. The resources were selected from 6 main areas of investigation which included: 1) Pedestrian Friendly/Walk-able Communities; 2) Sustainable Design; 3) Universal Design and Disability Research 4) Active Living Research 5) Senior Zoning and Policy Practices and 6) Transportation/Accessibility Research. Upon critical analysis of these varied sources one body of work was chosen for each investigation area that demonstrated best practice in community planning and urban design. These sources served to provide the baseline for Universal Design Standard development for Lifelong Communities and are described and analyzed in the following text.

3.2.1 Existing Standards Reviewed and Source Descriptions

Portland Pedestrian Design Guide

Portland's Pedestrian Design Guide was created to integrate a wide range of design criteria and practices into a coherent set of standards and guidelines that, over time, will promote an environment conducive to walking and pedestrian mobility. In some cases, the practices covered in this guide are also subjects of other regulation or code. Thus it seeks to knit together disparate minimum requirements typical in ADA regulation to promote a vision of a universal pedestrian network. These guidelines provide standards for the development of sidewalk corridors, crosswalks, pathways and stairs. This resource provided best practice information on how to design Lifelong Communities for walk-ability and safe pedestrian accessibility.

LEED for Neighborhood Development Rating System

The Nation's First Rating System for Green Neighborhoods is a partnership among the Congress for New Urbanism (CNU), the U.S. Green Building Council (USGBC) and the Natural Resource Defense Council (NRDC). The system lays out a coordinated environmental strategy for sustainability at the scale of neighborhoods and communities. The joint venture, known as LEED for Neighborhood Development (or LEED-ND), is a system for rating and certifying green neighborhoods. The LEED-ND builds upon USGBC's Leadership in Energy and Environmental Design (LEED) systems, a third-party verification system that ensures a development meets high standards for environmental responsibility. LEED-ND integrates the principles of New Urbanism, Green Building, and Smart Growth into the first national standard

for neighborhood design, expanding LEED's scope beyond individual buildings to a more holistic concern about the context of those buildings. This was an invaluable source for providing baseline standards for developing sustainable communities in the context of this research.

GUDC Development Standards Draft Version 0.1

These Standards are currently in development in part with funding from the Global Universal Design Commission, Inc. (GUDC) and the National Institute on Disability and Rehabilitation Research (NIDRR), through the Rehabilitation Engineering Research Center on Universal Design and the Built Environment (RERC-UD). The GUDC is a not-for-profit corporation established to increase understanding and use of Universal Design principles. Its mission is to accelerate adoption of Universal Design for the range of human performance and preferences in order to move beyond focus on compliance with law to a vision of design that provides ease of use without disadvantage to any group or individuals. The NIDRR provides leadership and support for research related to the rehabilitation of individuals with disabilities. The RERC-UD is a research consortium of people from design and disability communities nationwide. The Center researches and develops critical tools for advancing the field of universal design and applying those tools to develop exemplar products and places through industry partnerships.

These guidance standards are being developed to incorporate universal design principles into new and existing community developments. They are intended to complement existing

accessibility standards by identifying and encouraging the incorporation of features that increase usability, safety and health for a diverse end user population. This resource provided baseline research for strategies to implement Universal Design into Lifelong Communities.

Active Design Guidelines: Promoting Physical Activity and Health in Design

The New York City Departments of Design and Construction (DDC), Health and Mental Hygiene, Transportation (DOT), and City Planning presented this publication to complement other guidelines produced by the City of New York, such as the DDC's series of handbooks for architects and urban designers and the DOT's *Street Design Manual*. The *Guidelines* are also part of the vision of a more livable and hospitable NYC promoted in Mayor Bloomberg's Design + Construction Excellence Initiative. The *Active Design Guidelines* are the City's first publication to focus on designers' role in tackling one of the most urgent health crises of our day: obesity and related diseases including diabetes.

The four principal city agencies named above have partnered with the Mayor's Office of Management and Budget, the American Institute of Architects New York Chapter (AIANY), and with members of the academic community in developing the *Guidelines*. Earlier drafts of the *Guidelines* were circulated widely for review among public and private sector building professionals, and feedback was solicited in a design workshop held in January 2009. The authors also received helpful input from the Mayor's Office of Long-Term Planning and Sustainability; the Mayor's Office for People with Disabilities; School Construction Authority;

the Departments of Buildings, Parks & Recreation, Housing Preservation and Development, and Aging; and from numerous design practitioners.

The *Active Design Guidelines* address those responsible for the planning and construction of buildings, streets, and neighborhoods. The publication seeks to educate designers about opportunities to increase daily physical activity, including measures such as making stairs more visible and providing inviting streetscapes for pedestrians and bicyclists. Some of the strategies are common sense; although many are supported by research translated into practical recommendations. These guidelines provide measures that seek to contribute toward bringing about healthier lifestyles in communities.

The goal of these guidelines is to create an environment that enables all city residents to incorporate healthy activity into their daily lives. The guidelines provide design strategies that increase physical activity and improve health. Active design not only benefits public health but also benefits the advancement of Universal Design. It includes measures that promote walking over driving, stair over elevator use, and active recreation over television watching. In addition, active design can assist not only people able to climb stairs daily, but users of all mobilities, ages, and backgrounds. This resource provided a baseline for developing active and healthy lifestyle design guidelines for Lifelong Communities.

City of Atlanta Senior Zone Policy Ordinance 08-0-2427

Given that seniors comprise 20% of Atlanta's population and are one of the fastest growing groups within it, expected to double by 2030 to 33%, The Atlanta Regional Committee

(ARC) facilitated the implementation of this Senior Zone policy. The purpose of establishing this policy is to protect and separate older adults from vehicular traffic by provision of sidewalks and other design elements in areas where a substantial number of seniors congregate. The intent is also to provide adequate streets and traffic control devices within these areas to safely compensate for the diminishing physical capabilities of Senior Drivers.

This source provided a resource for developing guidelines for streets/sidewalks, signs, markings, traffic signals and transit stops that take into consideration the specific user needs of the aging population. This policy operates on the assumption that designing for the elderly and physically disabled will include the young, however to only focus on the physically fit and young will exclude the elderly and disabled.

USDOT FHWA Best Practices Design Guide

The Federal Highway Administration (FHWA) is a part of the U.S. Department of Transportation (USDOT) that is charged with the broad responsibility of ensuring that America's roads and highways are safe and technologically up-to-date. The design and development of transportation infrastructure seeks to improve conditions for bicycling and walking by planning for the long-term. Transportation facilities are long-term investments that remain in place for many years. The design and construction of new facilities should anticipate likely future demand for bicycling and walking facilities and not preclude the provision of future improvements. The FHWA publishes best practices guidelines that address the need for bicyclists and pedestrians to cross corridors as well as travel along them. Even where bicyclists

and pedestrians may not commonly use a particular transportation corridor, they will likely need to be able to cross that corridor safely and conveniently. Therefore, these standards seek to ensure that the design of intersections and interchanges accommodate bicyclists and pedestrians in a manner that is safe, accessible and convenient.

The FHWA is responsible for implementation of pedestrian access requirements from the ADA and Section 504. This is accomplished through stewardship and oversight over all Federal, State, and local governmental agencies that build and maintain highways and roadways. The FHWA published *Designing Sidewalks and Trails for Access, Part II: Best Practices Design Guide*, a user friendly guide that explains how universal design benefits everyone and how to accommodate all pedestrians in transportation systems. Universally designed pedestrian networks greatly improve community livability and social interaction. Soliciting active involvement of the disability community and providing adequate funding for universal features will move communities beyond just compliance with ADA requirements. *Designing Sidewalks and Trails for Access* is a comprehensive report for designing sidewalks and street crossings and contains compatible information on providing accessibility with information published by the Access Board of the Americans with Disabilities Act Accessibility Guidelines (ADAAG). These standards served as a key resource for establishing baseline Lifelong Community Universal Design Standards for the design of facilities for bicyclists and pedestrians.

3.2.2 Analysis of Existing Standards

Upon review of these sources for lifelong community design standards the following analysis was performed on each source to determine the applicable standards within the six main areas of investigation for lifelong community design.

Pedestrian-friendly/Walkable Community Standards

The Portland Pedestrian Guide provided several key guidelines for inclusion in the proposed Lifelong Community Universal Design Standards. It provided valuable insight on the design of Pedestrian Paths and the Sidewalk Corridor. A few of the standards that were evaluated from this source involve the design of the Sidewalk Corridor which includes:

The sidewalk corridor should be easily accessible to all users, regardless of their level of ability.¹

This standard had a direct correlation to the Universal Design Performance objectives for Ease of Use and Accessibility. However this standard received a Universal Design Score of 86% as it did not provide a measure for tolerance for error. In order to improve upon this standard other specifications were added to the requirements of the design of the sidewalk corridor.

The Sidewalk Corridor should be wide enough to accommodate four distinct zones: the Curb Zone, the Furnishings Zone, the Through Pedestrian Zone, and the Frontage Zone.¹

This standard was used to help organize the functional layers of the design of the sidewalk corridor. Establishing Functional Zones along the sidewalk corridor helps to improve the appropriateness of the design feature and promote ease of use. Further specifications were

needed to ensure the functional requirements of each of these zones adhered to the principles of Universal Design.

Sidewalk corridors should allow pedestrians to feel a sense of safety and predictability without feeling threatened by adjacent traffic.¹

Since safety is a major concern in the universal design of a lifelong community this standard expresses the performance goal necessary for universally designed sidewalks. The modification of this standard involved stating safety measures for safe street crossings and management of pedestrian and bicycle traffic.

Sidewalk corridors should provide an obvious route for travel that does not require pedestrians to go out of their way unnecessarily.¹

This last example addresses the need for continuity of mobility features within the lifelong community. It expresses the goal to provide a pedestrian-friendly environment by removing the environmental barriers that keep people from traveling along pedestrian paths.

Sustainable Design Standards

LEED-ND provided guidelines for determining standards for defining the key elements of a sustainable lifelong community. These standards provided insight on the essential design objectives for sustainable Land Use features in the Lifelong Community. Analysis of these standards included:

A universally designed lifelong community should provide a range of housing options for people of all ages and abilities within close proximity to public transit and community

resources. Residential development should promote social equity by enabling residents from a wide range of economic levels, household sizes, and age groups to live in the same community, with a minimum provision of the following universal dwelling types:²

In order to design sustainable communities the design should take into consideration all of the potential users of the environment over time. While LEED-ND seeks to promote this type of diverse environment further measures were added to this standard to ensure that the ideals of Universal Design are considered in the development of the Lifelong Community. This included measures to determine what type of housing options that should be available.

- *Commercial businesses in a universally designed lifelong community should be sufficiently varied to provide for common household needs.²*
- *Commercial businesses should be located within close proximity of residences.²*
- *There should be an elementary school close enough so that at least 50% of children living in the community and their caretakers can walk, roll or bicycle from their dwelling. This distance should not be more than one mile from any residential area.⁸*

In establishing Universal Standards for the Lifelong Community it is important to connote the key elemental features that define the actual community. Therefore this resource provided guidance on which essential commercial businesses and civic/social services were essential to include in the proposed standards. However one of the most important aspects of the design of these elements is the proximity they have with other related elements such as residences. The importance of proximity in Universal Design of the Lifelong Community is an important feature in determining the appropriateness and usability of these key community

amenities. Thus modification of these standards takes into consideration the relative closeness of the amenities to one another as a means to promote pedestrian mobility.

Universal Design/Disability Research Standards

The GUDC Development Standards helped to provide a point of reference for the development of specific guidelines that takes into consideration the unique challenges of designing for people with Disabilities. These standards focus mainly on the private sector and the built environment however there were several insights on the design of private development that could be applied at the community scale. This resource offered guidance on the Universal Design of community elements such as: Site Entrances and Exits, Pathways, Vertical Circulation, Transit Stops, Landscaping, Seating Areas, and Public Information Systems. The following analysis was made regarding the use of these design guidelines in the Lifelong Community Universal Design Standards:

Interactive signs should identify all site access points and paths of travel choices at each decision point.³

Site Entrances and Exits play an important role in helping individuals access community amenities. Thus Universal Design plays an equally important role in determining ways to identify site accessibility. Interactive signs can help individuals maneuver through the community by foot, wheelchair or other mobility device. These signs should accommodate a wide range of users for example visually impaired persons who may need tactile clues to determine destination and departure points from various locations within the community.

Pathways should be wide enough to accommodate expected traffic flow³

The design of pathways should take into consideration all the potential users including people with mobility aids and wheelchairs. Incorporating this standard into the Lifelong Community Universal Designs standards required the addition of measures to determine the appropriate width of pedestrian and bicycle pathways that are used for travel throughout the public right-of-way.

Stairs and ramps should be eliminated whenever possible.³

Occasionally in communities where the topography of the natural environment presents unusual slope conditions, Vertical Circulation becomes an issue to address at the community scale. A common practice in the implementation of Universal Design Strategies is to eliminate stairs and ramps and utilize other means of vertical circulation such as elevators or lifts. However when these solutions are not viable options it is important to provide measures that determine how stairs and ramps might be used easily, safely, and appropriately for the widest array of users. These measures are further outlined in the Proposed Lifelong Community Universal Design Standards.

Existing Standard:

Transit stops should be clearly marked with routes served.³

Modified Universal Design Standard:

Real time arrival information and interactive maps should be available in a variety of audio/visual/tactile media formats at major transit stops.³

Transit Stops are vital resources that provide transportation and mobility to diverse users in the community, but especially for people with limited mobility options. Therefore perceivable information regarding the routes served by a particular mode of transportation becomes an important feature of the design of transit stops. Universal Design standards for determining ways to communicate this information to allow for the wide perceptibility was the focus for improving these standards.

Vegetation and permeable sloped paving should be used to reduce standing water that could cause slippage or accidental injuries in the pedestrian environment.³

Landscaping is an important streetscape feature that should take into consideration the safety and protection of all potential users. This standard provides guidance on material choices that should be used to create the character and identify of the community landscape.

Resting Areas should have a variety of seating options available to accommodate people of all ages, abilities and statures.³

Careful attention to the appropriate size, proportion and accessibility should be paid to the design of benches, tables and other seating options within resting areas of a lifelong community. These proportions and dimensions should consider the comfort, ease of use, safety and accessibility of all potential users.

Interactive maps and signage should be provided for orientation to community facilities, including: buildings, site amenities, entries, site access points, parking and other important features.³

Public Information Systems are important features for communicating key elements within the Lifelong Community. Thus it is critical that a universally designed lifelong community provide way-finding and orientation signage in a manner that allows for greatest perceptibility across a wide array of users. The GUDC Guidelines helped to provide Universal standards for designing these informational systems within the lifelong community.

Active Living Research Standards

The New York Active Design Guidelines provided a framework for establishing standards that promote increased physical activity and healthy living in a lifelong community and was used to establish a basis for the design of parks, playgrounds, and the public environment that promote involvement and activity in the lifelong community. Several design strategies that encourage active use of these features were adapted from this source and include the following:⁴

- *Improve access to transit and transit facilities*
- *Improve access to plazas, parks, open spaces, and recreational facilities, and design these spaces to maximize their active use where appropriate*
- *Improve access to full-service grocery stores and fresh produce*
- *Design accessible, pedestrian-friendly streets with high connectivity, traffic calming features, landscaping, lighting, benches, and water fountain.*
- *Facilitate bicycling for recreation and transportation by developing continuous bicycle networks and incorporating infrastructure like safe indoor and outdoor bicycle parking.*

Senior Zoning and Policy Standards

The Atlanta Senior Zoning Policy helped to develop universal design standards that were appropriate for the unique nuances of the aging adult population. Key standards identified from analysis of this source include:

- *Transit stops should be within a maximum of 100 feet of pedestrian travel from one another.*⁵
- *Pedestrian crossing cycles should be long enough for a slow moving pedestrian to cross safely or clearance interval for crossing signal should be set based on min 2.8 ft/sec crossing speed.*⁵
- *Transit stop locations on opposite sides should have a pedestrian crosswalk from both sides of the street with actuated pedestrian traffic signals.*⁵

These guidelines support the notion that communities that are adequately designed for older adults with increasing physical impairments can be beneficial to all potential users. Thus the standards included from this source were chosen for the adaptability of the design criterion to a wide variety of users.

Transportation/Accessibility Standards

Lastly as Pedestrian Mobility and Transportation within the community are a key objectives to the development of Lifelong Community Universal Design Standards, the FHWA design guide standards were useful for determining how mobility can be achieved through the

design of sidewalks and pathways. The following sidewalk specifications are examples of the Universal Design standards that were adapted from this guide:⁶

- *Sidewalk surfaces should be firm and stable. They should also be slip resistant under dry conditions.*
- *At least 3 feet of clear space in pedestrian paths is necessary for people who use assistive devices such as wheelchairs, walkers, and crutches to maneuver along the sidewalk.*

Safety is an important safety feature in the Universal Design of sidewalks and pedestrian pathways. Thus much attention has been placed on the design of this essential feature. Firmness is the degree to which the surface resists deformation by indentation when, in this case, a person walks or wheels across it. A firm surface would not compress significantly under the forces exerted as a person walks or wheels on it. Stability is the degree to which the surface remains unchanged by contaminants or applied force, so when the contaminant or force is removed, the surface returns to its original condition. A stable surface would not be significantly altered by a person walking or maneuvering a wheelchair on it.⁶

*Eliminate any removable and protruding obstacles, such as newspaper stands or tree branches, that limit the clear width of the sidewalk and/or protrude into the path of travel.*⁶

This source reveals that objects that protrude into the sidewalk corridor but are higher than 80 inches are not a problem for people with vision impairments because most pedestrians require less than 80 inches of headroom. In addition, people with vision impairments who use long white canes to navigate (if they are of adult stature and using their canes skillfully) will

usually detect and avoid objects on the sidewalk that extend below 27 inches. However, obstacles that protrude into the sidewalk between 27 inches and 80 inches and do not extend to the ground, are more difficult to avoid because the long white cane is unlikely to contact the object before the person contacts the object.

The grade of the sidewalk corridor is often determined by the grade of the street.

Whenever possible, however, the grade of the sidewalk corridor should not exceed 5.0 percent.

Grades and cross slopes are very difficult for some people with mobility impairments to negotiate because it is harder to travel across sloped surfaces than horizontal surfaces. People with mobility impairments who are ambulatory or use manual wheelchairs must exert significantly more energy than other pedestrians to traverse sloped surfaces. Powered wheelchairs are affected by the additional work required on steep grades because more battery power is used. This reduces the travel range of a powered chair. Both powered and manual wheelchairs can become unstable and/or difficult to control on sloped surfaces. Whenever possible, slopes in a universally designed lifelong community should be minimized to improve access for people with mobility impairments.

3.2.3 Design Criteria: Performance Objectives

Based on the initial literature review, the following performance objectives helped to define the strategic goals of the Lifelong Community Universal Design Standards. Analyzing

the existing standards against these objectives helped to ensure that the main principles of Universal Design were brought to the forefront.

Objective 1: The design should promote pedestrian mobility (i.e., walking or rolling by providing a safe, appealing, and comfortable environment that supports public health by reducing pedestrian injuries and encouraging daily physical activity.

Objective 2: Sidewalks, pathways and crossings should be designed so people can easily find a direct route to a destination and delays are minimized.

Objective 3: The design should enhance the look and feel of the pedestrian environment which includes open spaces such as plazas, courtyards, and squares, as well as amenities such as street furniture, banners, art, plantings and special paving. The design should also arrange the elements of the pedestrian environment in a way that minimizes hazards and errors and to minimize sustained physical effort for people with limited physical abilities. Lastly to accommodate for appropriate size and space the design of these spaces should be the appropriate size for accommodating all potential users.

Objective 4: The pedestrian environment should be a place where public activities are encouraged. Commercial activities such as dining, vending and advertising may be permitted when they do not interfere with safety and accessibility.

Objective 5: Sidewalks, pathways and crosswalks should ensure the mobility of all users by accommodating the needs of people regardless of age or ability and should include measures for maintaining the safety and minimization of hazards.

- Objective 6:* The pedestrian network should provide a continuous direct routes and convenient connections between destinations, including homes, schools, shopping areas, public services, recreational opportunities and transit.
- Objective 7:* Sidewalks should allow pedestrians to feel a sense of safety and predictability. Sidewalk users should not feel threatened by adjacent traffic.
- Objective 8:* Sidewalks, pathways and crossings should be designed and built to be free of hazards and to minimize conflicts with external factors such as noise, vehicular traffic and protruding architectural elements.

3.3 Evaluation

The Lifelong Community Universal Design Standards were developed to focus primarily on two fundamental areas of design: 1) Key Design Elements of the Lifelong Community and 2) Mobility and Transportation within the public community space in the Lifelong Community. These areas of design highlight the essential elements inherent in a universally designed lifelong community as well as the features that make the lifelong community accessible and usable by all of its potential users. Evaluation of these standards was measured through critical analysis using a uniquely designed assessment tool and a case study investigation.

3.3.1 Evaluation Methods

Two assessment methods were used to evaluate the appropriateness of the proposed Lifelong Community Universal Design Standards. These methods were used to first assess the strategic Performance Objectives for Universally Designed Lifelong Communities that were

developed from the Literature Review. Secondly, each of the technical standards were evaluated individually for relevance and applicability to Universal Design Principles. This provided a means to modify and improve upon the initial recommendations found in common practice.

3.3.2 Evaluating Performance Objectives

The Lifelong Community Universal Design Performance Objectives were evaluated against the seven Universal Design principles. Each objective was assigned a numerical value of either 1, which signified that the corresponding Universal Design principle was met satisfactorily or 0, which signified that the corresponding Universal Design principle was not met. The rows were then averaged to provide a Universal Design Score that determined the overall percentage of which the objective adhered to all seven Universal Design principles.

Lifelong Community Performance Objectives: Pedestrian	UNIVERSAL DESIGN PRINCIPLE INDEX						
	Equitable Use	Flexibility in Use	Simple and Intuitive Use	Perceptible Information	Tolerance for Error	Low Physical Effort	Size and Space Appropriate for Use
1. Ease of Use							
1. The design should promote walking by providing a safe, appealing, and comfortable environment that supports public health by reducing pedestrian injuries and encouraging daily physical activity. Site furniture is accessible, conveniently located, and comfortable	1	1	1	1	1	1	1
2. Sidewalks, pathways and crossings should be designed so people can easily find a direct route to a destination and delays are minimized. Resting areas should be made available along steep or long pathways.	1	1	1	1	1	1	1
2. Community Involvement & Interaction							
1. The design should enhance the look and feel of the pedestrian environment which includes open spaces such as plazas, courtyards, and squares, as well as amenities such as street furniture, banners, art, plantings and special paving.	1	1	1	1	0	0	0
2. The pedestrian environment should be a place where public activities are encouraged. Commercial activities such as dining, vending and advertising may be permitted when they do not interfere with safety and accessibility.	1	1	1	1	0	1	1
3. Increased Physical Activity							
1. Sidewalks, pathways and crosswalks should ensure the mobility of all users by accommodating the needs of people regardless of age or ability.	1	1	1	1	0	1	1
2. The pedestrian network should provide a continuous direct routes and convenient connections between destinations, including homes, schools, shopping areas, public services, recreational opportunities and transit.	1	1	1	1	0	1	1
4. Safe Environment							
1. Sidewalks should allow pedestrians to feel a sense of safety and predictability. Sidewalk users should not feel threatened by adjacent traffic.	0	0	1	1	1	1	1
2. Sidewalks, pathways and crossings should be designed and built to be free of hazards and to minimize conflicts with external factors such as noise, vehicular traffic and protruding architectural elements.	0	0	0	1	1	0	1

Figure 8: This chart illustrates the evaluation method of the community performance objectives

Each performance objective in the Lifelong Community Universal Design Standards was given an overall Universal Design score from zero to 100%. If a score was greater than 75%, but less than 100% the factors limiting the score were investigated to determine how to best adapt the performance objectives to better meet the principles of Universal Design. These revised objectives became the strategic goals used to determine the technical performance standards to be included in the Lifelong Community Universal Design Standards.

Mobility and Transportation Performance Objectives: Pedestrian	UNIVERSAL DESIGN PRINCIPLE SUMMARY/KEY FINDINGS	
	UD SCORE	DISCUSSION NOTES
1. Ease of Use		
1. The design should promote walking by providing a safe, appealing, and comfortable environment that supports public health by reducing pedestrian injuries and encouraging daily physical activity	100%	This design objective effectively achieves 7 out of 7 UD design principles.
2. Sidewalks, pathways and crossings should be designed so people can easily find a direct route to a destination and delays are minimized.	100%	This design objective effectively achieves 7 out of 7 UD design principles.
2. Community Involvement & Interaction		
1. The design should enhance the look and feel of the pedestrian environment which includes open spaces such as plazas, courtyards, and squares, as well as amenities such as street furniture, banners, art, plantings and special paving.	57%	This design objective fails to address UD Principles 5, 6 and 7. In order to meet the Tolerance for Error standard the design should also arrange the elements of the pedestrian environment in a way that minimizes hazards and errors. In order to meet the Low Physical Effort Standard the objective must be to minimize sustained physical effort in the design of pedestrian environment. Lastly to accommodate for appropriate size and space the design of these community spaces should be the appropriate size for accommodating all potential users.
2. The pedestrian environment should be a place where public activities are encouraged. Commercial activities such as dining, vending and advertising may be permitted when they do not interfere with safety and accessibility.	100%	This design objective effectively achieves 7 out of 7 UD design principles.
3. Increased Physical Activity		
1. Sidewalks, pathways and crosswalks should ensure the mobility of all users by accommodating the needs of people regardless of age or ability.	86%	This design objective fails to address UD Principle 5. In order to meet the Tolerance for Error standard the objective should include measures for maintaining the safety and minimization of hazards in sidewalks, pathways and crosswalks.
2. The pedestrian network should provide a continuous direct routes and convenient connections between destinations, including homes, schools, shopping areas, public services, recreational opportunities and transit.	86%	This design objective fails to address UD Principle 5. In order to meet the Tolerance for Error standard the objective should include measures for maintaining the safety and minimization of hazards in the pedestrian network
4. Safe Environment		
1. Sidewalks should allow pedestrians to feel a sense of safety and predictability. Sidewalk users should not feel threatened by adjacent traffic.	71%	This design objective fails to address UD Principles 1 and 2. In order to promote Equitable use the safety of sidewalks should appeal to all users not just for people that can walk on their own. In order to provide flexibility in use sidewalks should be able to accommodate many different scenarios of users safely and effectively. For example to wheelchair users should be able to pass
2. Sidewalks, pathways and crossings should be designed and built to be free of hazards and to minimize conflicts with external factors such as noise, vehicular traffic and protruding architectural elements.	43%	This design objective fails to address UD Principles 1, 2, 3 and 6. In order to promote Equitable Use the design should be marketable to all users. For Flexibility in Use the design should also appeal to all users. It should be simple and intuitive while providing ample safety measures and precautions against hazards. The built pedestrian environment should be efficient and reduce sustained physical effort while maintaining an adequate level of physical activity.

Figure 9: This chart illustrates the interpretation method of the community performance objectives

3.3.3 Evaluating Performance Standards

Each design standard in the Lifelong Community Universal Design Standards was evaluated against Universal Design principles. In order to do this each standard was assigned a numerical value of either 1, which signified that the standard had a positive impact on the

corresponding Universal Design principle, -1, which signified that the standard had a negative impact on the corresponding Universal Design principle, or 0, which signified that there was no impact on the corresponding Universal Design principle. The columns were then averaged to provide a Universal Design Score that determined the overall percentage of which the objective adhered to all seven Universal Design principles. Standards with a score of 50% or less were automatically excluded while standards with higher scores were analyzed for improvement and modifications that would potentially raise the score to 100%.

Mobility and Transportation System Performance Standards: Pedestrian		Sidewalks and Pathways									
UNIVERSAL DESIGN PRINCIPLE INDEX	Surfaces should be slip resistant. ² Two people walking together should be able to pass a third person comfortably, and different walking speeds should be possible. In areas of intense pedestrian use, sidewalks should be wider to accommodate the greater volume of walkers. ² The Sidewalk Corridor should be wide enough to accommodate four distinct zones: the Curb Zone, the Furnishings Zone, the Through Pedestrian Zone, and the Frontage Zone. ² Areas surrounding pedestrian areas that are designed for rare overflow pedestrian should be constructed with permeable but stable surface materials that are suitable for wheeled mobility devices. ³ Pathways should have continuous illumination on them without hotspots or glare. ³ Pathways should have increased illumination levels at major nodes. ³ Use smart lighting systems that automatically activate when movement detected. ³ Use smart lighting that can activate audible information for hearing impaired. ³ Use photo luminescent to define sidewalk area or edges during night hours. ³ Resting areas should be available along steep or long pathways. ³										
	1. Equitable Use:										
	The design is useful and marketable to people with diverse abilities	1	1	1	1	1	1	1	0	1	1
	2. Flexibility in Use:										
	The design accommodates a wide range of individual preferences and abilities.	0	1	1	1	0	0	1	0	1	1
	3. Simple and Intuitive Use:										
	Use of the design is easy to understand, regardless of the user's experience, knowledge, language skills, or current concentration level.	1	1	1	1	0	0	1	-1	0	1
	4. Perceptible Information:										
	The design communicates necessary information effectively to the user, regardless of ambient conditions or the user's sensory abilities.	-1	0	-1	0	0	0	0	-1	0	0
	5. Tolerance for error:										
	The design minimizes hazards and the adverse consequences of accidental or unintended actions.	0	-1	1	1	1	1	1	1	1	1
	6. Low Physical Effort:										
	The design can be used efficiently and comfortably and with a minimum of fatigue.	-1	-1	1	0	0	0	0	0	0	1
	7. Size and Space for Approach and Use:										
	Appropriate size and space is provided for approach, reach, manipulation, and use regardless of user's body size, posture, or mobility.	1	1	1	0	0	1	0	0	0	1

Figure 10: This chart illustrates the evaluation of the Lifelong Community Standards for Pedestrian Mobility: Sidewalks and Pathways

CHAPTER 4

RESULTS

4.1 Determination of Final Proposed Universal Design Standards

An iterative evaluation process was used to continuously assess and ultimately determine each standard that was included in the final proposed Universal Design Standards for Lifelong Communities. Some of examples of omitted standards and the reasons for omission include:

6. Architectural criteria and community layout should maximize a sense of local community in harmony with the natural setting.

Reason for Omission:

UD evaluation score was 20%; This is due to the fact that while this objective is marketable to a wide array of users and promotes the objectives of sustainable design, it does not bear particular significance to Universal Design criteria.

- Smart lighting systems should be used along paths and sidewalks that will automatically activate when movement is detected.

Reason for Omission:

UD evaluation score was 42%; While this standard scored close to the cutoff point for inclusion in the final standards it was found to be too prescriptive in that it limited designers to the use of a specific type of technology and was not performance-based.

- Curb-side taxi zones should be designated for taxi and para-transit services.

Reason for Omission:

UD evaluation score was 50%; This standard would require the use of multiple transportation facilities and was in direct conflict with the land conservation standards for multi-modal transportation at transit stops by creating additional designated locations.

Once irrelevant standards were omitted from the initial review the resultant Universal Design Standards were edited further through the lens of Universal Design. These standards were adapted and oriented toward performance-based criteria that indicate the intent of Universal Design goals and suggest possible methods of achieving these goals. Given the wide range of circumstances and potential design solutions, the final proposed standards were written to give designers and other users the flexibility to use their creativity and expertise to satisfy overall performance objectives.

4.2 Proposed Lifelong Community Universal Design Standards

4.2.1 Standards for Community Elements

1.0 Zoning & Land Use

A community is a subarea of a city consisting of residential, commercial and institutional uses that share a common identity to all of its users and members. The built environment consists of buildings, roads, utilities, homes, fixtures, parks and all other improvements that form the physical character of a community. Land use and community design patterns create a particular physical reality and compel behaviors that have a significant effect on the environmental performance. The following standards describe the key

elements inherent in the physical character of a universally designed lifelong community.

1.1 Residential

A universally designed lifelong community should provide a range of housing options for people of all ages and abilities within close proximity to public transit and community resources. Residential development should promote social equity by enabling residents from a wide range of economic levels, household sizes, and age groups to live in the same community. Residential zoning and land use should be designed with a minimum provision of the following universal dwelling types:²

1.1.1 *Universally Designed Multifamily Dwellings*

This type of housing designation includes apartments, condominiums, or several connected homes that also offer independent living situations that accommodate people of all ages and level of physical abilities.

1.1.2 *Universally Designed Shared Housing*

This type of housing designation includes houses for a group of unrelated, independent individuals living together and sharing household duties, and companionship.

1.1.3 *Universally Designed Single Family Dwellings*

This type of housing designation includes homes designed to meet the needs of people that wish to live independently as long as they can, while offering an individualized living environment.

1.1.4 *Universally Designed Accessory Dwellings*

This type of housing designation may take several forms, including independent cottages in the backyards of single-family homes. Some cottages are modular units that can be located temporarily in a backyard. Other units may be attached to a home or located over a garage. These units would be designed to accommodate independent living of an elderly person that may require close proximity to a relative or caretaker for some assistance with daily living but may also be occupied by other unrelated individuals.

1.2 **Commercial**

Commercial businesses in a universally designed lifelong community should be sufficiently varied to provide for common household needs. Commercial businesses should be located within close proximity of residences:⁸

1.2.1 Commercial zoning and land use should be designed with a minimum provision for the following diverse uses:²

Food Retail

- Full service grocery store

- Other food store with produce

Community-Serving Retail

- Clothing Store or department store selling clothes
- Convenience Store
- Farmer's Market
- Hardware Store
- Pharmacy
- Other Retail

Services

- Bank
- Gym/Health Club/Exercise Studio
- Hair Care
- Laundry/Dry Cleaning
- Restaurant/Cafe/Diner (excludes drive-through only)

1.2.1.1 These designated businesses should be located within ¼ mile distance from residential areas.

1.2.1.2 Transit stops should be located within ¼ mile distance from each other and near these businesses.

1.3 **Civic/Social**

Civic Spaces and Social Services in a Universally Designed Lifelong Community should provide diverse facilities for work, play, schools, health services and recreation that are located within close proximity to residences.

1.3.1 Civic/Social zoning and land use should be designed with a minimum provision for the following communal services:⁶

Civic/Community Facilities

- Adult/Senior Care (licensed)
- Child Care (licensed)
- Community/Recreation Center
- Cultural Arts Facility (museum, performing arts)
- Educational Facility (including K-12 school, University, Adult Education Center, Vocational School, Community College)
- Family Entertainment Venue (Theater, Sports)
- Governmental Office that serves Public on site
- Place of Worship
- Medical Clinic, Office or Facility where patients are treated
- Police or Fire Station
- Post Office
- Public Library

- Public Park
- Social Services Center

1.3.2 There should be parks, trails and playgrounds near every dwelling. This distance should not be more than one-eighth of a mile.^{2,10}

1.3.3 Open space should be aggregated in one large area rather than dispersing into smaller pieces. Wherever possible this open space should be provided within $\frac{1}{4}$ of a mile of residential areas.⁴

1.3.4 A distinguishable community center should include spaces such as plazas that are located within one mile from residential areas for ease of accessibility to pedestrians and bicyclists.⁵

2.0 Connectivity

Connectivity is defined as a system of publicly accessible streets with multiple routes and connections serving the same origins and destinations, including intersections of streets with dedicated *alleys* and transit rights-of-way, and intersections of streets with non-motorized rights-of-way. In a universally designed lifelong community connectivity plays an important role in providing and controlling vehicular, pedestrian, and other forms of transportation to, from and within key destination areas. These universal design standards measure connectivity by the number of intersections per square mile and describe a systematic network of streets in a lifelong community.

2.1 Street Intersections

The community should have a discernible Activity Center. This is often a plaza, square or green, and sometimes a busy or memorable intersection. A transit stop should be located at this center.⁸

2.1.1 Within a 1/2 mile distance from the community perimeter there should be connectivity of at least 75 intersections per square mile.

2.1.2 Vehicular streets should form a grid with intersections every 400 to 500 feet.

2.2 Pedestrian Paths

2.2.1 All Streets within a community should have continuous sidewalks on both sides of the streets.⁵

2.2.2 Dedicated pedestrian and bicycle paths should be maintained on dead-end streets to provide access even where cars cannot pass.²

2.2.3 Pedestrian paths should form a grid with intersections every 400 to 500 feet.²

2.3 Public Transit Stops

2.3.1 Transit shelter should clearly communicate routes for all potential users.³

2.3.2 Real time arrival information and interactive maps should be available in a variety of audio/visual/tactile media formats at major transit stops.³

2.3.3 Transportation vehicles should be easily boarded with a ramp at a safe slope or from a level surface.³

- 2.3.4 At least one secure bicycle storage rack should be located at each transit Shelter.⁴
- 2.3.5 Courtesy phones should be available at major transit stops to connect to taxi and para-transit services.⁶
- 2.3.6 Passengers should have direct view of oncoming transit vehicles from transit shelter interior.³
- 2.3.7 Transit stop shelters should provide internal clearances for mobility aid users, which means appropriate offsets between the shelter and the curb.
- 2.3.8 Transit stop locations on opposite sides should have a pedestrian crosswalk from both sides of the street with actuated pedestrian traffic signals.⁵

3.0 Involvement

The pedestrian environment in a universally designed lifelong community should be a place where public activities are encouraged that actively involve all members of the community. These activities should not interfere with safety and accessibility for people of any age or ability. Streetscapes are an important component of the *public realm* (public spaces where people interact), which help defines a community's aesthetic quality, identity, economic activity, health, social cohesion and opportunity, not just its mobility. Balanced and active streets should facilitate a healthy mix of activity including pedestrians, businesses, services, parking, and through traffic and provide safe and universal access to promote involvement and stimulate street life. Activity on both

sidewalks and roadways must be balanced to provide space for pedestrian amenities and traffic flow. Streetscaping in a universally designed lifelong communities should comply with the following standards related to public safety and pedestrian involvement:

3.1 **Sidewalk Corridor**

The sidewalk corridor is the part of the pedestrian mobility system from the edge of the roadway to the edge of the right-of-way, generally along sides of streets and between street corners. The sidewalk corridor functions to provide a separate pedestrian environment from vehicular movement. The sidewalk corridor should be provided with the following attributes:

3.1.1 *Adequate Travel Width*

The Sidewalk Corridor should be wide enough to accommodate four distinct zones: the Curb Zone, the Furnishings Zone, the Through Pedestrian Zone, and the Frontage Zone.¹

The *Curb Zone* is an area that prevents water in the street gutters from entering the pedestrian space, discourages vehicles from driving over the pedestrian area. It is an important tactile element that signifies the edge of a pedestrian path to people who use mobility aids such as canes or walkers.

3.1.1.1 The curb should have a minimum width and height of 6 inches wide with the exception of curb cuts and ramps at intersections.

The *Furnishing Zone* provides a buffer between pedestrians and the adjacent roadway. It is an area where elements such as trees, signal poles, utility poles, street lights, hydrants, signs, controller boxes, parking meters, driveway aprons, trash receptacles, grates, hatch covers, and universally accessible street furniture should be located.

3.1.1.2 The furnishing zone should have a minimum width of 3 feet from the curb zone.

3.1.1.3 On sidewalks with adjacent traffic at speeds greater than 55 mph the Furnishing Zone should be wider than 3 feet.

The *Through Pedestrian Zone* is the area intended for pedestrian travel. This area should be entirely free of permanent and temporary objects. This is the paved area that is most commonly referred to as the “sidewalk” and should be designed to accommodate all potential users.

3.1.1.4 The Through Pedestrian Zone should accommodate at least two people walking together and allow for a third person to pass comfortably in a wheel-device or with a mobility aid.¹

3.1.1.5 The Through Pedestrian Zone should have a minimum width of 5 feet.

The Frontage Zone is the area between the Pedestrian Through Zone and the property line which creates a buffer between building fronts and private property fences or hedges.

3.1.1.6 The frontage zone should have a minimum width of 6 inches.

3.1.2 *Safety*

Sidewalk corridors should allow pedestrians to feel a sense of safety and predictability without feeling threatened by adjacent traffic or protruding objects.

3.1.2.1 Traffic calming devices should be placed near pedestrian pathways to prevent collisions and incidental injuries and deaths.³

3.1.2.2 Physical protections should be provided between vehicular and pedestrian areas (i.e. bollards, planters, etc.)³

3.1.3 *Continuity*

Sidewalk corridors should provide a continuous and obvious route for travel that does not require pedestrians to go out of their way unnecessarily.¹

3.2 Physical Comfort and Weather Protection

Streetscapes should provide shelter that provides comfortable areas of social interaction and protection from unfavorable weather conditions such as high winds, rain, sun, and snow.

3.2.1 Shelter enclosure should block prevailing winds.³

3.2.2 Shelter enclosure should block splashing from roadway.³

3.2.3 Should have adequate night illumination.³

3.2.4 Shelters should provide weather protection for bicycle storage.³

3.3 Trees and Landscaping

Street trees are an important part of the streetscape that creates a pedestrian-friendly environment, especially large canopied trees. Landscaping and planting strips contribute to the character of the community and should create desirable micro-climates that contribute to the psychological and visual comfort of sidewalk users.

3.3.1 Planting strips, located between the curb and sidewalk, in the Furnishing Zone, should be used to help create shaded streets, promote walking and slow traffic.¹

3.3.2 Tree limbs and branches must leave 7'-6" clearance above the level of the sidewalk.¹

3.3.3 Plants that shed leaves and fruit should be located in places where they will not create slipping hazards.³

- 3.3.4 Vegetation and permeable sloped paving should be used to reduce standing water that could cause slippage or accidental injuries in the pedestrian environment.³

4.2.2 Standards for Mobility/Transportation Systems

4.0 Streets

There are several key elements to consider in the universal design of streets in a Lifelong Community. Some of these design features include street crossings that allow for safe travel across busy or wide intersections; curb ramps that prevent High "lips" on ramps at the street edge and tipping risk for wheelchairs; effective vehicle and bicycle traffic lanes that are safe and reduce potential for accidental deaths and injuries; as well as universally designed site entrances and exits that allow for accessibility by all people regardless of age or ability.

4.1 **Pedestrian Street Crossings**

- 4.1.1 Street Crossings should be spaced at a minimum of 100 feet where blocks are longer than 500 feet.²
- 4.1.2 Visual/Audible pedestrian traffic signals should be activated upon request at major street crossings.³
- 4.1.3 Pedestrian crossing cycles should be long enough for a slow moving pedestrian to cross safely or clearance interval for crossing signal should be set based on min 2.8 ft/sec crossing speed.⁵

- 4.1.4 Minimum refuge island width between travel lanes should be 6 feet and min length should be at least 20 feet.²

4.2 **Curb Ramps and Extensions**

- 4.2.1 Curb extensions should be used to shorten the distance of a crosswalk.²
- 4.2.2 Curb ramps should be as wide as adjacent crosswalks to avoid “bottlenecks”.³
- 4.2.3 Boundaries of safe crossing zones should be clearly defined using color and tactile markings (i.e. Reflective markers, graphics and lighting).³
- 4.2.4 Street crossing should be raised close to sidewalk elevation to provide curb-less intersection.³
- 4.2.5 Crossings should have curb ramps with tactile cues such as “turtle” tiles to accommodate visually impaired persons.⁵

4.3 **Bicycle and Vehicular Traffic Lanes**

- 4.3.1 Arterial streets should be designed to be only as wide as needed for low-speed two-way traffic.⁸
- 4.3.2 Residential-only streets should be designed for a target speed of no more than 20 mph.⁸
- 4.3.3 Nonresidential and/or mixed-use streets should be designed for a target speed of no more than 25 mph.⁸
- 4.3.4 On lower traffic volume streets, bicyclists should be considered a normal part of traffic. On higher volume streets, bicyclists should be

accommodated with minimum of six-feet-wide bike lanes, but separate routes for less experienced bicyclists may be considered as well. ⁸

4.3.5 Extra turning lanes should be available for vehicles to disengage from through traffic ³

4.4 **Trails and Multi-Use Paths**

4.4.1 All paths should be connected to provide a continuous network. ³

4.4.2 Paths should have resting stations/areas along the peripheral edges of the path. ³

4.4.3 Shared bicycle/pedestrian pathways should have a clear passage width of at least 12 feet. ²

CHAPTER 5

DISCUSSION: CASE STUDY APPLICATION OF THE STANDARDS

5.1 Overview of Toco Hills Community

5.1.1 Community Description

The study area chosen for this application was the Toco Hills community in Dekalb County which is centered at the intersection of North Druid Hills Road and Clairmont Road. Toco Hills is an existing community in a thriving area. Development pressures are likely to force redevelopment sometime in the foreseeable future, and this redevelopment could provide substantial benefits for the entire community. The application of Lifelong Community Design Standards would provide on-site accommodation to existing residents the greatest extent possible.

The area contains Thompson Park, Mason Mill Park, a new library, a lifelong learning center, trails, and recreational opportunities for all ages. In the larger area of influence around the center of the study area are large shopping centers, older single-family neighborhoods, offices, and new town homes. The community is in close proximity to Emory University, Emory University Hospital, Wesley Woods Geriatric Center, Atlanta Veterans Hospital, and the US Centers for Disease Control, all of which are the largest employers in the area.

The median household income of residents currently living in this community is \$59,600 per year and the median home value is roughly \$289,200. The population is comprised of 24% Empty Nesters and Retirees; 29% Families; 47% Younger Singles and Couples. Almost 3,000 households represent the annual potential market for new mixed-income housing units that could be developed within the community. The household groups that comprise the potential market for new mixed-income housing units are: 53% Younger Singles and Childless Couples, 21% Families (21 percent); 21% Empty-nesters and retirees.

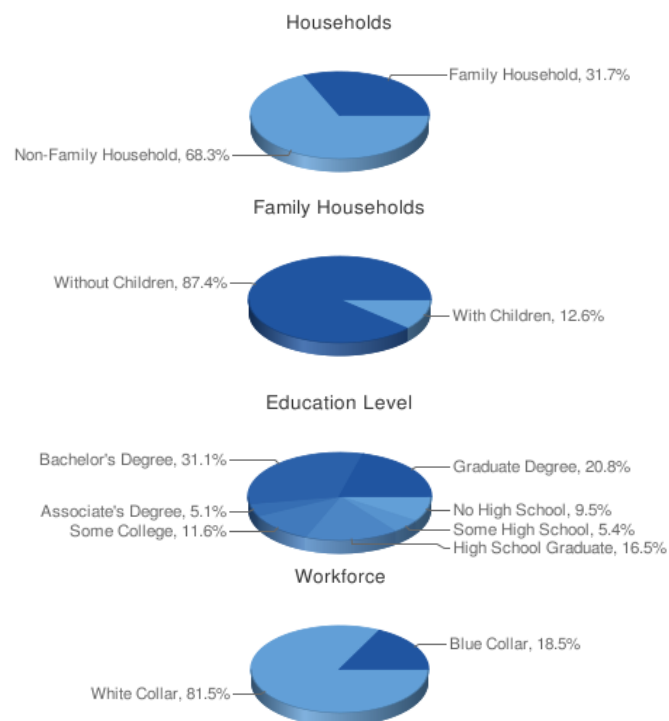


Figure 11: Community Demographics
Source: OnBoard Informatics

Existing Community Snapshots



Figure 12: Photo collage of existing community mobility features



Figure 13: Aerial Photo of Study Area ½ mile radius shown
Source: Google Maps

5.1.2 Regional Context

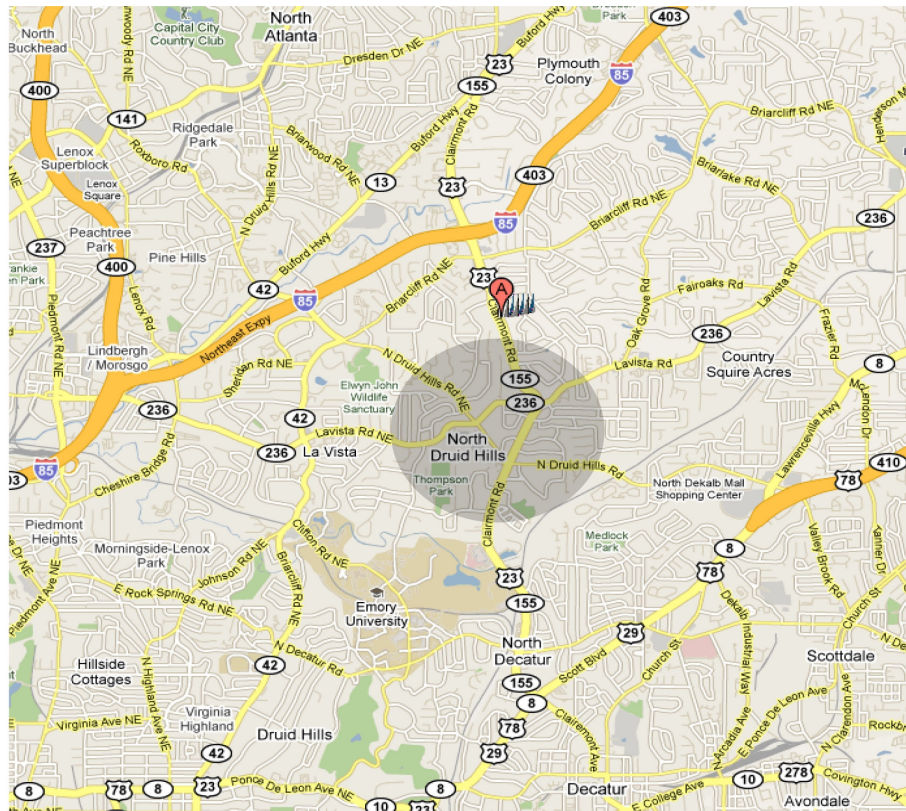


Figure 14: Regional map highlighting study area
Source: Google Maps

The community takes its name from a large commercial area in the located at the busy intersection of Lavista and North Druid Hills roads. The area is home to a large Jewish population. Most of the residences are wooded subdivisions featuring mostly ranch homes. However there are also a few newly developed town homes and multifamily housing in the area.

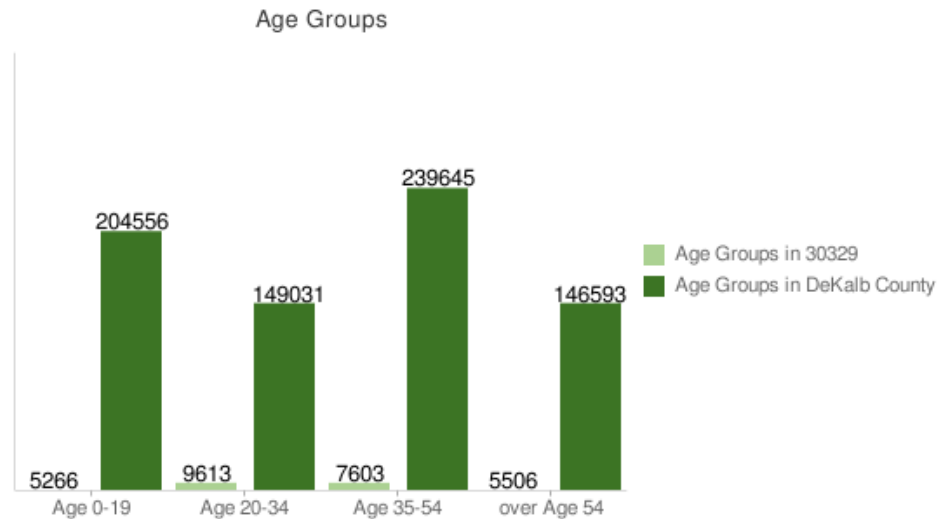


Figure 15: Age Groups in Toco Hills community compared to all of Dekalb County
Source: OnBoard Informatics

5.2 Standard Application of Community Elements

5.2.1 Zoning & Land Use Application

In this community, applying the standards explored methods for the integration of residential, commercial and civic land uses. Careful consideration was made in the site design with minimal impact to existing housing. Future residents of this community however may benefit from an enhanced design that includes a variety of universally designed housing choices strategically placed within a block and lot structure to enable diversity of type within the new framework. The site design pays special attention to knitting together existing roads and infrastructure with new construction to incrementally patch together a new street grid.

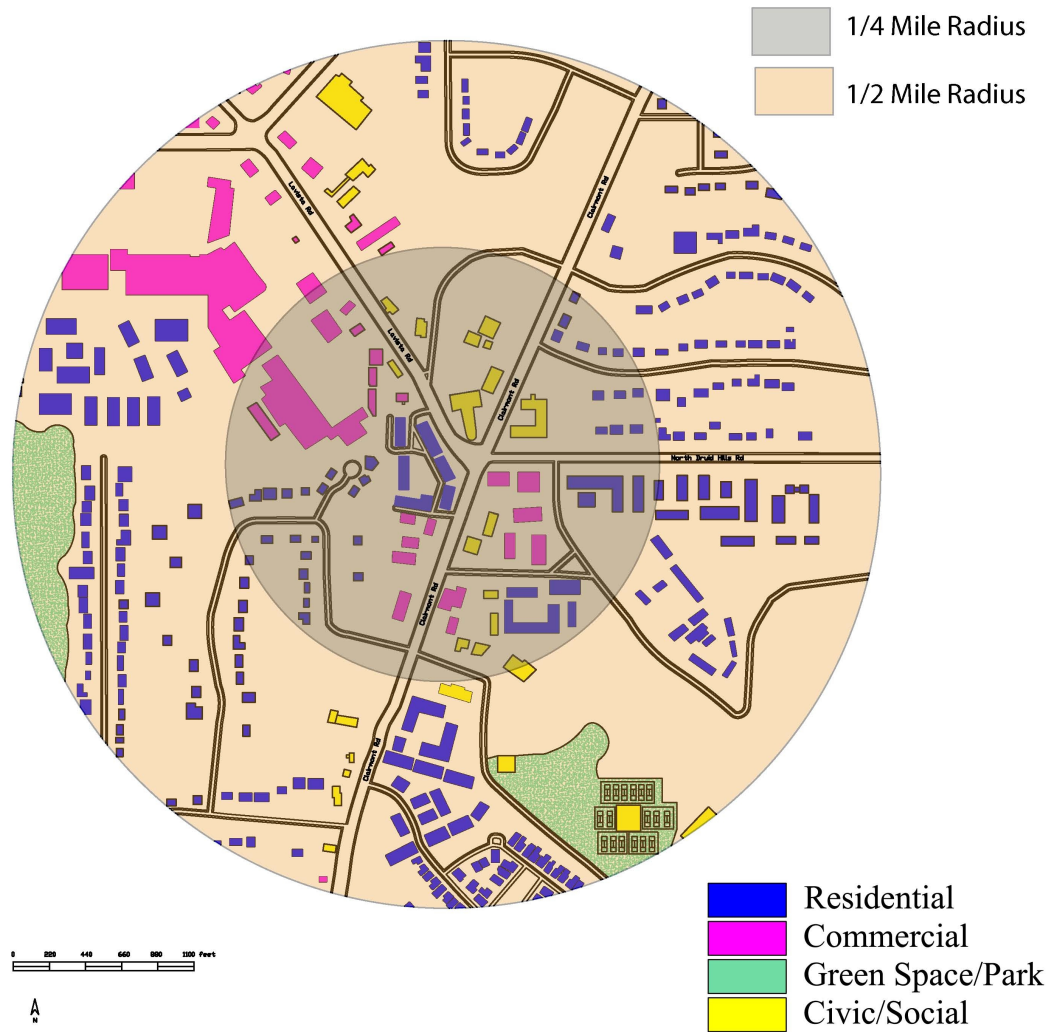


Figure 16: Illustration of Existing Building Types/Land Use in Toco Hills Community

Zoning and Land Use
(Lifelong Community Universal
Design Standard 1.0)

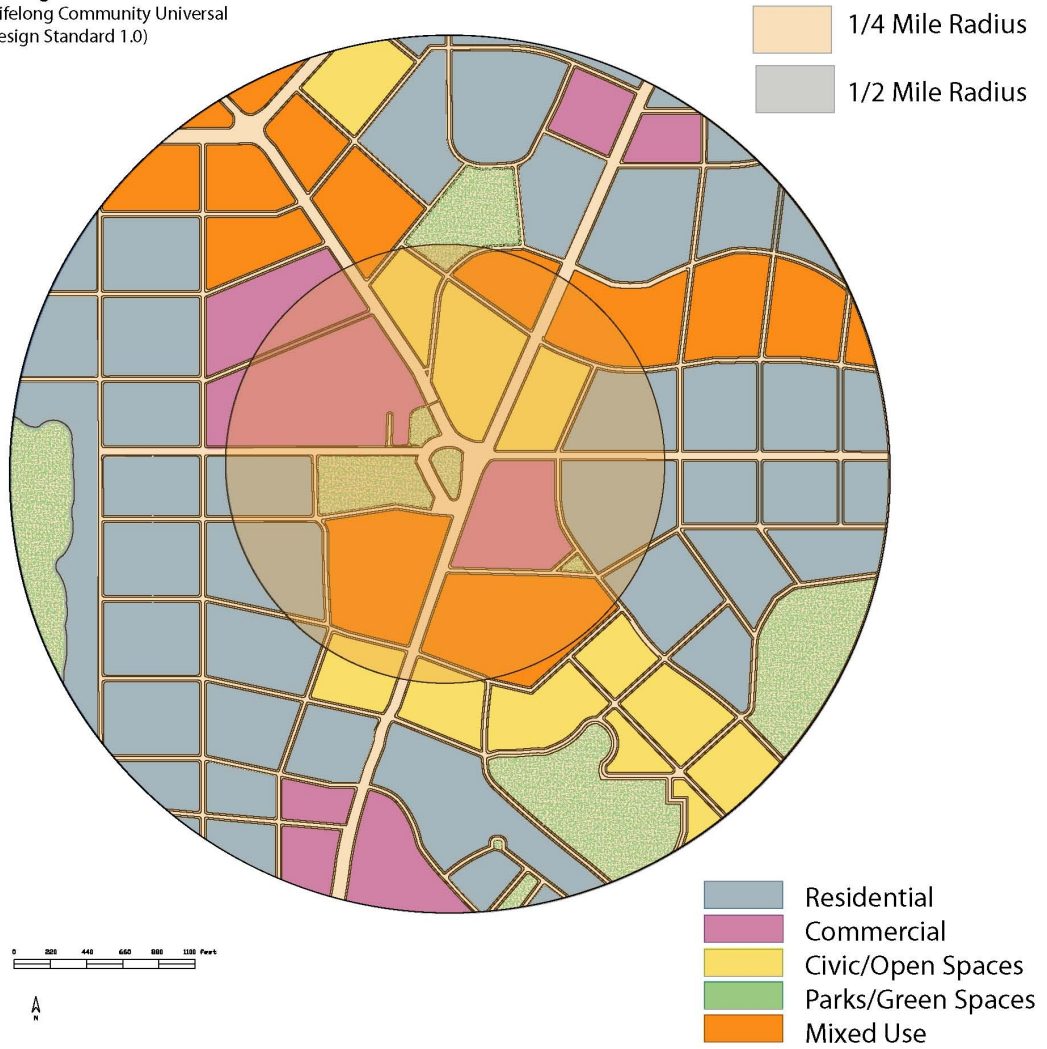


Figure 17: Illustration of Proposed Zoning and Land Uses in Toco Hills Community

Residential

The Toco Hills community is referred to as a NORC, an acronym for Naturally Occurring Retirement Community. This designation is given to the community because Toco Hills is a community where the majority of older adults have decided to remain in their homes for as long as possible. Toco Hills is home to 2,097 adults over the age of 65, or 15.73% of the Toco Hills population. Some seniors have lived here for their entire lives. Applying the Lifelong Community standards to this community would therefore call for a greater need to adopt practices and ideas that would benefit these existing residents who at present are not well served by the existing infrastructure.

Most of the existing residential dwelling types in the community are single family homes that are segregated in arterial streets from the main commercial strip along Clairmont Road. There are a few new multifamily dwellings that have been recently developed in the area along the commercial strip and some within Emory University housing area. This type of segregated zoning forces residences to be almost completely dependent on automobiles to be able to access basic community amenities and services such as: banks, grocery stores, health services, jobs and schools. In addition much of the housing that exists does not adequately provide for the needs of people with varying levels of physical ability and pedestrian mobility.



Figure 18: Photos of Multifamily dwelling units on Clairmont Road



Figure 19: Photos of Single Family House on Vistavia Circle



Figure 20: Illustration of Existing Residential Building Types and Land Use

Residential Zoning and Land Use
(Lifelong Community Universal Design
Standard 1.1)

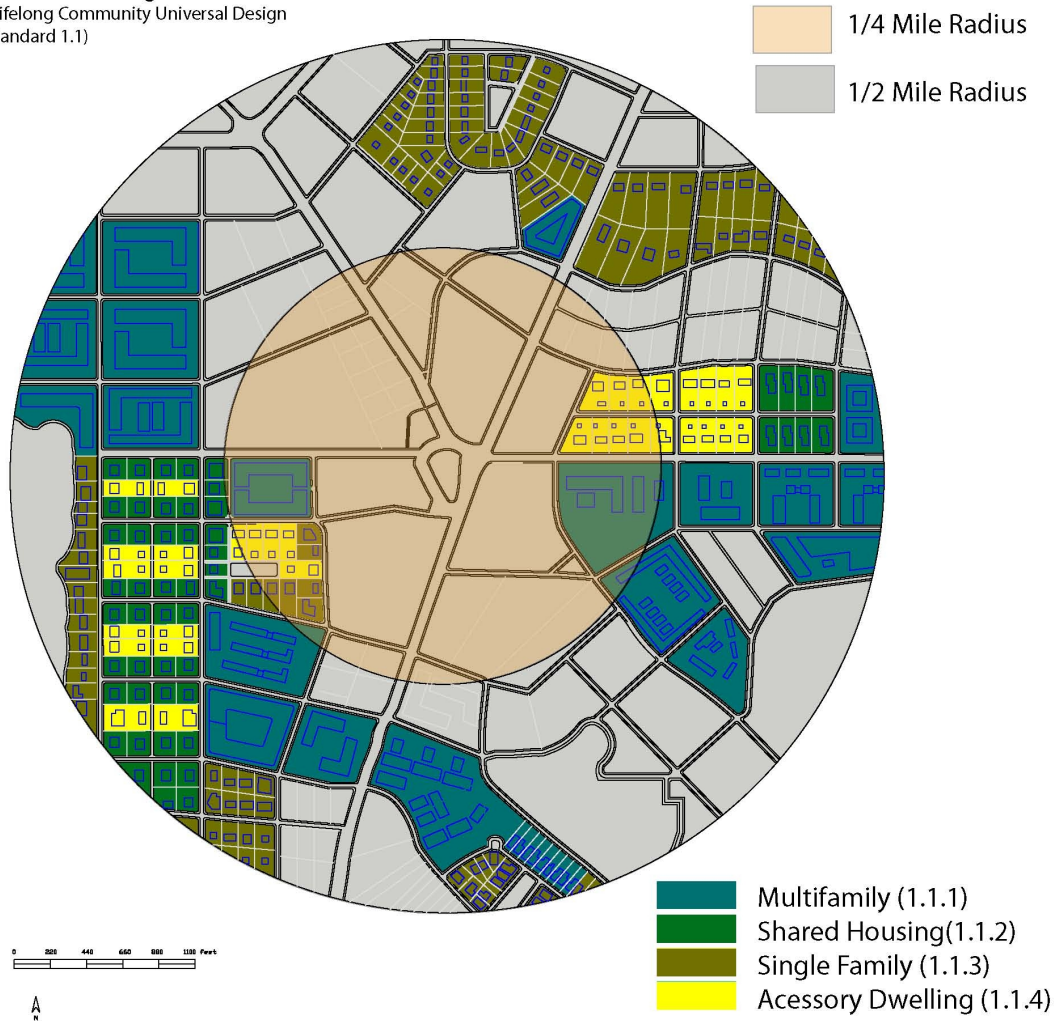


Figure 21: Proposed Residential Zoning and Building Types

This application of the standards explored alternative approaches to dwelling types that include options for people of all ages and levels of ability. According to the Lifelong Community Universal Design Standard 1.1:

A universally designed lifelong community should provide a range of housing options for people of all ages and abilities within close proximity to public transit and community resources. Residential development should promote social equity by enabling residents from a wide range of economic levels, household sizes, and age groups to live in the same community, with a minimum provision of the following universal dwelling types:²

1.1.1 Universally Designed Multifamily Dwellings



Figure 22: Elevation of a Universally Designed Condominium Complex
Source: Indian Ridge 2006

This residential dwelling type is an example of a universally designed condominium complex. In this design each condominium has an open floor plan layout. All homes are single-floor living, no stairs in any homes. All the buildings in this type of development would be fully

protected by fire sprinklers and security systems that enable all users to exit the building easily and efficiently in case of emergency or fire.

1.1.2 *Universally Designed Shared Housing*



Figure 23: Illustration of Universally Designed Shared Housing
Source: AIA Journal

This residential dwelling type can exist within existing infrastructure allowing for already built single-family homes to be given a zoning designation of shared housing. This designation would be given to a single family house that can be shared between non related members. The requirement of this arrangement however would be that at least one or more of the individuals would be disabled or physically challenged and the home must be modified for his or her use. This alternative might be applied as an extra incentive for home modifications when one or more people with special abilities reside in it. This would allow the homes to still be used universally

and can provide homeowners the incentive to upgrade existing homes in the area to become more universal in their design.

1.1.3 *Universally Designed Single Family Dwellings*



Figure 24: Illustration of Universally Designed Single-family House
Source: The Center for Universal Design NC State University

As new single family homes are being developed in the area this application would allow for new homes to be already designed with the intent of usability for a lifetime. This example demonstrates how a single family home might be designed using Universal Design principles.

1.1.4 *Universally Designed Accessory Dwellings*



Figure 25: Illustration of Universally Designed Accessory Dwellings



Figure 26: Illustration of Universally Designed Accessory Dwellings
Source: Public Architecture 2010

This type of unit would be added to existing single family homes in the area to accommodate independent living of an elderly person that may require close proximity to a relative or caretaker for some assistance with daily living but may also be occupied by other unrelated individuals. In some cases, as in the example in *Figure 26*, accessory dwelling units may be converted from existing garages.

Commercial

In order for Lifelong Community Standards to be applied to this area retail business and service planning must respond to the site context. Currently nearly all of the commercial activity in the area is centered along the high traffic area along Clairmont and North Druid Hills roads. The current location of these existing businesses and services would require residents to walk over at least a half of a mile to access these critical services. The proposed application of the Lifelong Community Standards would allow for mixed use development as infill opportunities which would bring residents closer in to critical community amenities and allow for more pedestrian mobility.

In order to service the needs of existing residences that are currently on the suburban fringe of the commercial core this application proposes smaller scale convenience stores and retail establishments be provided within a ¼ mile radius of these residential areas.



Figure 27: Aerial Photo of Toco Hills Shopping Center

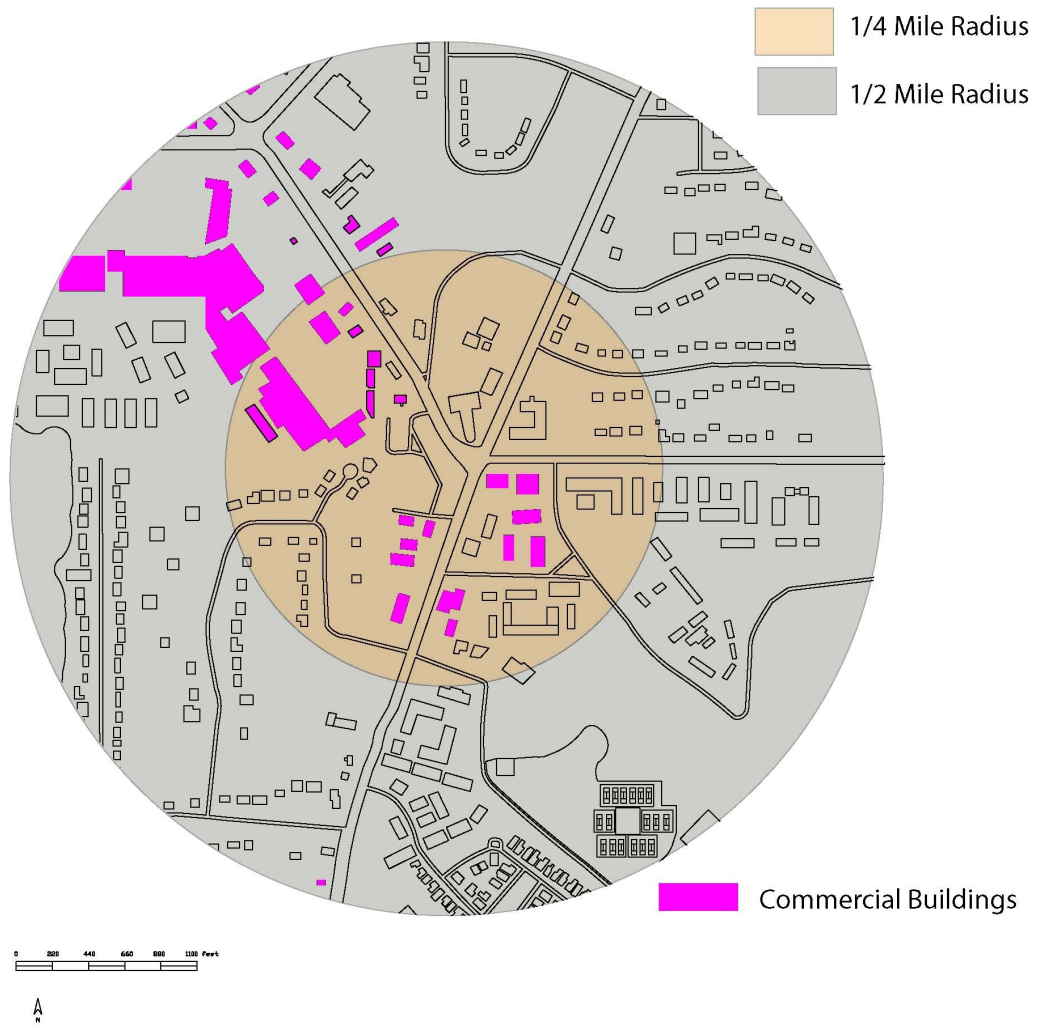


Figure 28: Illustration of Existing Commercial Buildings in Context

The application of the following standards was used to determine the availability and accessibility of essential commercial businesses and services essential to the lifelong community.

According to the Lifelong Community Universal Design Standard 1.2:

*Commercial businesses in a universally designed lifelong community should be sufficiently varied to provide for common household needs. Commercial businesses should be located within close proximity of residences:*⁸

*Commercial zoning and land use should be designed with a minimum provision for the following diverse uses:*²

- *Food Retail*
- *Community-Serving Retail*
- *Services*

1.2.1 These designated businesses should be located within ¼ mile distance from residential areas.

1.2.2 Transit stops should be located within ¼ mile distance from each other and near these businesses.

Commercial Zoning and Land Use
(Lifelong Community Universal Design
Standard 1.2)

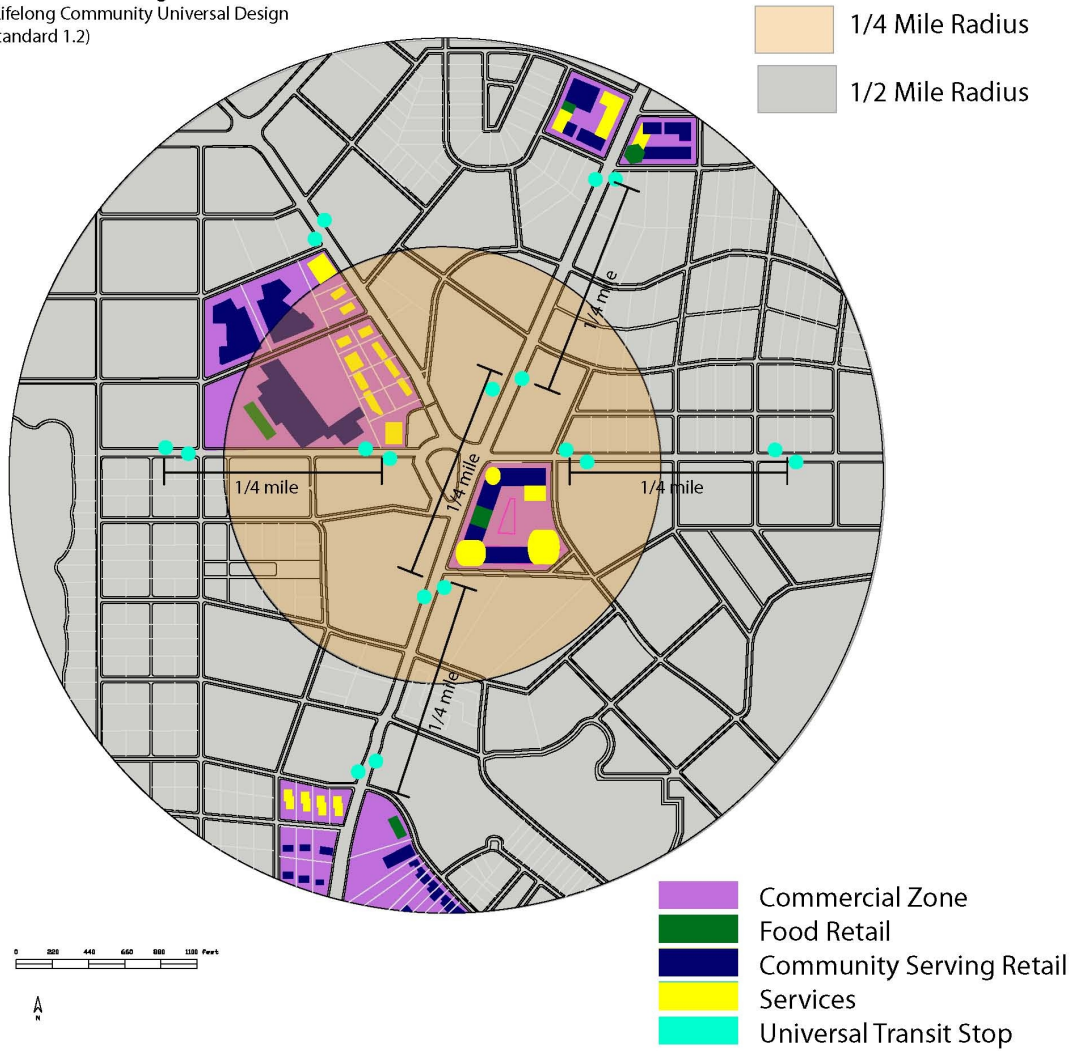


Figure 29: Illustration of Proposed Commercial Zoning and Land Use

Civic/Social

The existing land use in Toco Hills Community provides many civic and social resources that can be used to facilitate the healthy living goal of a universally designed lifelong community. Mason Mill Park provides a variety of recreational advantages, a senior center is currently under development, and several internationally recognized, state of the art health care facilities are located nearby. The focus of re-design of the civic/social land use in this community was primarily on opening up pedestrian access to the key amenities within this healthy environment.



Figure 30: Photo Collage of Existing Civic Spaces (Mason Mill Park, Clairmont Presbyterian Church, and Avis G Williams Library)

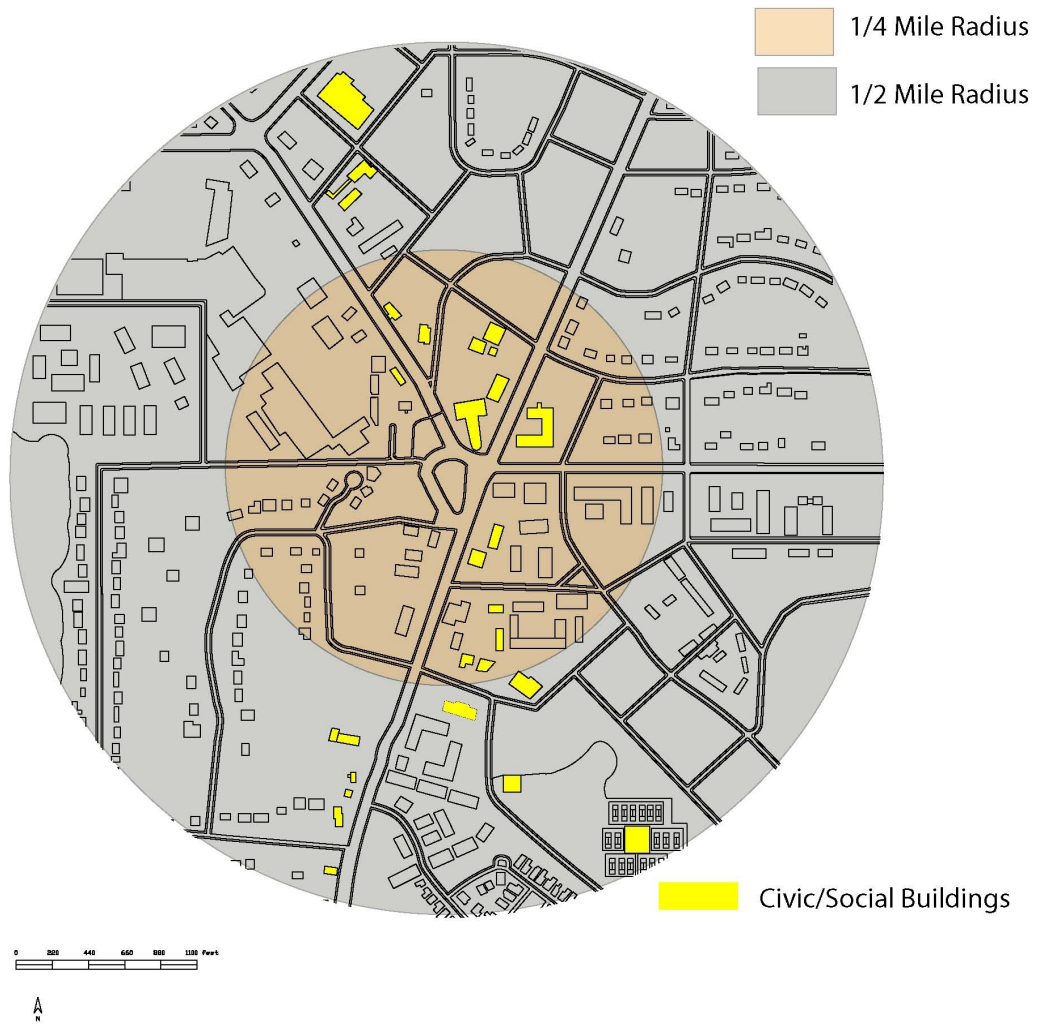


Figure 31: Illustration of Existing Civic/Social Facilities and Land Use

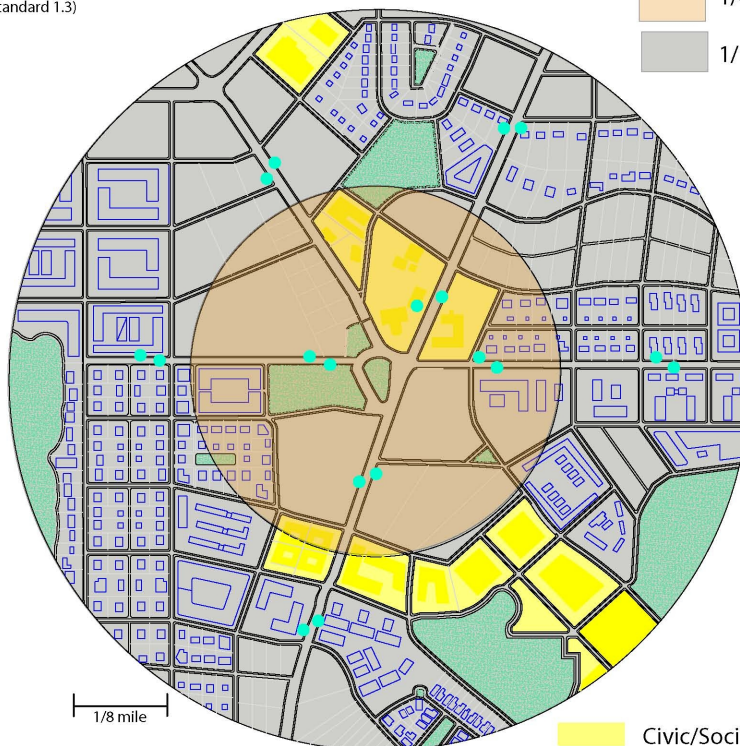
The application of the following standards was used to determine the proximity and zones in which civic and social spaces should be designed in this community. Careful attention was made in determining where essential civic and social services should be placed especially at the center of the community within a ¼ mile radius of the intersection of North Druid Road and Clairmont Road Intersection.

According to the Lifelong Community Universal Design Standard 1.3:

- 1.3.1 Civic/Social zoning and land use should be designed with a minimum provision for communal services.⁶*
- 1.3.2 There should be parks, trails and playgrounds near every dwelling. This distance should not be more than one-eighth of a mile.^{2,10}*
- 1.3.3 Open space should be aggregated in one large area rather than dispersing into smaller pieces. Wherever possible this open space should be provided within ¼ of a mile of residential areas.⁴*
- 1.3.4 A distinguishable community center should include spaces such as plazas that are located within one mile from residential areas for ease of accessibility to pedestrians and bicyclists.⁵*

Civic/Social Zoning and Land Use
(Lifelong Community Universal Design
Standard 1.3)

1/4 Mile Radius
1/2 Mile Radius



Civic/Social Zone
Green Space/Parks
Residences
Civic Buildings
Universal Transit Stop

Figure 32: Illustration of Proposed Civic/Social Zoning, Facilities and Green-space

5.3 Connectivity

Lifelong Communities are heavily dependent on good connectivity thus it was necessary to suggest a design for re-weaving the land use patterns in the area. The full weight of a regional traffic problem bears on the Toco Hills community and the surrounding area. Typically when planners identify a traffic problem they are describing points where traffic backs up and cars are unable to move freely. In the context of neighborhood connectivity, however, the opposite is true: a traffic problem is created when cars are able to move down a road too fast and in too great a volume for local street grids and pedestrian trails to interface across it. With protected parkland to the south and east and major regional traffic barriers to the north and west, this community works for neither cars nor pedestrians and has significant exterior connectivity problems along its entire perimeter.

In order to address the connectivity problems this application of the standards introduces alternative routes around the Clairmont and North Druid Hills intersection. Arterial street connections are cut through the site from North Druid Hills to Clairmont. These routes open the neighborhood to the greater community to the fullest extent possible. They also transform the residential area near the park from an enclave that obscures and land locks Mason Mill Park, to a neighborhood that can serve as a grand gateway to Mason Mill's tremendous public amenities. The design significantly contributes to resolving connectivity problems, and does so in a way that liberates the park from its current confines and gives it a more notable civic presence.



Figure 33: Illustration of Existing/Proposed Street Connectivity

Street Intersections

According to the Lifelong Community Universal Design Standard 2.1:

*The community should have a discernible Activity Center. This is often a plaza, square or green, and sometimes a busy or memorable intersection. A transit stop should be located at this center.*⁸



Figure 34: Illustration of Proposed Activity Center
Source: Original Rendering Adapted from ARC Lifelong Community Charette

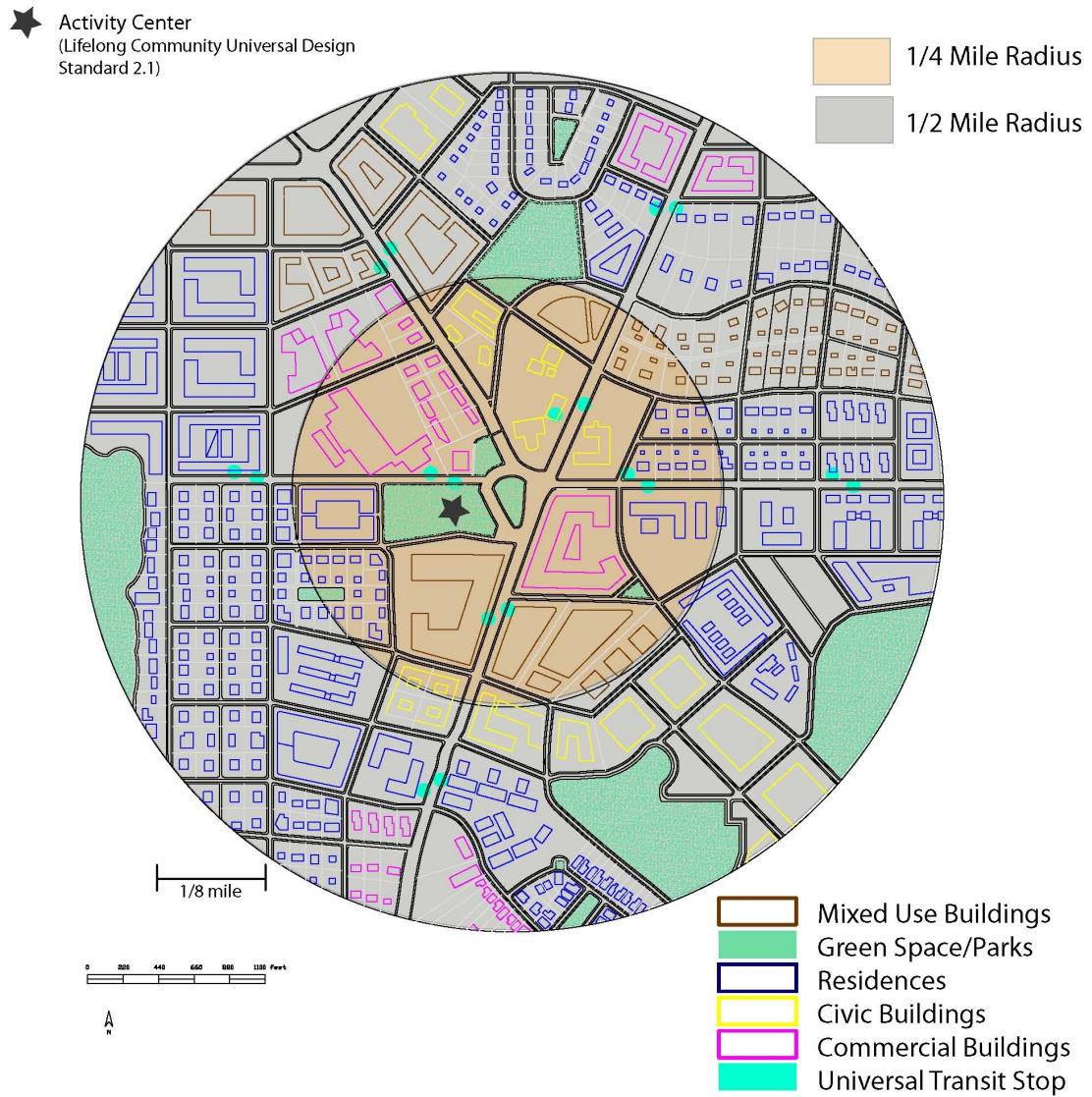
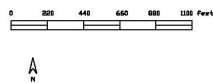
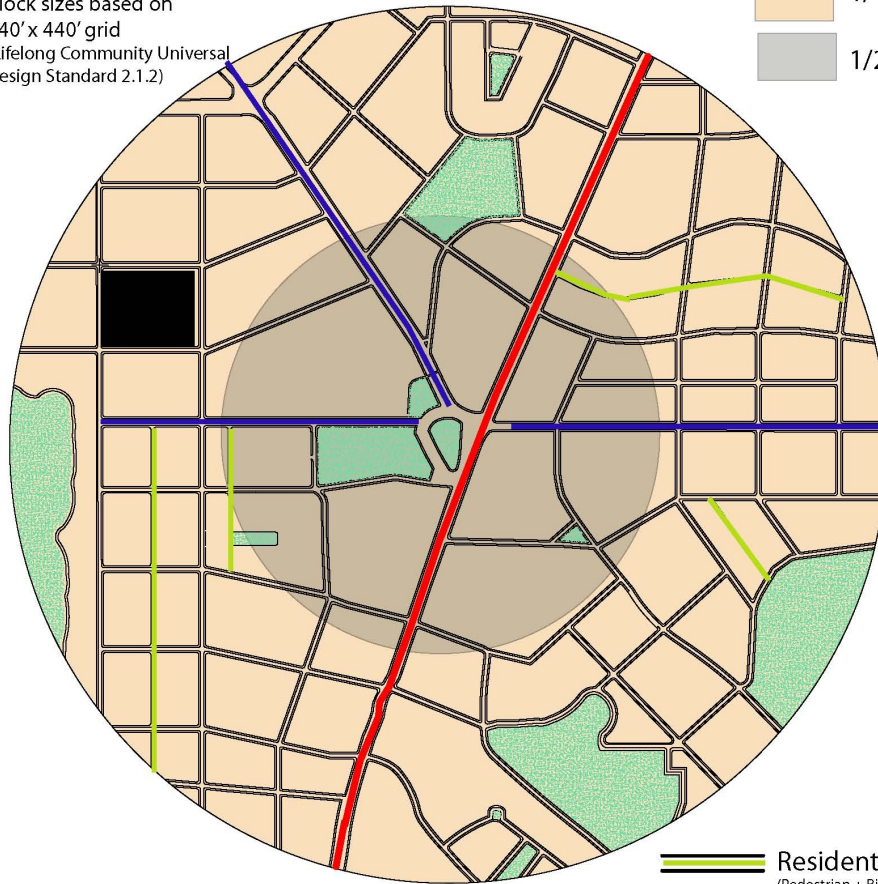


Figure 35: Illustration of Proposed Street Network highlighting Activity Center of the Community

+ # Intersections per 1/2 mile
 is greater than 100
 (Lifelong Community Universal
 Design Standard 2.1.1)

Block sizes based on
 440' x 440' grid
 (Lifelong Community Universal
 Design Standard 2.1.2)

1/4 Mile Radius
 1/2 Mile Radius



*Note: #Intersections
 exceeds 100 per 1/2
 mile radius (

Residential Streets/Trails
 (Pedestrian + Bicycle Only)
 Mixed-Use Streets
 (2-way Vehicular + Bike + Pedestrian)
 High Volume Streets
 (Multi Lane Vehicle + Bike + Pedestrian)
 Boulevard
 (Multi Lane Vehicle + Bike + Pedestrian
 +Median)

Figure 36: Diagram of Proposed Street Types and Intersections

Pedestrian Paths

According to the Lifelong Community Universal Design Standard 2.2:

2.2.1 *All Streets within a community should have continuous sidewalks on both sides of the streets.⁵*



Figure 37: Illustration of Proposed Pedestrian Paths

Public Transit Stops and Shelters

Access to public transit is an important asset to this community given its relative location and demographic mix. However the inadequacies of the current transit stop network needs to be considered in order to improve public transit mobility within the community. This application proposes an addition of transit stops in residential neighborhoods that are more than ¼ mile from the urban core of the city.

According to the Lifelong Community Universal Design Standard 2.3:

- 2.3.1 Transit shelter should clearly communicate routes for all potential users.³*
- 2.3.2 Real time arrival information and interactive maps should be available in a variety of audio/visual/tactile media formats at major transit stops.³*
- 2.3.3 Transportation vehicles should be easily boarded with a ramp at a safe slope or from a level surface.³*
- 2.3.4 At least one secure bicycle storage rack should be located at each transit Shelter.⁴*
- 2.3.5 Courtesy phones should be available at major transit stops to connect to taxi and para-transit services.⁶*
- 2.3.6 Passengers should have direct view of oncoming transit vehicles from transit shelter interior.³*
- 2.3.7 Transit stop shelters should provide internal clearances for mobility aid users, which means appropriate offsets between the shelter and the curb.*

2.3.8 *Transit stop locations on opposite sides should have a pedestrian crosswalk from both sides of the street with actuated pedestrian traffic signals.⁵*



Figure 38: Illustration of Proposed Transit Stop and Shelter Design

5.4 Involvement

The social challenge for this community is developing a sense of neighborhood identity that accommodates both familiar relationships among neighbors as well as anonymous interactions with those visiting the park or orbiting through on their way to somewhere else. For the past half century, residential neighborhoods have been inhabited as small enclaves wedged between regional concerns: two arterial streets and two large public parks. The Williamsburg Apartments have developed a neighborly claim to the Mason Mill Park and a sense of protected separation from the Druid Hills traffic. Both of those relationships must change if the overall area is to be better connected and pedestrian friendly.

Social interaction will be significantly aided by creating an interim scale that relates the neighborhood to the surrounding community. The large civic square created as part of the intersection redevelopment is critical to establishing this scale. Currently the intersection has divided the area into four stand alone quadrants effectively internalizing each neighborhood and separating the residences from the regional traffic flow. The square opens up a common space at the center of the intersection and establishes a place for inter-neighborhood relationships and larger community identities to form. It is also provides a good vantage point for regional people watching: a place to see and be seen at a regional scale.



Figure 39: Illustration of Universal Design Signage

As a result of the connectivity problems, pedestrian mobility in the Toco Hills community is also problematic. The application of the standards focused primarily on two objectives: increasing pedestrian mobility for people of all ages and open up parks and greenspaces to the greatest extent possible. Mason Mill Park is an enormous public asset that is currently cut off by the Williamsburg Apartment complex. Within this enclave, the park has been further sequestered to the backs of buildings. The natural beauty that is prized by existing residents is primarily that of the enormous public park, which is not adequately shared amongst all residents in the community.

This application of the standards proposes a park promenade in the center of the community at the North Druid Hills and Clairmont Road intersection that opens up a dramatic pedestrian experience to the larger community. The orientation of the street grid also draws pedestrian movement toward the beauty of the park. From North Druid Hills Road at front to the park frontage in back, the grade falls away precipitously. By running the streets down the grade, dramatic vistas over the park are opened and the tree canopy acts as a tranquil backdrop to the pedestrian experience. The redesign of the intersection at the city core refocuses the surrounding buildings onto a civic space that connects the center to the larger community. This area serves to provide safe pedestrian access and helps to engage all residents in the community into active participation in community amenities.

Sidewalk Corridor

According to the Lifelong Community Universal Design Standard 3.1:

3.1.1 Adequate Travel Width

The Sidewalk Corridor should be wide enough to accommodate four distinct zones: the Curb Zone, the Furnishings Zone, the Through Pedestrian Zone, and the Frontage Zone.¹

3.1.1.1 The curb should have a minimum width and height of 6 inches wide with the exception of curb cuts and ramps at intersections.

3.1.1.2 The furnishing zone should have a minimum width of 3 feet from the curb zone.

3.1.1.3 On sidewalks with adjacent traffic at speeds greater than 55 mph the Furnishing Zone should be wider than 3 feet.

3.1.1.4 The Through Pedestrian Zone should accommodate at least two people walking together and allow for a third person to pass comfortably in a wheel-device or with a mobility aid.¹

3.1.1.5 The Through Pedestrian Zone should have a minimum width of 5 feet.

3.1.1.6 The frontage zone should have a minimum width of 6 inches.

Sidewalk Corridor Section

Scale: 1/4" = 1'-0"

(Lifelong Community Universal Design
Standard 3.1)

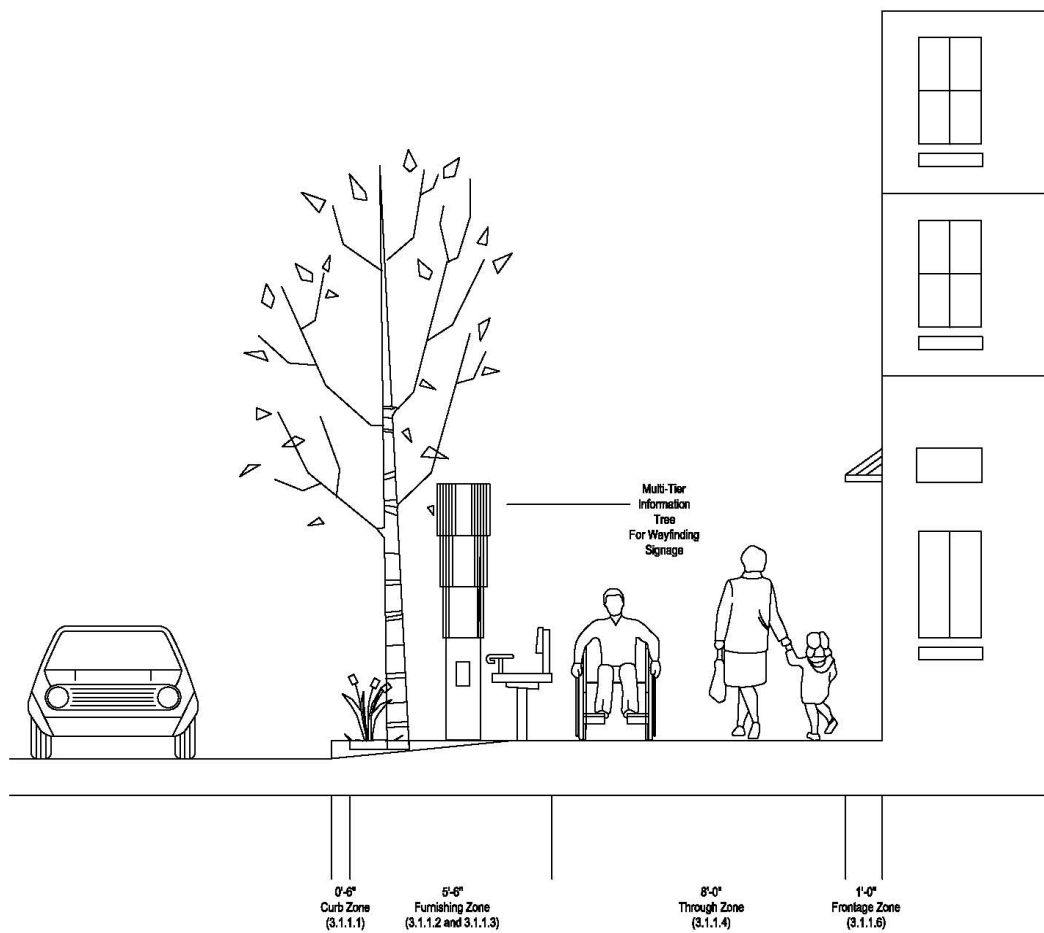


Figure 40: Illustration of Proposed Sidewalk Corridor

3.1.2 Safety

3.1.2.1 *Traffic calming devices should be placed near pedestrian pathways to prevent collisions and incidental injuries and deaths.*³

3.1.2.2 *Physical protections should be provided between vehicular and pedestrian areas (i.e. bollards, planters, etc.)³*

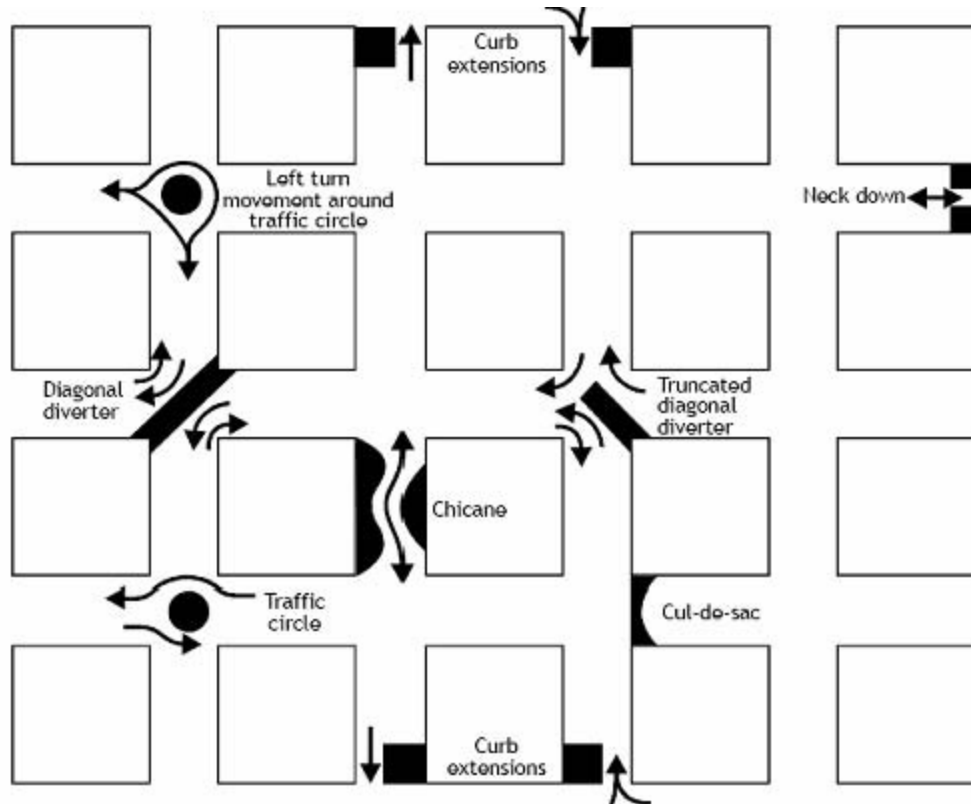


Figure 41: Illustration of Traffic Calming Devices

Physical Comfort and Weather Protection

According to the Lifelong Community Universal Design Standard 3.2:

- 3.2.1 Shelter enclosure should block prevailing winds.³*
- 3.2.2 Shelter enclosure should block splashing from roadway.³*
- 3.2.3 Should have adequate night illumination.³*
- 3.2.4 Shelters should provide weather protection for bicycle storage.³*

These features were applied in the design of the transit stop shelter (See Figure 38).

Trees and Landscaping

According to the Lifelong Community Universal Design Standard 3.3:

- 3.3.1 Planting strips, located between the curb and sidewalk, in the Furnishing Zone, should be used to help create shaded streets, promote walking and slow traffic.¹*
- 3.3.2 Tree limbs and branches must leave 7'-6" clearance above the level of the sidewalk.¹*
- 3.3.3 Plants that shed leaves and fruit should be located in places where they will not create slipping hazards.³*

3.3.4 *Vegetation and permeable sloped paving should be used to reduce standing water that could cause slippage or accidental injuries in the pedestrian environment.*³

Sidewalk Corridor Elevation
Scale: 1/32" = 1'-0"
(Lifelong Community Universal Design
Standard 3.3)

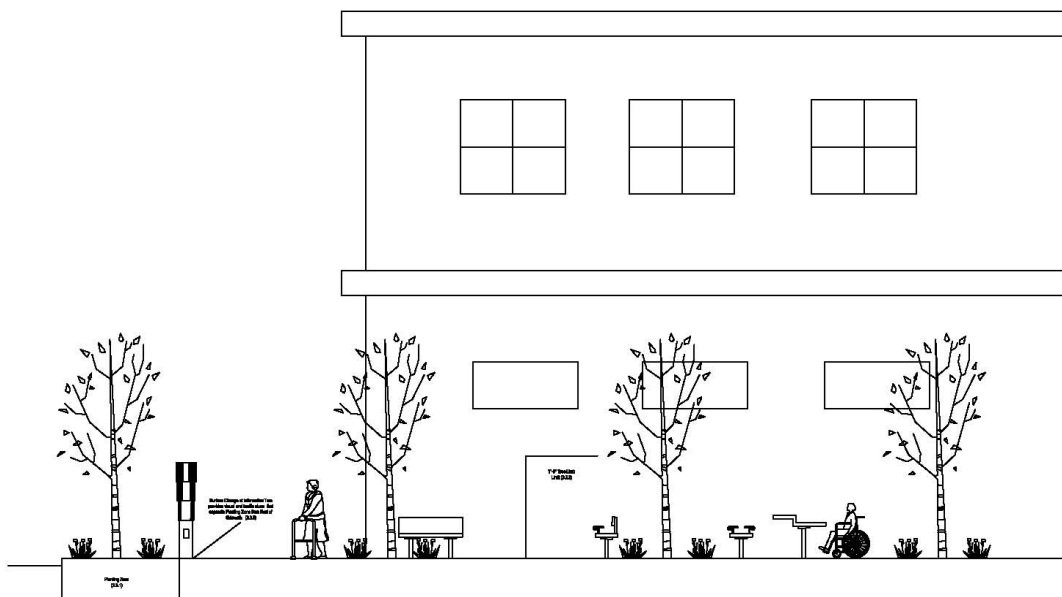


Figure 42: Elevation Drawing of Proposed Sidewalk Corridor

5.5 Mobility/Transportation Systems

Pedestrian Street Crossings

According to the Lifelong Community Universal Design Standard 4.1:

- 4.1.1 Street Crossings should be spaced at a minimum of 100 feet where blocks are longer than 500 feet.²*
- 4.1.2 Visual/Audible pedestrian traffic signals should be activated upon request at major street crossings.³*
- 4.1.3 Pedestrian crossing cycles should be long enough for a slow moving pedestrian to cross safely or clearance interval for crossing signal should be set based on min 2.8 ft/sec crossing speed.⁵*
- 4.1.4 Minimum refuge island width between travel lanes should be 6 feet and min length should be at least 20 feet.²*

Curb Ramps and Extensions

According to the Lifelong Community Universal Design Standard 4.2:

- 4.2.1 Curb extensions should be used to shorten the distance of a crosswalk.²*

- 4.2.2 *Curb ramps should be as wide as adjacent crosswalks to avoid “bottlenecks”.*³
- 4.2.3 *Boundaries of safe crossing zones should be clearly defined using color and tactile markings (i.e. Reflective markers, graphics and lighting).*³
- 4.2.4 *Street crossing should be raised close to sidewalk elevation to provide curb-less intersection.*³
- 4.2.5 *Crossings should have curb ramps with tactile cues such as “turtle” tiles to accommodate visually impaired persons.*⁵



Figure 43: Photo of Street Crossing at Major Intersection
Source: Rio City Project, Rio de Janeiro



Figure 44: Photo of Street Crossing at Major Intersection
Tactile warnings alert blind person at this mid street crossing
Source: San Francisco, California

Bicycle and Vehicular Traffic Lanes

According to the Lifelong Community Universal Design Standard 4.3:

- 4.3.1 Arterial streets should be designed to be only as wide as needed for low-speed two-way traffic.⁸*
- 4.3.2 Residential-only streets should be designed for a target speed of no more than 20 mph.⁸*
- 4.3.3 Nonresidential and/or mixed-use streets should be designed for a target speed of no more than 25 mph.⁸*
- 4.3.4 On lower traffic volume streets, bicyclists should be considered a normal part of traffic. On higher volume streets, bicyclists should be accommodated with minimum of six-feet-wide bike lanes, but separate routes for less experienced bicyclists may be considered as well.⁸*
- 4.3.5 Extra turning lanes should be available for vehicles to disengage from through traffic³*

Residential Streets

(Lifelong Community Universal Design
Standard 4.3.2)

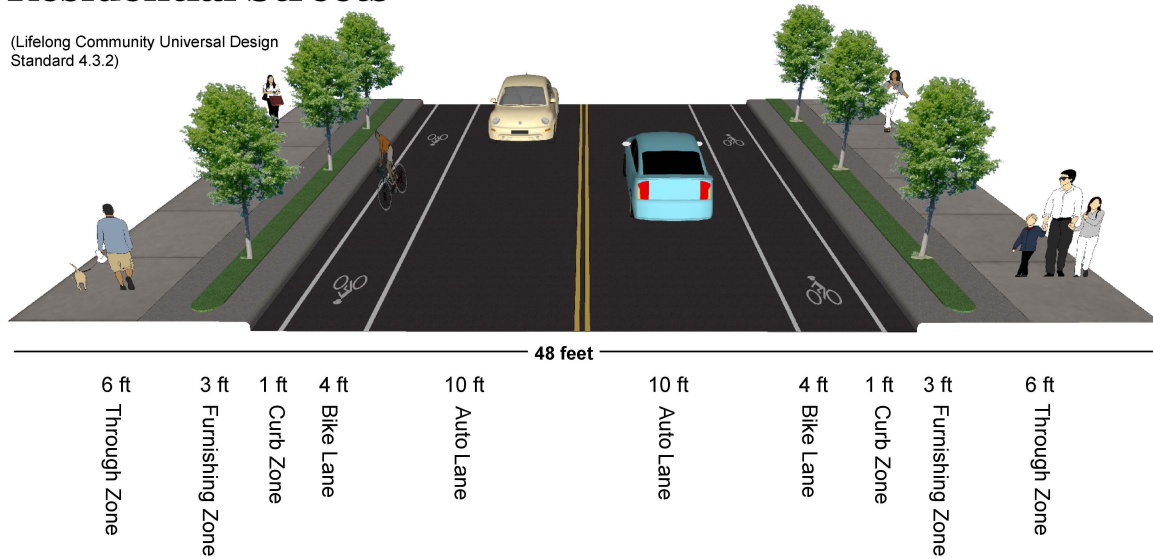


Figure 45: Illustration of Proposed Street Design for Residential Streets

Non-Residential and/or Mixed Use Streets

(Lifelong Community Universal Design
Standard 4.3.5)

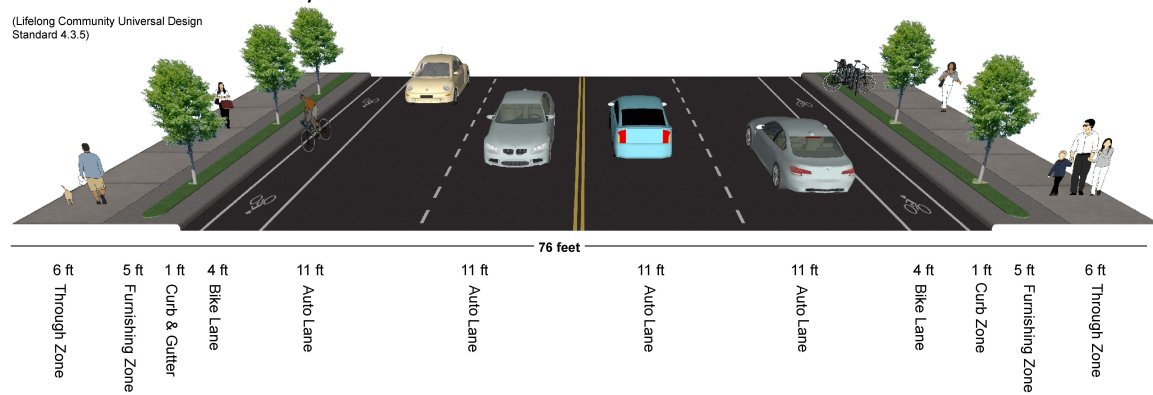


Figure 46: Illustration of Proposed Street Design for Mixed-Use Streets

North Druid Hills Road

(Lifelong Community Universal Design
Standard 4.3.4)

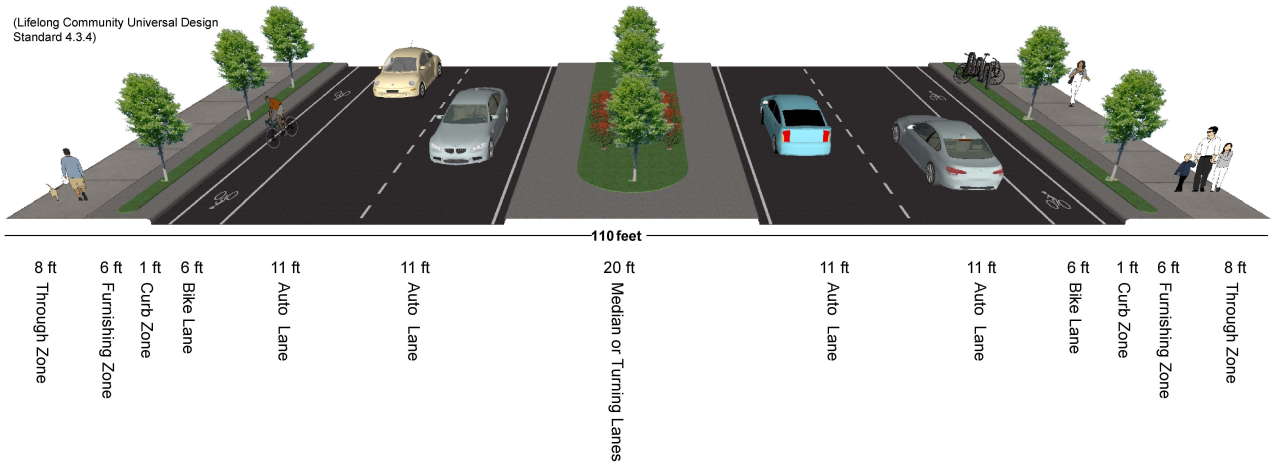


Figure 47: Illustration of Proposed Street Design for High Traffic Volume Streets

Trails and Multi-Use Paths

According to the Lifelong Community Universal Design Standard 4.4:

- 4.4.1 *All paths should be connected to provide a continuous network.³*
- 4.4.2 *Paths should have resting stations/areas along the peripheral edges of the path.³*
- 4.4.3 *Shared bicycle/pedestrian pathways should have a clear passage width of at least 12 feet.²*

Multi-Use Trail

(Lifelong Community Universal Design
Standard 5.2)

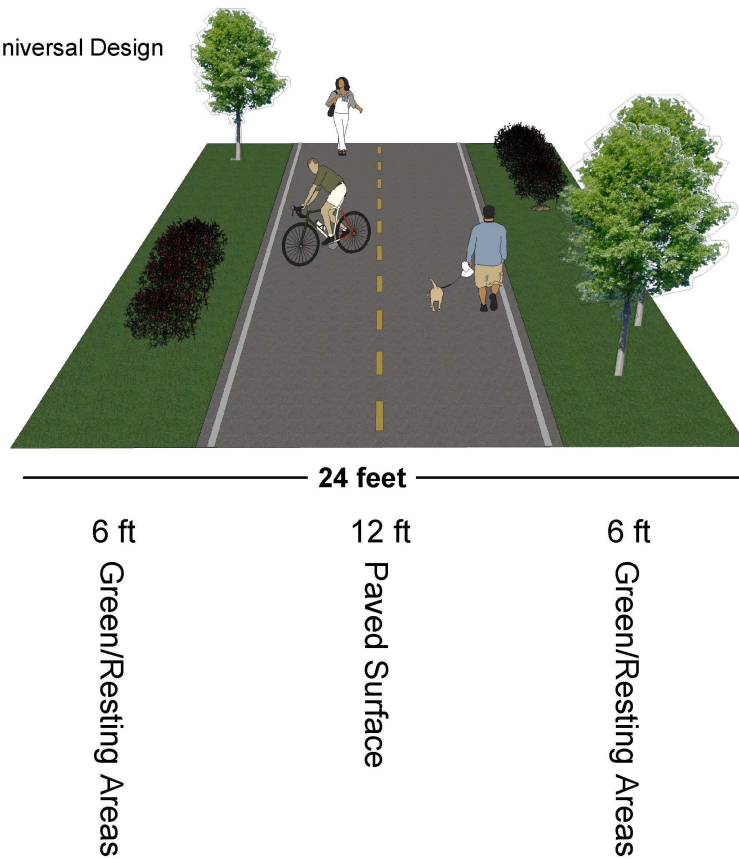


Figure 48: Illustration of Proposed Street Design for Trails/Multi-use Paths

CHAPTER 6

CONCLUSION

6.1 Summary

The Lifelong Community Universal Design Standards were developed with the intention of becoming a usable guide for planning agencies such as the Atlanta Regional Commission and other regional community design facilitators. By integrating universal design principles into the practice of urban planning and design these standards help provide a framework for communities to accomplish three main goals: 1) Encourage healthy and active lifestyles for people of all ages and physical abilities; 2) Reduce the potential for accidental deaths and injuries due to environmental risks; and 3) Improve mobility and active involvement for people of all ages and physical abilities. After significant research, study and development of these Lifelong Community Universal Design Standards, several conclusions were drawn that necessitate the implementation of these guidelines.

First, Lifelong Communities must adhere to the fundamental principles of Universal Design to truly be places where all people can live throughout their lifetimes. They must also be designed for full mobility, from the dwelling, down the street and up to the convenience store, bank or church, removing barriers to community involvement by designing continuously across the entire urban landscape. Lastly, Given that people are living longer, often with the presence of

managed disabilities or chronic conditions, community design must reflect the new reality which includes ever increasing life expectancies and varying levels of ability.

6.2 Lessons Learned

After applying these standards to an existing community with a mix of residents that exemplify this changing dynamic several discoveries were made. The first discovery made is that application of the Universal Design Standards to existing communities requires significant development changes in order to achieve more integrated land uses that are essential for the lifelong community. This type of integrated design can allow people to remain independent and involved in the community around them throughout a lifetime by providing better housing options and bringing essential community amenities closer together.

Another key discovery found in the application of the Lifelong Community Universal Design Standards was that street connectivity and pedestrian mobility are essential factors to ensuring that people of all ages and ability have access to community amenities. The key elements of a community are only as good as the connective network of streets and sidewalk corridors that transport members throughout it. Better connectivity in the Toco Hills community will eliminate the distance barrier created by segregated land uses that cause heavy reliance on the automobile and major arterial streets.

Social Interaction was also an important factor in applying the standards to this community. The challenges associated with segregated land use inhibited the existing

community from having a well defined common activity center. The design of a central promenade at the main intersection allowed for this sense of communal gathering space. This large open space created an opportunity for greater socialization, while branching off of the promenade, the local streets incorporated several protective gestures to create more intimate spaces for social interaction within the nucleus of the community.

The application of the Lifelong Community Universal Design Standards provided greater use of public amenities like parks, recreation and activity centers to support healthy lifestyles. This collaborative use of civic/social facilities, not only maximizes valuable land space and county resources, it also increases the opportunities for inter-generational socializing, education and physical activities that support multiple users' needs.

Lastly the application of these standards demonstrated that in order to improve pedestrian transportation and mobility within a community, the design of transit stop should be carefully integrated into the project planning process. This means that Transportation agencies must carefully reexamine existing policies and programs to determine if they provide the features and measures that make them truly universal for all users. Mobility is a basic right and it is the responsibility of transportation agencies to guarantee this right by ensuring that physical barriers are removed, audible and visual information is provided, and transit stops are universally designed. This assures that facilities will be usable and safer for all pedestrians.

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