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WHY WON'T GRANDMA CROSS THE ROAD? NEIGHBORHOOD PERCEPTIONS AND WALKING BEHAVIOR AMONG OLDER ADULTS IN LEXINGTON, KENTUCKY

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THESIS

A thesis submitted in partial fulfillment of the
requirements for the degree of Master of Science in the
College of Design
at the University of Kentucky

By

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ABSTRACT OF THESIS

WHY WON'T GRANDMA CROSS THE ROAD? NEIGHBORHOOD PERCEPTIONS AND WALKING BEHAVIOR AMONG OLDER ADULTS IN LEXINGTON, KENTUCKY

Many urban places contain subtle details that can unintentionally deter pedestrian activity. These details can be assessed through six themes: safety, comfort, pedestrian infrastructure, aesthetics, proximity, and ease of navigation. Adults over age 65 may have more concerns about walking in urban settings than people in other age groups. This study identifies urban design elements that encourage and discourage walking among older adults and makes recommendations for design improvements. Study participants (n= 67) completed an online survey about walking behaviors, perceptions of health and community, and perceptions of seven unidentified scenes of pedestrian environments in Lexington, Kentucky. Findings suggest that feelings of safety and comfort were frequent concerns for older adults. Evidence-based recommendations are made to improve all six themes, to encourage walking among older adults in Lexington, Kentucky.

KEYWORDS: Walking, Universal Design, Older Adults, Urban Design, Built Environment

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1 INTRODUCTION

In 2010, the Foundation for a Healthy Kentucky first asked a question about walking in its annual Kentucky Health Issues Poll. In the decade since, walking-related questions have only been asked two other times, in 2013 and 2016. In those six years, respondents' perceptions of safety and ease of walking in their neighborhoods had improved, despite increased reported observations of poor walking infrastructure. In the 2010 version, participants were asked how strongly they agreed that there were many destinations within walking distance of their home. Nearly 70% of respondents disagreed. The question was not asked again (Foundation for a Healthy Kentucky, 2010).

Feeling safe is not enough to convince people to walk in their neighborhoods. For many Kentuckians, close proximity to destinations and sufficient pedestrian infrastructure are necessary to complete daily tasks. In Lexington alone, about 8% of households do not have a vehicle (U.S. Census Bureau, 2019). However, of the population who walk, bike, carpool, or take a rideshare or public transportation to work, most own one or more vehicles. The benefits of walking in lieu of driving are numerous, including increased physical activity and time spent in nature, more opportunities for random social contact, and decreased carbon emissions from vehicles. How can the vehicle-owning 92% of Lexington's population be convinced to walk instead of drive?

One method is to manipulate the built environment to accommodate all ages and abilities. Universal design, a term coined by architect Robert Mace in the mid-twentieth century, is the practice of designing "all products and the built environment to be aesthetic and usable to the greatest extent possible by everyone, regardless of their age, ability, or status in life." Mace was paralyzed after contracting polio as a child and used a wheelchair for the rest of his life (Center for Universal Design NCSU, 2008). The theory of universal design suggests that when environments are designed to meet the needs of those who may require special accommodation, including older adults, people with disabilities, and children, everyone benefits. Equal access by all diverse users is a fundamental piece of successful design, according to Mace and other researchers at North Carolina State University (Story, Mueller, & Mace, 1998).

Like many American cities, Lexington's population is rapidly aging. The number of Lexingtonians over 65 increases by almost 10% every year (U.S. Census Bureau, 2019). Older adults are vulnerable road users, both as drivers and pedestrians. Acknowledging this, the Lexington Fayette Urban County Government Division of Planning has a motto to re-design the city for users "from eight to eighty." This motto references a nationwide design advocacy organization, 8 80 Cities. This organization's mission emphasizes that if a city is great for an eight-year-old or an eighty-year-old, the city will be great for everyone (8 80 Cities, 2021).

How can Lexington become more universally designed to accommodate everyone? First, information must be collected on older adults' perceptions of existing pedestrian conditions in Lexington, Kentucky. Then, that information can be analyzed to develop design recommendations to create appealing spaces to walk. Knowing how a vulnerable group of residents perceives their pedestrian infrastructure, safety, comfort, aesthetics, proximity, and navigability will allow Lexington's planners and decision makers to create places that accommodate all ages and abilities. This study collects, analyzes, and compares data on older adults' perceptions of their health, neighborhood quality, and sense of community, and their feelings about seven unlabeled photographs of scenes around Lexington, Kentucky. The study

then uses this insight to identify and recommend changes to the presented scenes and methods to apply those recommendations to other places, in any city.

The specific aims of this study are to:

A. Investigate older adults' perceptions of the neighborhood built environment;
B. Identify specific design interventions that encourage increased pedestrian activity; and
C. Recommend universal design improvements.

2 BACKGROUND AND LITERATURE REVIEW

Since 2004, Belgian Ageing Studies (BAS) has partnered with 140 municipalities in Belgium to collect survey responses from adults over age 60 who reside at home. Nearly 65,000 people have participated in the study, which focuses on understanding home-dwelling older adults' perceptions of daily life, from loneliness and neighborhood involvement to mobility and use of public space (Belgian Ageing Studies, n.d.). The BAS datasets have been used by many researchers in studies on topics including community development and health behaviors. One trend particularly stands out among these studies: feelings of safety and access to destinations are associated with higher rates of walking for recreation and mobility among older adults (Cauwenberg, et al., 2012).

Unfortunately, a similar study of this scale has not been undertaken in an American context. Some small-scale studies on universal design, aging-in-place, and neighborhood walkability perceptions have been conducted in various US cities, including Louisville, Kentucky. Each study uses its own methodology and there is not one streamlined set of criteria to compare American cities' walkability. Perhaps the most well-known walkability methodology is the WalkScore®, an algorithm primarily used by the real estate industry to score neighborhoods by their proximity to certain destinations, with considerations for block length and population density. In terms of time to make a trip by foot, WalkScore® is fairly accurate and well-regarded. However, the methodology only uses easily accessible datasets and leaves out important factors including sidewalk condition, lighting, impediments on the path such as tree roots, crime, and the presence of established street crossings. These variables may not affect a walking trip for a fit 30-year-old but can make or break pedestrianism for older adults. Upon further investigation into the sites WalkScore® is scoring, the methodology is ageist or ableist at worst, and lazy at best.

To expand on those methods, one study used WalkScore® and a survey of older adults' neighborhood perceptions to compare raw geographic data with subjective data on feelings of safety and neighborhood cohesion and with objective data on car-dependence and neighborhood income levels (Towne Jr., et al., 2016). Perceptions of safety were determined through Likert-scale responses to statements such as "I see and speak to other people in my neighborhood when I am walking in my neighborhood" and "My neighbors can be counted on to help in case of need." By comparing the perceptions and the WalkScore® information, the study found that positive neighborhood perceptions and proximity are equally important to older adults, and a strong blend of both is desirable for meeting the recommended 150 minutes of physical activity per week. This study supports the 'eyes on the street' theory of Jane Jacobs, that in a successful urban area "a person must feel personally safe and secure on the street among all these strangers." Jacobs endorsed a large pedestrian presence as making streets safer, and encouraged design interventions

like lighting, large windows, and street-level retail and dining to further drive pedestrian activity (Jacobs, 1964).

Eyes on the street goes both ways. Research on the "surveillance zone" suggests that views into neighbor's windows enhance older adults' sense of community (Rowles, 1981). Seeing in to and out of windows allows people to become familiar with their neighbor's daily activities and keep an eye out for each other. One participant in the study stated that she couldn't be sick in bed long because another neighbor waits for her to open the drapes each morning. Watching and being watched create feelings of practical and social support, and the surveillance zone becomes both a passive and active social space for the community members.

Positive feelings about one's neighborhood go beyond just being a good neighbor. "Urban friendliness" is defined by one study as a complex mix of urban design elements that make an environment comfortable for walkers (Chiang & Lei, 2016). This mix summarizes 22 indicators within four categories: safety, facilities, aesthetics, and land use mix. Rather than surveying walkers, this survey collected opinions from professionals in urban planning, transportation, architecture, and landscape architecture. These expert opinions were combined and analyzed to develop a multidisciplinary approach to inventorying built environments for their urban friendliness. Like the WalkScore® and perceptions study, safety was easily the most important dimension to the experts. After safety, facilities such as wide sidewalks, curb ramps, and tactile pavements were determined to be the next most important, in order to physically accommodate users of all abilities. Next, cleanliness, commissioned street art, and the presence of trees (all grouped in the aesthetics category) were ranked as third-most important to enhance public health, quality of life, and to increase community and cultural engagement with the public space. Finally, land-use mix is important to keep urban environments interesting, diverse, and allow basic amenities to be accessible by active transportation modes. Unfortunately, examples of multidisciplinary assessments in the academic literature are sparse. By surveying professionals in multiple fields concerning walkability, this study holds a high level of credibility. It will be used to provide a general framework for developing the criteria employed in this study.

A 2010 pilot project from the City College of New York (CCNY) created an environmental risk criterion set to assess what may impair activity among older adults (Weiss, Maantay, & Fahs, 2010). Paired with a survey of senior center activity participants, the project studied older adults' perceptions of neighborhoods against a formal inventory of design characteristics. The study was one of a kind in terms of its depth and breadth. A research literature review did not show this pilot project's methods applied to any other city in the decade since its launch.

The CCNY study's theory and methods are highly applicable to this study. The environmental risk criteria are vetted by expert opinions on urban friendliness, and expanded into further detail. Pedestrian safety, like crosswalk quality and lighting, and neighborhood safety, such as presence of drug paraphernalia and absence of lighting, are analyzed separately in this study. Neighborhood safety does not necessarily have to include pedestrian concerns and is more broad, to encompass other facets of public health and crime prevention. Objective data and perceptions of survey respondents were analyzed side by side to find trends in why older adults feel more comfortable in certain places and are more likely to walk there. Other environmental risk criteria are land-use mix, street connectivity and maintenance, and aesthetics, much like the urban friendliness assessment.

It is clear that safety is of utmost importance. Within safety, though, is a more specific theme- comfort. In an era where climate change is a growing concern, especially among at-risk health populations like older adults and children, tree coverage and green space go beyond just aesthetics. Shade, seating options, temperature management, peace and quiet, gardens, water features, and even the presence of birds can create a welcoming environment for older adults to feel more comfortable out walking alone (Gallagher, et al., 2010).

Safety, comfort, aesthetics, proximity, and high-quality pedestrian infrastructure are all critical components of a universally accessible built environment. To get around, though, navigability must be considered. Street signs and landmarks are overwhelming favorites for creating cognitive maps, among any age group (Marquez, et al., 2015). Older adults are more likely to stop and ask another adult for directions, further emphasizing the importance of "eyes on the street" and the presence of other street-level activity. Of note, when asked to recall their walking route around the long-term neighborhood of their residence, older adults may have trouble correctly giving directions. This reinforces the need for clear signage and landmarks.

Kevin Lynch's influential 1960 book *The Image of the City* discusses cognitive mapping in urban settings (Lynch, 1960). Bits and pieces of one's experience in a neighborhood or city are compiled into mental maps that are often taken for granted. Five common features are listed as present in every site: landmarks, edges, districts, nodes, and paths. Little research exists about the development or strength of cognitive maps by older adults. One study examined participants' cognitive maps created after a virtual tour of a maze (Moffatt & Resnick, 2002). Older adults were more likely than children to recall landmarks and proximal objects in the creation of their maps after the virtual tour. Older adults were also more likely to take longer routes to reach the destination.

The 1998 *Universal Design File* by Robert Mace and a team of researchers at North Carolina State University laid out the seven principles of universal design: equity, flexibility, simplicity, legibility, room for error, low required effort to use, and appropriate size and space (Story, Mueller, & Mace, 1998). In this book, several examples of each principle applied in the real world are given. Many of these examples concern public space. A campsite with a retaining wall provides a place to sit and a place for wheelchair users to transfer is given as an example of incorporating equity into design. Flexibility is demonstrated through a distinctive building entrance which serves as both a "grand entrance" and an easy way to find the door from the parking lot. Simplicity and legibility can be applied through signage with color-coded icons and written labels. A curb alongside the edge of a ramp allows room for error and keeps the user safe from falling off the side. Low physical effort is achieved through the placement of regular seating options along a pedestrian path. Finally, wide gates and paths give ample space for wheelchair users to navigate. The examples given in *Universal Design File* are just the beginning of how universal design can be included in public space and pedestrian design. The seven principles also overlap with the six common themes (safety, comfort, pedestrian infrastructure, aesthetics, proximity, and navigation) found throughout the literature, especially safety, comfort, and navigation.

Understanding all of this, people's experience of their neighborhoods can be broken down into how they use the physical space, what they feel, and how they recognize their environment. This is different for everyone. The conceptual framework in Figure 2.1 shows how each independent category can influence and be influenced by the others.

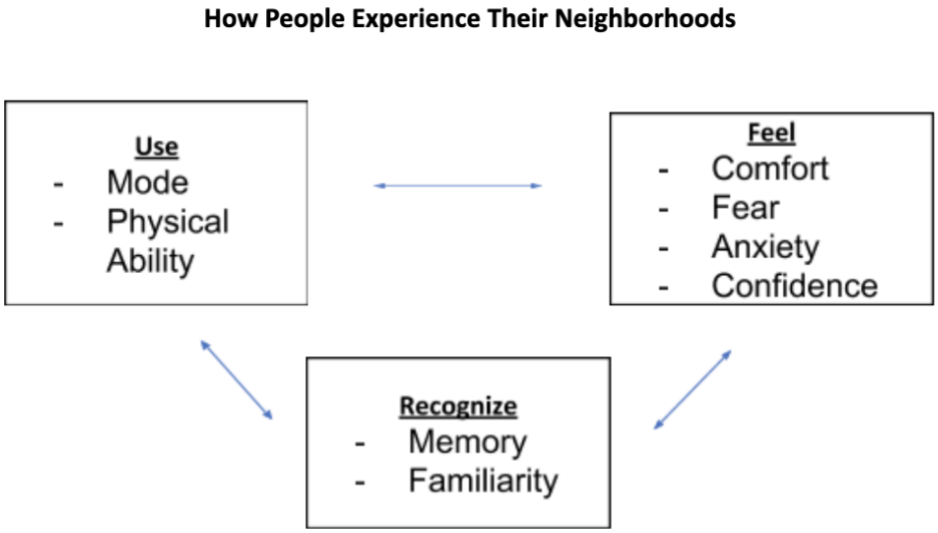

Figure 2.1 How People Experience Their Neighborhoods: Conceptual Framework

Derived from the existing literature, the specific aims of this study are to:

A. Investigate older adults' perceptions of the neighborhood built environment;
B. Identify specific design interventions that encourage increased pedestrian activity; and
C. Recommend universal design improvements.

While a considerable amount of broad research has already been conducted on the older adults' perceptions of their physical surroundings, few studies dive into identifying detailed, specific design recommendations. This study provides evidence-based design interventions using survey response data from older adults.

3 RESEARCH DESIGN AND METHODOLOGY

3.1 Research Design

An online survey was conducted in early 2021 among adults over age 65 to assess perceptions and attitudes toward pedestrian infrastructure, safety, comfort, aesthetics, proximity, and navigability as these elements appear through seven unspecified photographs in Lexington, Kentucky.

Figure 3.1 Map of Selected Scenes

3.2 Methodology

3.2.1 Participants

Adults over age 65 were recruited via personal friend and family networks, personal social media profile posts i.e., Facebook and Instagram, interest-specific social media groups i.e., Lexington Urbanists Forum Facebook group, known University of Kentucky faculty, staff, and alumni, and known Transylvania University faculty, staff, and alumni. The participants were recruited solely through online methods.

3.2.2 Measures & Materials

The participants completed a three-part online survey designed in Qualtrics which took approximately fifteen minutes to finish. Part I consisted of multiple-choice questions that assessed socioeconomic information including income, housing status, and age. Part II, consisting of another set of multiple-choice questions, evaluated quality of life via questions regarding physical activity levels, life satisfaction, and feelings of connectedness to the immediate neighborhood and broader community. Part III featured a set of Likert scale questions alongside photographs of unspecified sample sites in Lexington. These questions assessed perceptions of pedestrian infrastructure, safety, comfort, aesthetics, proximity, and navigability as they relate to various design elements.

Part III was the most in-depth part of the survey. Each survey page featured three questions relating to one image. In question one, the image was divided into several unlabeled regions and participants were asked to click once on what they like about the image and twice on elements they do not like (Figure 3.2). The unlabeled regions were defined by the researcher, categorized by which of the six themes (safety, comfort, infrastructure, aesthetics, proximity, navigation) that the element belonged. The second question on the page was open-ended for participants to make comments regarding their responses to the image, to provide additional discussion points and context. These first two questions provided qualitative insight into the next question. The third question asked the participant to rank how they felt about the image as it related to the six categories: pedestrian infrastructure, safety, comfort, aesthetics, proximity, and navigability. Considered in concert, responses to the three questions provided an in-depth look into survey respondents' perceptions of each scene.

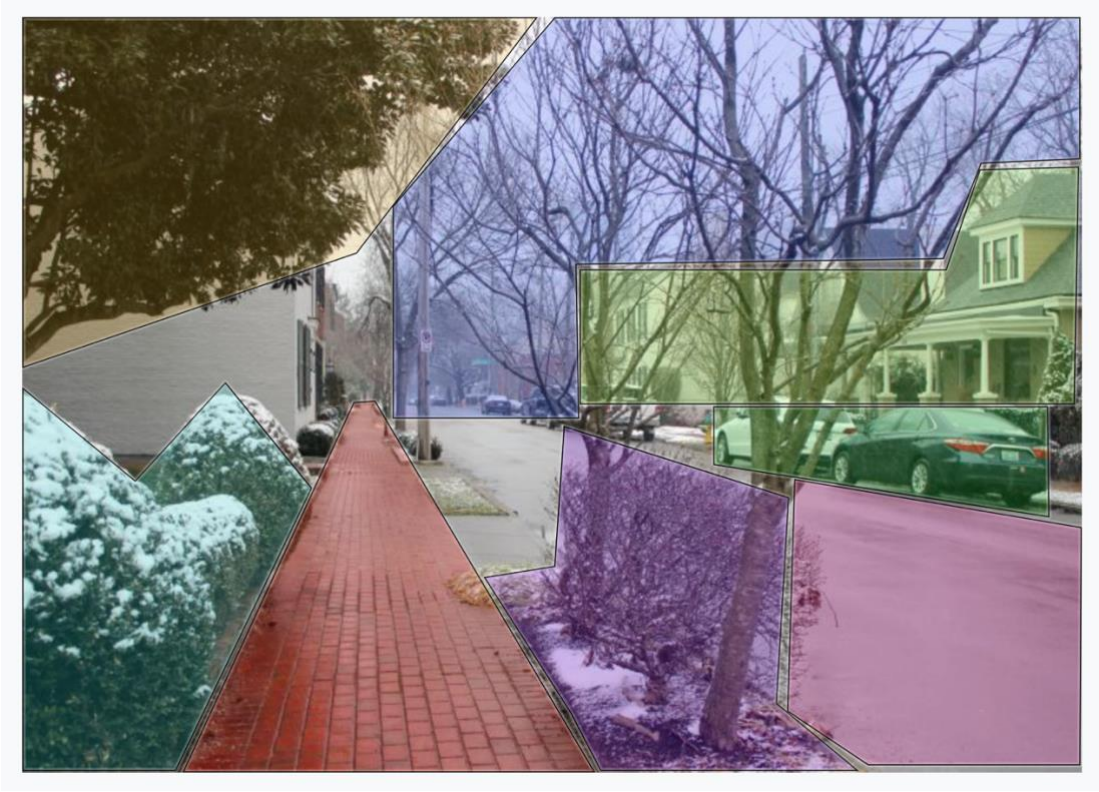

Figure 3.2 Example of Photograph Regions Shown in Online Survey

The seven presented scenes depict residential, commercial, urban core, recreational, and "edge"-type areas. Figure 3.3 shows the archetype of each scene.

Figure 3.3 Scene Typology

3.2.3 Procedure

Photographs were taken in downtown Lexington and its immediately adjacent neighborhoods to capture residential, commercial, recreational, and hybrid "edge"-type areas. These photographs included one or more of the six selected elements (pedestrian infrastructure, safety, comfort, aesthetics, proximity, and/or navigability). Both positive and negative elements, as identified from the literature, were featured in the photographs.

All questions were organized in an Excel spread sheet with the corresponding question identification number. This Excel sheet served as the code book for reference during the analysis, to minimize and prevent errors when sorting and labeling the data.

The final version of the survey was posted and opened online. All participants completed the same survey. The online survey was open for a period of two weeks in late February and early March 2021.

3.2.4 Analysis

Only completed surveys of adults age 65 years or older who consented to participation in the study were included in the analysis.

Using Qualtrics reporting tools, data were exported into an Excel master sheet. A variety of tabs were created within the sheet to sort by different variables. All steps were noted for consistency throughout the process, and to make returning to the data easier for other users and over time.

Due to the complexity and variety in survey questions, multiple approaches to data analysis were necessary. These approached are broken down by specific aim in Table 3.1.

Table 3.1 Collection and Analysis Approach, by Specific Aim

Specific Aim A: Investigate older adults' perceptions of the neighborhood built environment.	Collection: Survey Part I and III Analysis: Frequency counts by perception and theme
Specific Aim B: Identify specific design interventions that encourage increased pedestrian activity.	Collection: Survey Part II and III, data from Specific Aim A and B analyses Analysis: Frequencies, synthesis of Specific Aims A analysis
Specific Aim C: Recommend specific universal design improvements.	Collection: Full survey results Analysis: Adobe Photoshop overlay of more positive elements over more negative elements

To prepare open-ended comments for analysis, positive-leaning and negative-leaning comments were sorted by perception and theme (safety, comfort, pedestrian infrastructure, aesthetics, proximity, and navigation) into multiple spreadsheets by the researcher. The tables of sorted comments are available in the Appendix.

4 FINDINGS

4.1 Sample Characteristics

Of the 97 individuals who initiated the online survey, 81 consented to participation and fully completed the survey. Sixty-seven respondents met the minimum age of 65 years old.

Participants ranged in age from 66 to 90 years ($\bar{x} = 74 \pm 0.7$) The majority were married (73%), held a bachelor's degree or higher (82%), had a household income of $51,000 per year or higher (67%), owned their home (94%), were retired and no longer working (66%), drive themselves some or all of the time (98%), and had two or more cars available to their household (77%). All participants had at least one car available to their household.

Most respondents reported positive feelings toward their neighbors and community. (Table 4.2) Overall, respondents agreed that five of the six themes (safety, comfort, aesthetics, facilities, navigation) were positively represented in their neighborhoods. They disagreed that close proximity to visit friends or run errands was available from their home.

Participants reported exercising 4.02 days a week and walking for fun or exercise 3.77 days per week. Participants walked for transportation (i.e., to visit a friend or run an errand) 1.34 days per week.

Table 4.1 Sample Characteristics (N= 67)

Characteristic	**Frequency, *n* (%)**
Sex	
Female	32 (47.76%)
Male	35 (52.24%)
Highest Level of Education	
High School	7 (10.45%)
Bachelor's Degree	21 (31.34%)
Master's Degree	25 (37.31%)
Ph.D. or higher	9 (13.43%)
Trade School	5 (7.46%)
Annual Household Income	
$25,000 or less	2 (2.99%)
$26,000 to $50,000	9 (13.43%)
$51,000 to $100,000	24 (35.82%)
$101,000 to $200,000	17 (25.37%)
More than $200,000	4 (5.97%)
Prefer not to say	11 (16.42%)
Marital Status	
Married	48 (72.73%)
Domestic partnership	4 (6.06%)
Separated or divorced	4 (6.06%)
Widowed	5 (7.58%)
Single or never married	5 (7.58%)
Home Ownership	
Own home	63 (94.03%)
Rent home	1 (1.49%)
Age-restricted community	1 (1.49%)
Friend/family member's home	2 (2.99%)
Employment	
Employed full-time	7 (10.45%)
Employed part-time	6 (8.96%)
Retired, no longer working	44 (65.67%)
Retired, still working	10 (14.93%)
Drive Self	
Yes	56 (83.58%)
No	1 (1.49%)
Sometimes	10 (14.93%)
Number of Vehicles in Household	
One	15 (22.39%)
Two	41 (61.19%)
Three	8 (11.94%)
Four or more	3 (4.48%)

Table 4.2 Sense of Community

	Strongly disagree	**Disagree**	**Agree**	**Strongly agree**
I am happy with where I live. (*N*= 67)	1 (1.49%)	-	25 (37.31%)	41 (61.19%)
I know my neighbors. (*N*= 67)	1 (1.49%)	7 (10.45%)	36 (53.73%)	23 (34.33%)
I trust my neighbors. (*N*= 65)	1 (1.49%)	2 (3.08%)	36 (55.38%)	26 (40.00%)
I am involved in my community. (*N*= 67)	3 (4.48%)	14 (20.90%)	38 (56.72%)	12 (17.91%)
I feel at home in my neighborhood. (*N*= 66)	2 (3.03%)	3 (4.55%)	28 (42.42%)	33 (50.00%)
My neighbors appreciate me. (*N*= 64)	1 (1.49%)	5 (7.81%)	42 (65.63%)	16 (25.00%)

Table 4.3 Neighborhood Perceptions

	Strongly disagree	Disagree	Agree	Strongly agree
My neighborhood is clean.	2 (2.99%)	1 (1.49%)	34 (50.75%)	30 (44.78%)
I feel safe walking in my neighborhood.	2 (2.99%)	-	29 (43.28%)	36 (53.73%)
My neighborhood is aesthetically pleasing and interesting to look at.	1 (1.52%)	-	36 (54.55%)	29 (43.94%)
I enjoy being outside in my neighborhood in any weather.	1 (1.49%)	7 (10.45%)	38 (56.72%)	21 (31.34%)
I can walk to visit friends or run an errand from my home.	5 (7.46%)	17 (25.37%)	31 (46.27%)	14 (20.9%)
I do not worry about getting lost in my neighborhood.	1 (1.49%)	-	24 (35.82%)	42 (62.69%)

Table 4.4 Walking Characteristics

Habit	0	1	2	3	4	5	6	7
How many days do you exercise per week? (*N*= 63)	5 (7.94%)	4 (6.35%)	4 (6.35%)	12 (19.05%)	11 (17.46%)	10 (15.87%)	8 (12.70%)	9 (14.29%)
How many days do you walk for fun or exercise per week? (*N*= 60)	7 (11.67%)	9 (15.00%)	4 (6.67%)	8 (19.33%)	5 (8.33%)	8 (13.33%)	8 (13.33%)	11 (18.33%)
How many days do you walk for transportation per week (i.e. to visit a friend or run an errand)? (*N*= 44)	18 (40.91%)	14 (31.82%)	1 (2.27%)	5 (11.36%)	3 (6.82%)	2 (4.55%)	1 (2.27%)	0 (0.00%)

4.2 Location Preferences

In response to "Where is your favorite place to walk?" respondents each gave a unique comment regarding their preferred location for walking. Comments ranged from "the sidewalk" to a specific turn-by-turn description of their favorite walking route. The 67 comments were sorted into eleven categories: college campus, downtown, historic districts (primarily residential and considered to be different from downtown commercial districts that may also be historic, i.e. Ashland Park neighborhood), home neighborhood where the respondent lives, indoors, natural area (considered to be separate from a city-maintained park, i.e. "on my farm" or hiking), park, suburban neighborhood (specified by the respondent to be a different neighborhood from where they live), those who are no longer able to walk, and those who did not specify location (i.e. "sidewalk" or "n/a").

Table 4.5 Preferred Walking Locations

Category	***n* (%)**
College Campus	2 (3%)
Downtown	7 (10%)
Historic District	3 (4%)
Home Neighborhood	18 (27%)
Indoors	2 (3%)
Natural Area	6 (9%)
Park	21 (31%)
Suburban Neighborhood	3 (4%)
Unable to Walk	2 (3%)
Unspecified	3 (4%)

4.3 Responses to Each Scene

Individual comments for each scene are provided in Appendix A.

4.3.1 Scene 1: West Short Street, 600 block

Overall, this photograph was rated most favorably by survey participants. Scene 1 depicts a historic residential neighborhood, with a narrow one-way street, mature trees, and a landscaped buffer between the sidewalk and street. At one time considered a suburb, this neighborhood today is on the edge of the downtown core.

Figure 4.1 Scene 1: West Short Street

Participants enjoyed the variety of greenery, including the landscaping of a residential yard (18%), a shady tree (19%), street trees (21%), and landscaping that serves as a street buffer (22%). Most liked were the brick sidewalk (73%) and historic residences (27%). Few responses were left on the road and the parked cars, suggesting general indifference toward those elements of the scene. Thirteen percent of respondents did not like the road, but overall, none of the elements were commonly disliked.

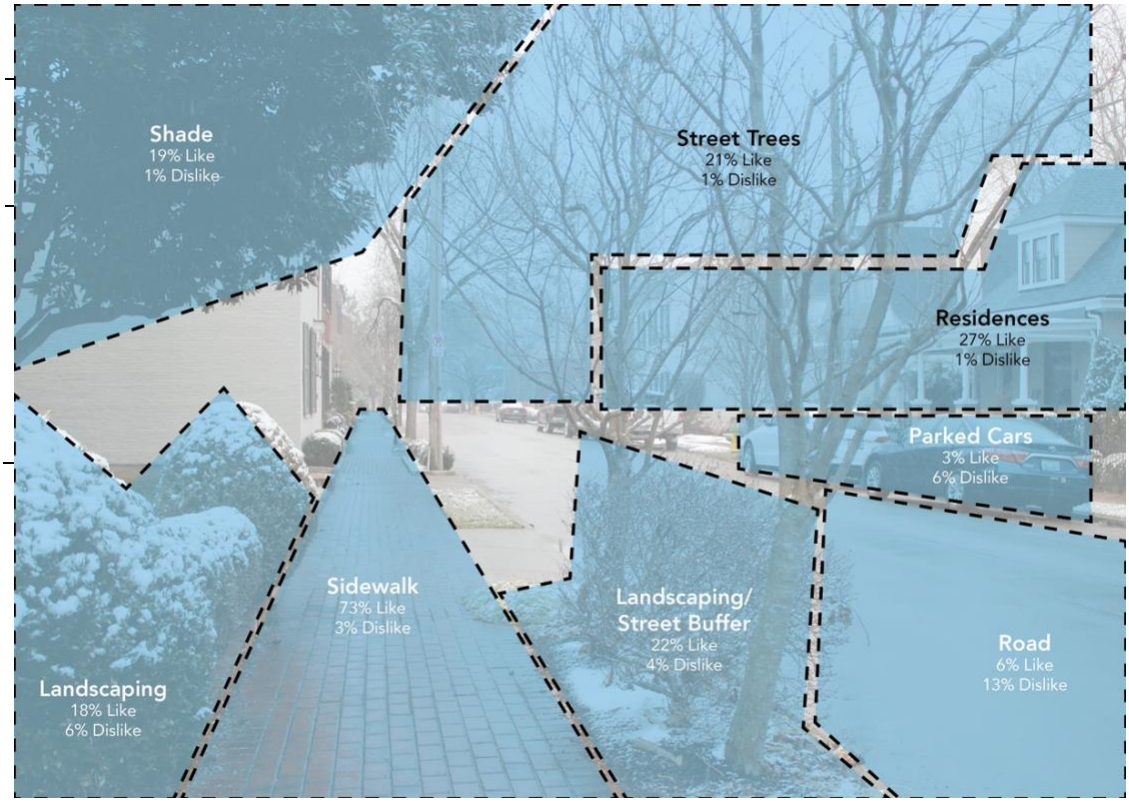

Figure 4.2 Scene 1 Regions Scores

When ranking feelings pertaining to the six themes, participants strongly felt that the scene was comfortable, safe, had adequate pedestrian facilities, was aesthetically pleasing, easy to navigate, and close to other places to walk.

Table 4.6 Scene 1 Themes

Theme	Disagree or Strongly Disagree	Neutral	Agree or Strongly Agree
Comfortable	4.48%	13.43%	82.09%
Safe	1.49%	22.39%	76.12%
Adequate Facilities	3.12%	15.63%	81.26%
Aesthetically Pleasing	0.00%	18.18%	81.82%
Easy to Navigate	0.00%	15.16%	84.85%
Close to Other Places	9.23%	26.15%	64.61%

4.3.2 Scene 2: Nicholasville Road, 2200 block

Figure 4.3 Scene 2: Nicholasville Road

Though Nicholasville Road is an area with surprising levels of foot traffic, the survey sample did not indicate willingness to walk in Scene 2. This site is a side road along a main traffic artery, without sidewalks but with low levels of traffic and speed. Several parking lots are scattered between the modern commercial businesses in this area. A grassy median separates the side road from the main road.

The tree and grassy median were liked the most, with 21% and 16%, respectively. With those two exceptions, none of the other elements were liked more than they were disliked. The cones (50%), street (45%), parking lot (24%), and Burger King sign (28%) were unfavorable to survey participants.

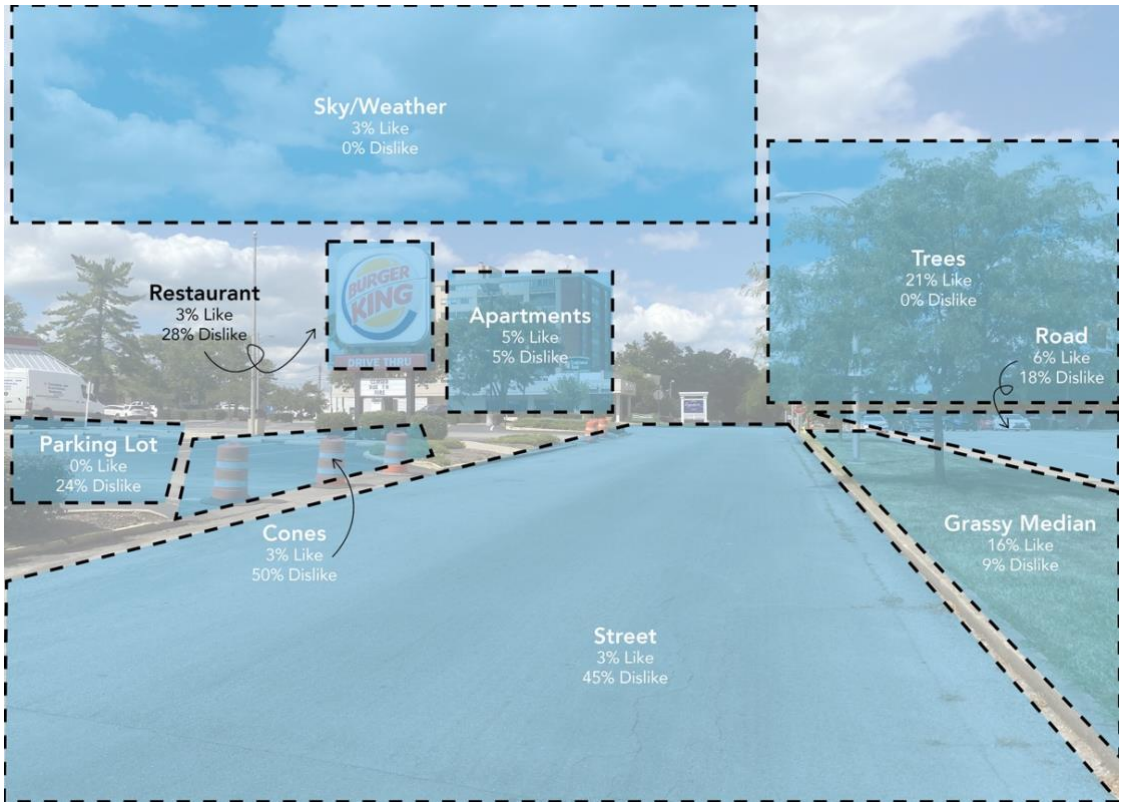

Figure 4.4 Scene 2 Regions Scores

Every single response to the six themes was negative. Study results suggest this type of place is not enticing to pedestrians and may only be walked out of necessity.

Table 4.7 Scene 2 Themes

Theme	Disagree or Strongly Disagree	Neutral	Agree or Strongly Agree
Comfortable	61.19%	31.35%	7.46%
Safe	47.76%	40.30%	11.94%
Adequate Facilities	68.18%	25.76%	6.07%
Aesthetically Pleasing	67.17%	28.36%	4.48%
Easy to Navigate	79.10%	19.40%	1.49%
Close to Other Places	31.82%	40.91%	27.28%

4.3.3 Scene 3: East Vine Street, 200 block

Figure 4.5 Scene 3: East Vine Street

A commonly traveled path near the bus station, this scene, like Scene 2, may only be traveled out of necessity or convenience. The primary concerns of participants were centered around fear: of falling, of harm from others, and of fast-moving vehicles. There is no landscaping, and a vacant parking garage is the most-disliked aspect of this scene. Many participants indicated the parking garage could attract people who may cause pedestrians harm.

The parking garage (66%) and road (37%) were most disliked. Forty-two percent of participants enjoyed the sidewalk, but overall, this scene was not highly rated by the older adults in this study.

Table 4.8 Scene 3 Themes

Theme	Disagree or Strongly Disagree	Neutral	Agree or Strongly Agree
Comfortable	36.36%	50.00%	13.64%
Safe	43.94%	40.91%	15.15%
Adequate Facilities	34.85%	40.91%	24.24%
Aesthetically Pleasing	71.21%	27.28%	1.52%
Easy to Navigate	18.46%	52.31%	29.23%
Close to Other Places	45.46%	39.39%	15.15%

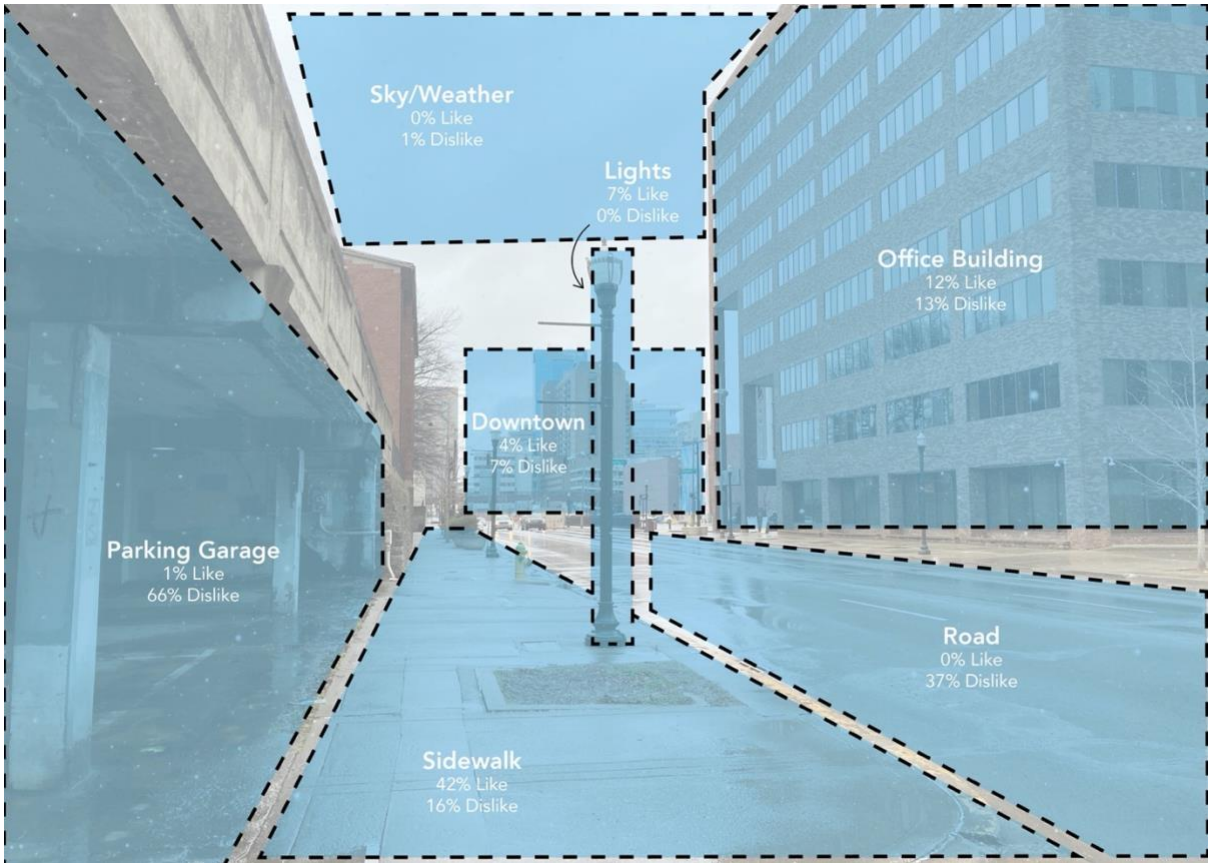

Figure 4.6 Scene 3 Regions Scores

4.3.4 Scene 4: East High Street, 800 block

A historic connection between a large university campus, downtown, and several circa-World War II suburban neighborhoods, Scene 4 is heavily traveled by pedestrians and vehicles. Despite this, study participants found this scene to be uncomfortable, unsafe, ugly, and inadequate for pedestrians. Though the scene is close to many businesses and neighborhood attractions, without prior knowledge and at first glance, this place appears unnavigable and far away from points of interest. The utilities disrupting the sidewalk (57%), the resulting dirt footpath (64%), and the road (40%) were most disliked. The sidewalk was the only element commonly rated positively, with 34% of study participants indicating they liked the sidewalk, but many still disliked it (22%).

Figure 4.7 Scene 4: East High Street

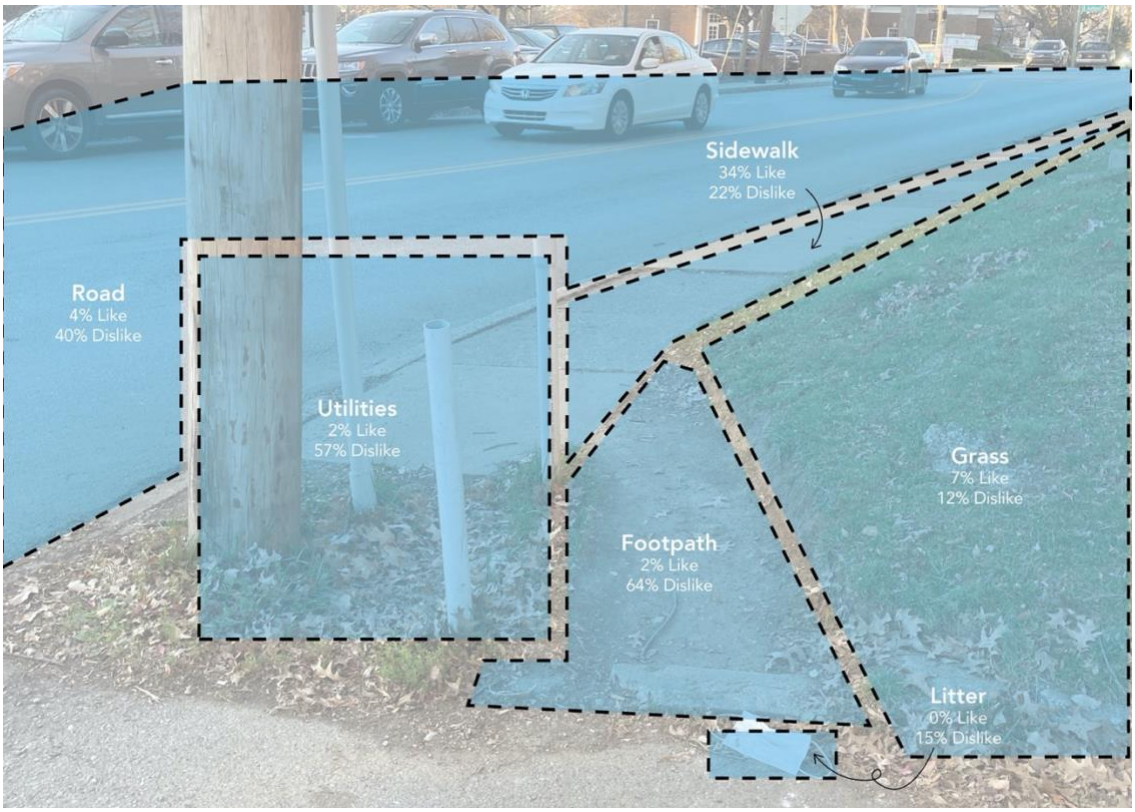

Figure 4.8 Scene 4 Regions Scores

Table 4.9 Scene 4 Themes

Theme	Disagree or Strongly Disagree	Neutral	Agree or Strongly Agree
Comfortable	43.94%	50.00%	6.06%
Safe	41.79%	53.73%	4.48%
Adequate Facilities	43.94%	56.06%	0.00%
Aesthetically Pleasing	73.14%	26.87%	0.00%
Easy to Navigate	33.84%	43.08%	23.08%
Close to Other Places	46.97%	45.45%	7.58%

4.3.5 Scene 5: Central Avenue, 500 block

Figure 4.9 Scene 5: Central Avenue at Old Park Avenue

Scene 5 depicts a traditional suburban, but historic neighborhood with mature trees. Participants generally liked this scene, but made several negative comments on the low-light sunset conditions and lack of street lighting. The trees (24%), historic homes (30%), cobblestone sidewalk (63%), and clear crosswalk (39%) were liked. The road (24%) was not.

Table 4.10 Scene 5 Themes

Theme	Disagree or Strongly Disagree	Neutral	Agree or Strongly Agree
Comfortable	13.64%	39.39%	46.97%
Safe	10.61%	43.94%	45.45%
Adequate Facilities	15.15%	42.43%	42.43%
Aesthetically Pleasing	13.64%	51.51%	34.85%
Easy to Navigate	9.23%	40.00%	50.77%
Close to Other Places	16.93%	50.77%	32.31%

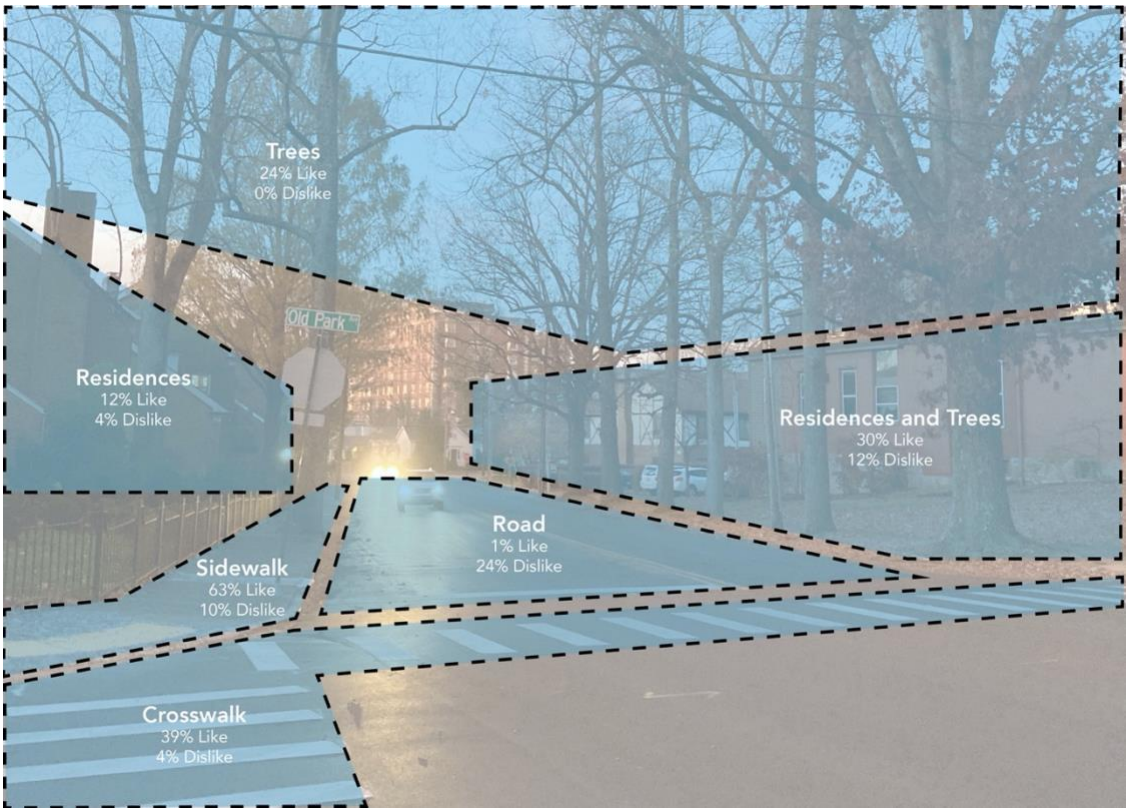

Figure 4.10 Scene 5 Regions Scores

4.3.6 Scene 6: The Legacy Trail at West Sixth Street

Visible in Scene 6 is an entrance to a shared-use trail. This twelve-mile trail is heavily used by cyclists, runners, and pedestrians, primarily for recreation. Some parts of the trail provide non-vehicular access to local businesses, as shown in Scene 6. The trail in this scene continues around the corner, out of scene, to a nearby residential neighborhood, a men's shelter, and a YMCA.

Study participants generally disagreed with the presence of the six elements in this scene. Concerns were voiced on the scene with comments including feeling desolate, under maintained, and appearing to be in a bad part of town. Comments were more positive toward the mural and wide path, even though "Aesthetically Pleasing" and "Adequate Facilities" were ranked negatively.

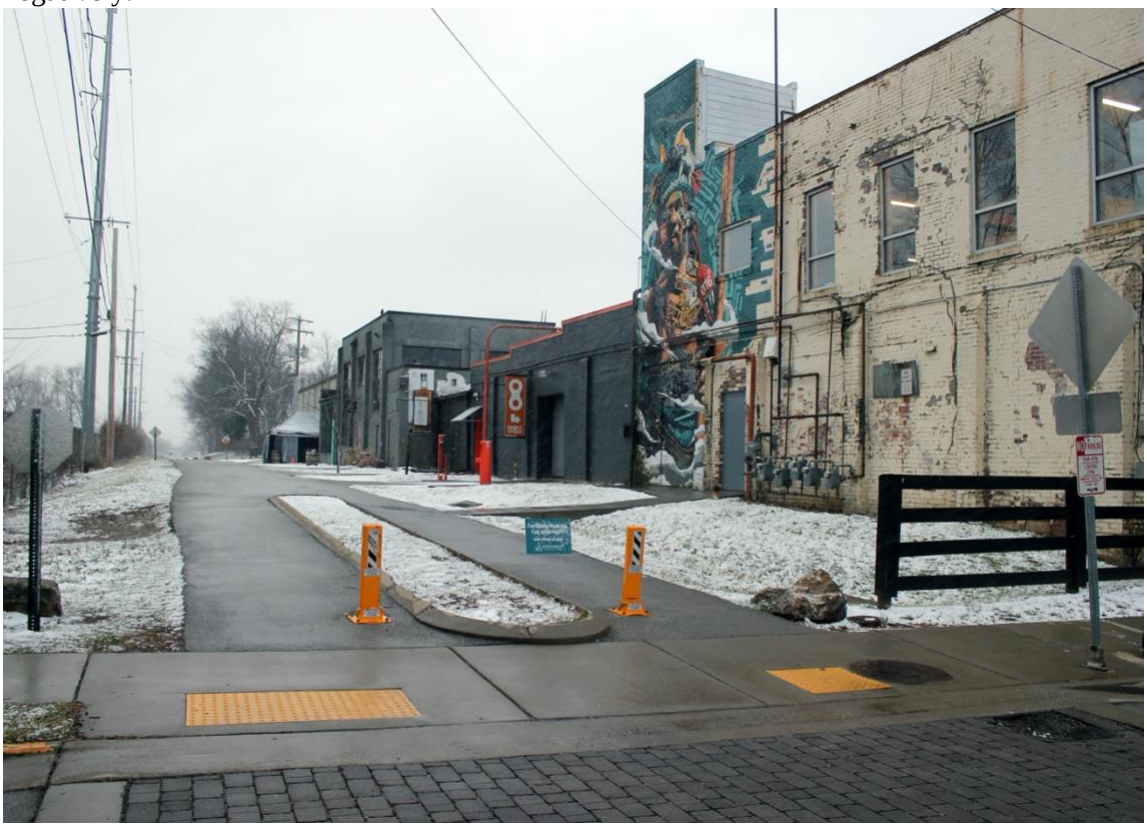

Figure 4.11 Scene 6: The Legacy Trail

The trail was nearly equally liked (29%) and disliked (31%). The buildings (33%) and snowy ground (20%) were disliked. Study participants commonly liked the sidewalk (36%).

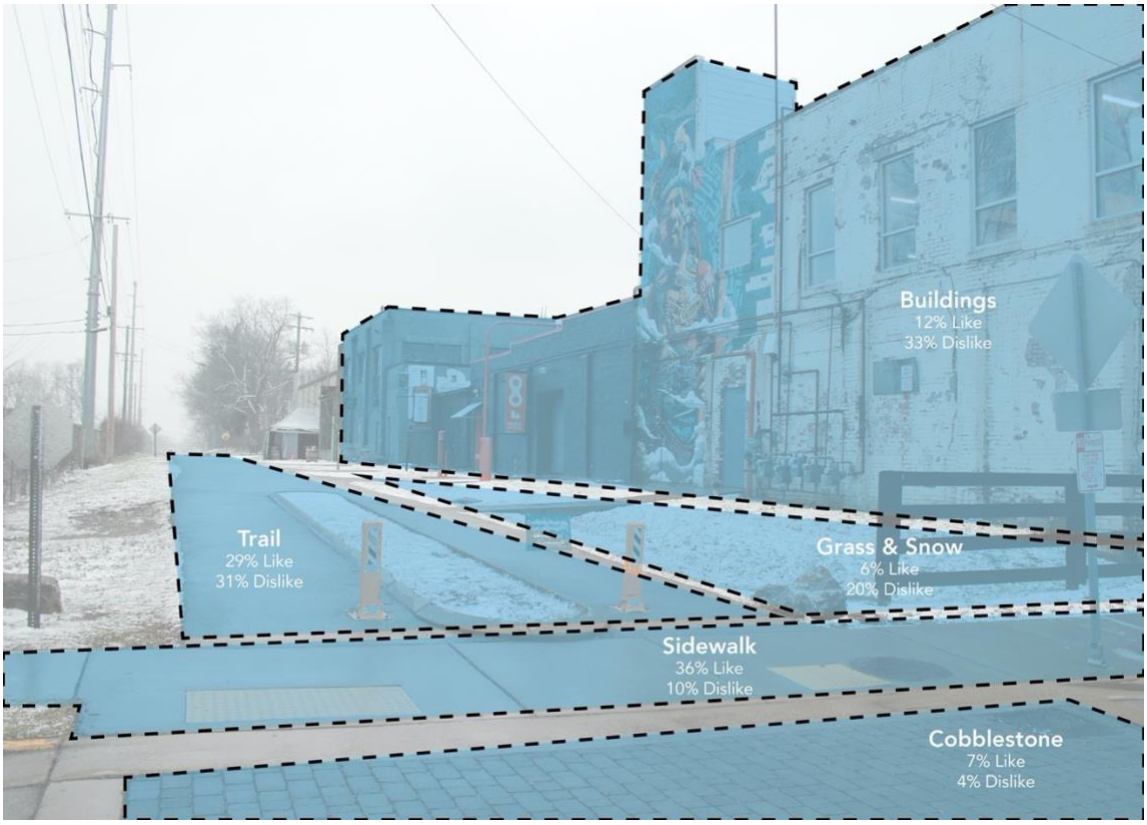

Figure 4.12 Scene 6 Regions Scores

Table 4.11 Scene 6 Themes

Theme	Disagree or Strongly Disagree	Neutral	Agree or Strongly Agree
Comfortable	37.31%	38.81%	23.89%
Safe	34.33%	50.75%	14.93%
Adequate Facilities	37.88%	31.82%	30.30%
Aesthetically Pleasing	56.72%	32.84%	10.45%
Easy to Navigate	37.88%	25.76%	36.37%
Close to Other Places	53.73%	31.35%	14.93%

4.3.7 Scene 7: Central Avenue, 100 block

Only four short blocks west from Scene 5, a very different place is represented in Scene 7. This scene is on the edge of a residential neighborhood and connects to a small commercial district about a block away. The primary concern of study participants was a fear of slipping on the snow-covered sidewalk (57% dislike). The clear sidewalk on the other side of the street was well-liked (25%). Twenty-eight percent of participants disliked the road. Scene 7 was not indicated to be interesting or comfortable, with mostly neutral like/dislike ratings, and was felt by the participants to be far away from other destinations.

Figure 4.13 Scene 7: Central Avenue at Kentucky Avenue

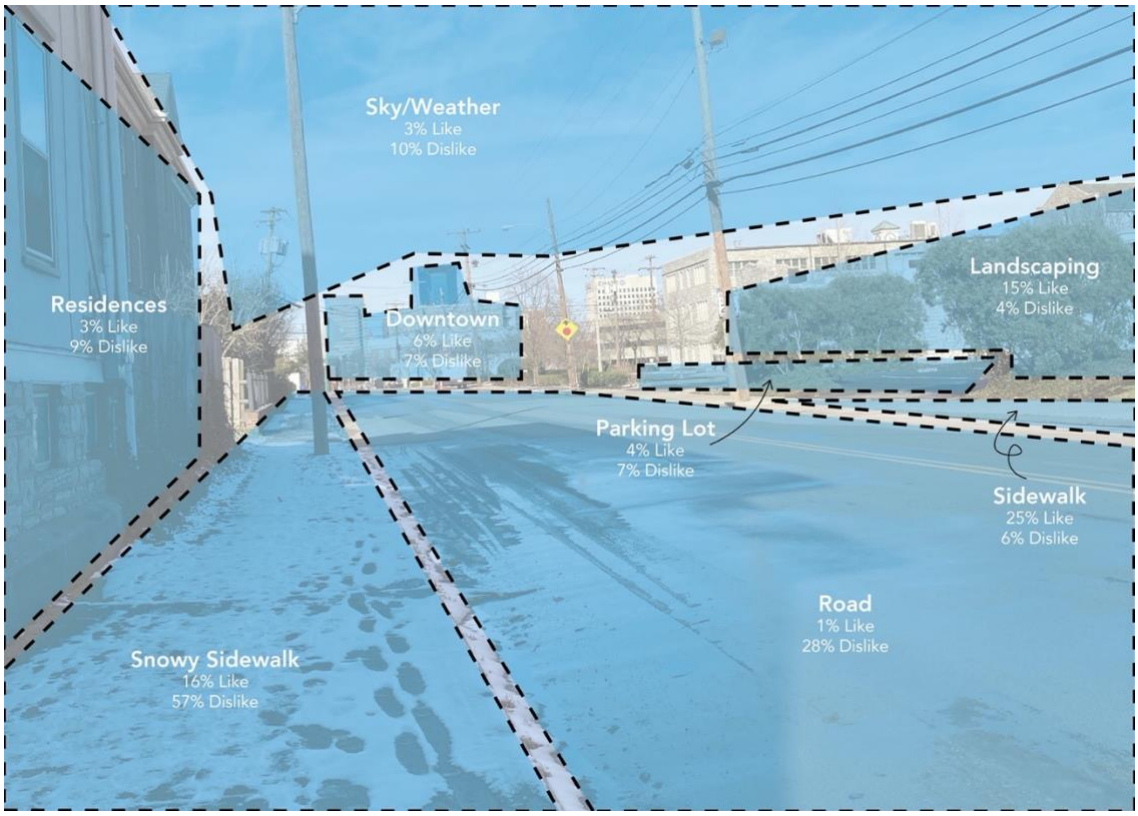

Figure 4.14 Scene 7 Regions Scores

Table 4.12 Scene 7 Themes

Theme	Disagree or Strongly Disagree	Neutral	Agree or Strongly Agree
Comfortable	47.76%	43.29%	8.96%
Safe	38.81%	56.72%	4.48%
Adequate Facilities	44.78%	46.27%	8.95%
Aesthetically Pleasing	61.54%	35.38%	3.08%
Easy to Navigate	30.31%	37.88%	31.82%
Close to Other Places	55.22%	34.33%	10.45%

4.4 Overall Themes

Across seven photographs of unlabeled scenes around Lexington, Kentucky, over 188 comments were collected via the online survey. All comments were sorted into positive or negative interpretations of the six themes of safety, comfort, facilities, aesthetics, proximity, and navigation. Several comments overlapped with two or more themes but were categorized by the single most predominant theme. Comments about the need for barriers in between walkways and vehicular traffic were sorted under "comfort," though these comments could also address safety.

In addition to open-text comments, participants selected things they liked or disliked about each image. These selections have been sorted by the field of selection (greenery, lighting, parked cars, etc.) and by whether participants selected "like" or "dislike" for that field.

4.4.1 Safety

Across the seven scenes of pedestrian places in Lexington, Kentucky, 46 total comments were left in the open-text comment section regarding safety. Of those, 44 were sorted as "negative." The negative comments primarily included a fear of falling, a fear of harm from other humans, and concerns about the absence of street lighting.

A fear of falling or slipping on the sidewalk was the most voiced safety concern. Several of the presented scenes featured brick or cobblestone paving or concrete sidewalks that needed maintenance. One scene presented a snow-covered sidewalk, which could be slick or conceal other obstacles that may lie beneath the snow. The risk of falling was not unique to any specific type of place (urban or suburban, commercial or residential) but present throughout the scenes. Even the highest-rated scene for safety, Scene 1, had a wet brick sidewalk.

Two scenes in particular raised concerns for the risk of harm by other people. Scene 3, a downtown one-way arterial road with an underutilized and poorly lit parking garage, and Scene 6, a shared-use trail along the backside of a rehabilitated commercial building, caused some participants to comment that wrongdoers may be attracted to those spaces. Inadequate lighting and isolation were often sited alongside fears of harm by others.

Lighting was mentioned alongside crime and falling, and general discomfort with walking in the dark. Both street lighting and daylight were considered by participants. One respondent specifically noted on each scene that their comments were for the daytime and may be different for a nighttime setting.

Like the Belgian Ageing Studies, feelings of safety in one's neighborhood were associated with more reported days of walking per week. The scenes with the most "Agree" or "Strongly Agree" responses were associated with more positive comments.

4.4.2 Comfort

Thirty-six comments concerned comfort. Of these, 31 were sorted as "negative." Concerns ranged from closeness to heavy traffic, lack of seating or rest areas, and appearance of the scene to be isolated or deserted.

By far, the most frequent comments on comfort regarded the closeness of a sidewalk to heavy or fast-moving traffic. Participants mentioned their appreciation for buffers between sidewalks and the road, and their discomfort with sidewalks which were immediately adjacent to a street without a landscaped buffer, no matter how wide the sidewalk. On Scene 5, the sidewalk

directly connected to the street without a grass buffer, but had mature trees planted within the sidewalk. Two participants stated the trees provided enough protection from vehicles.

The presence of seating or rest areas was another common concern. No scenes featured seating. The absence of somewhere to sit down and rest was mainly noticed by participants in more commercial areas, suggesting a secondary concern of distant proximity or sprawl that is not present in the dense residential scenes. One participant did note appreciation for the Burger King in Scene 2, because one can go inside and use the restroom there.

Feelings of isolation can overlap with "Safety." The eyes on the street theory suggests that street-level windows and the presence of other people out on the street can make an area feel safer. Scenes with vast parking lots, low vehicular traffic, and without residences made some participants feel alone and uncomfortable.

4.4.3 Facilities

Regarding pedestrian facilities, 55 comments were given and 33 were sorted as "negative." Negative comments included feedback on the absence of sidewalks and/or crosswalks, the poor condition of some sidewalks, and concerns that sidewalks are not wide enough. Positive commentary on facilities was predominately left on the photographs with grassy or landscaped separations between sidewalks and the street, especially tree-lined separations, and wide sidewalks. Comments on vegetation were mostly sorted under "Aesthetics," except for the comments that did not specifically recognize trees and landscaping for street beautification, which were included with "Facilities."

4.4.4 Aesthetics

Comments about aesthetics were generally balanced. Of 44 comments, 23 were sorted as "negative." Negative comments included scenes not being interesting to look at, buildings appearing as under-maintained, and lack of plants and trees. Several comments on scenes considered them as being just plain "ugly." Positive comments were made about murals, old or historic buildings, and cleanliness.

Participants preferred residential areas for their aesthetic qualities. This may be due to the density of buildings, with something new to look at every few yards, and the diversity of the architecture. Commercial areas were more often considered to be dirty or boring to look at.

4.4.5 Navigation

Six comments were left regarding navigation through the scene. All but one were sorted as "negative" and concerned the Legacy Trail at West Sixth Street and Coolavin Apartments. These participants were unclear what the pathway was, and weren't sure if the path was for pedestrians, cyclists, both, or neither. The backside of the Breadbox building suggested light industrial zoning to one participant.

4.4.6 Proximity

One comment was given on proximity, on the Legacy Trail scene—"no destination." This may suggest the need for development directly along the trail, to provide attractions for users who may not otherwise use the trail.

5 DISCUSSION

After synthesizing all comments and reported perceptions of the presented urban scenes, on top of an understanding of existing research, a checklist was developed from the most prominent concerns.

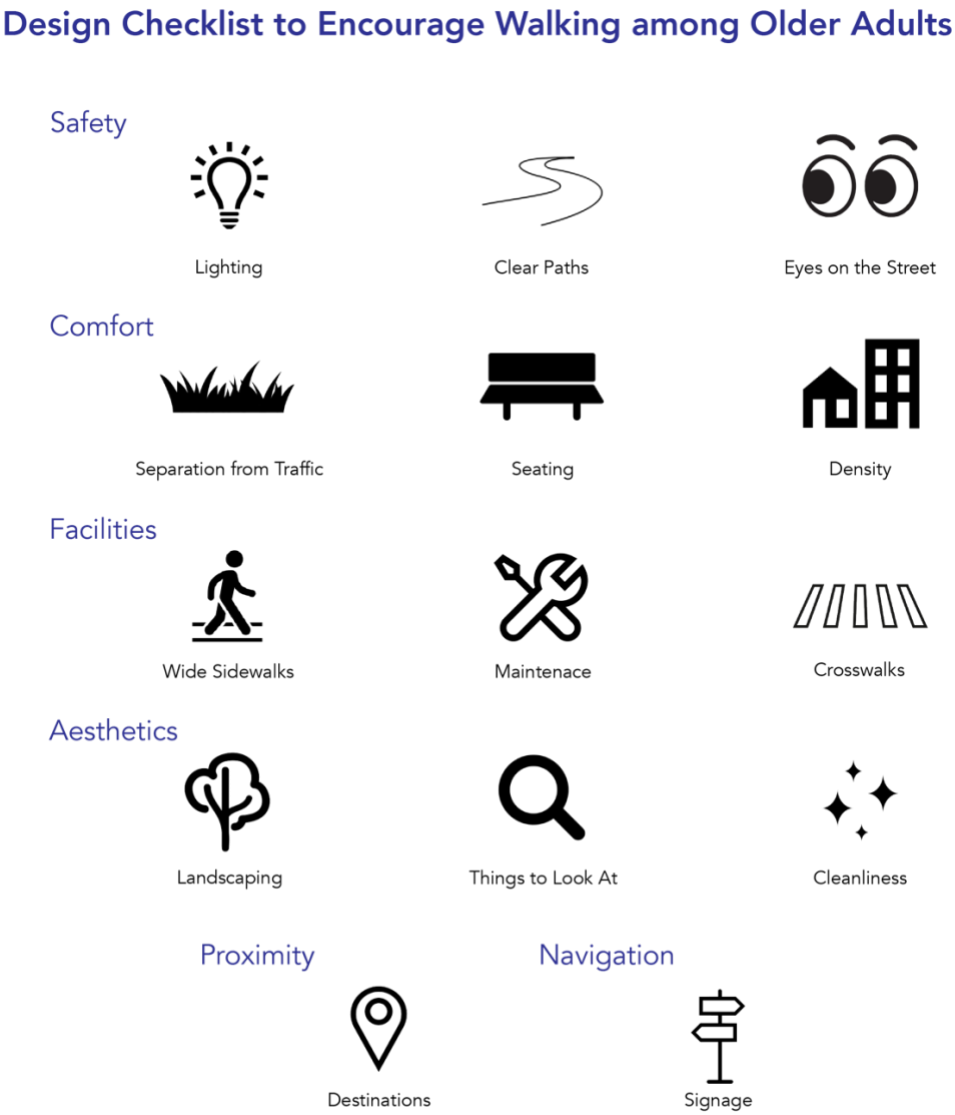

Figure 5.1 Design Checklist to Encourage Walking Among Older Adults

In Figure 5.1, each icon represents what was noted the most by study participants as being absent from or well-liked about all seven scenes. This quick-reference diagram can be used to assess all scenes for their pedestrian friendliness.

These broad recommendations are applied to each of the seven scenes in the study. Though five categories of common types of places in cities are shown, each scene is unique and requires individualized interventions.

Findings suggest that Scene 1 is the "ideal" environment, compared to the other six presented scenes. Scene 1 encompasses nearly all elements in Figure 5.1. Far from perfect, it is a desirable place to walk for older adults. Scene 1 does not include lighting, signage, or seating, but it does give off the aura of one important factor- the people who live in this neighborhood take good care of their physical environment.

Scene 1 was photographed on the same day as Scenes 6 and 7, a few days after a big snow in Lexington. Snow is on the ground and obscuring the sidewalk in Scene 7, which was noted by most study participants as creating an aversion to walking there. In Scene 1, the sidewalk was cleared. Sidewalk maintenance is the responsibility of the property owner. In Scene 1's neighborhood, either every homeowner cleared their front sidewalk, or a neighborhood association cleared the whole street's sidewalks. No level of design can control maintenance, and property owners and communities must take responsibility for caring for the shared public spaces present on private properties.

While Scene 1 does not have streetlamps, the closeness of the residences to the sidewalk allow for front porch lighting to shine onto the pedestrian areas. Like maintenance, private property owners should assume the responsibility of keeping their porch lights on at night to illuminate the public spaces.

Beyond the view of these scenes, it is important to address the larger pedestrian network. Mixed residential and commercial development in neighborhoods, with the positive presence of the six elements, can encourage walking, especially when close proximity and pedestrian infrastructure are available.

6 RECOMMENDATIONS

6.1 Site-Specific Urban Design Recommendations

6.1.1 Historic Residential Neighborhoods – Scenes 1 and 5

Overall, historic residential neighborhoods were rated as the most desirable places for walking by the study participants. Minimal changes were requested in the comments. The need for street lighting and clear, smooth sidewalks were the most frequently mentioned. Scene 1 is held as the model for historic residential neighborhoods, and no changes are proposed.

Figure 6.1 Scene 1 Perspective

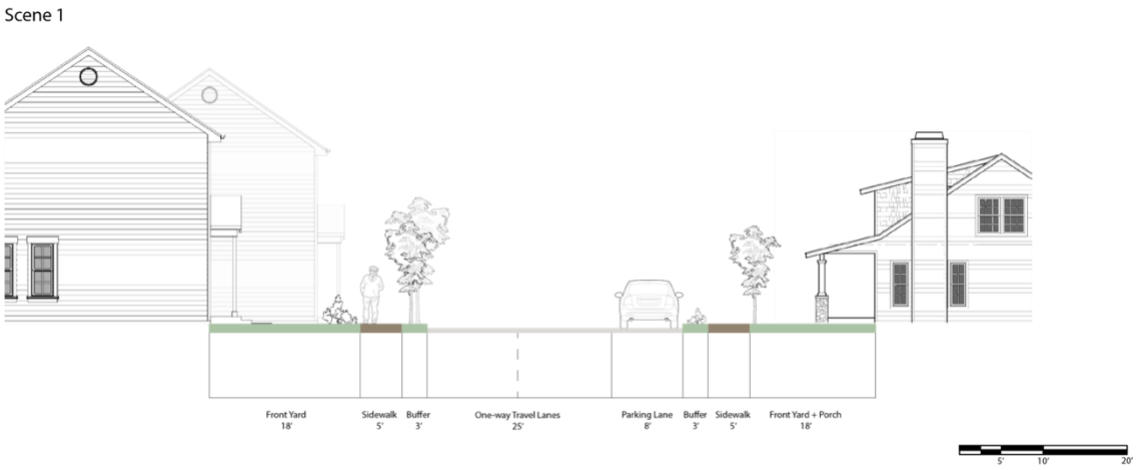

Figure 6.2 Scene 1 Existing Section

In Scene 5, lighting was added. The primary recommendation for each scene is to ensure sidewalks are clear and smooth to reduce the risk of tripping, which is achieved through regular maintenance.

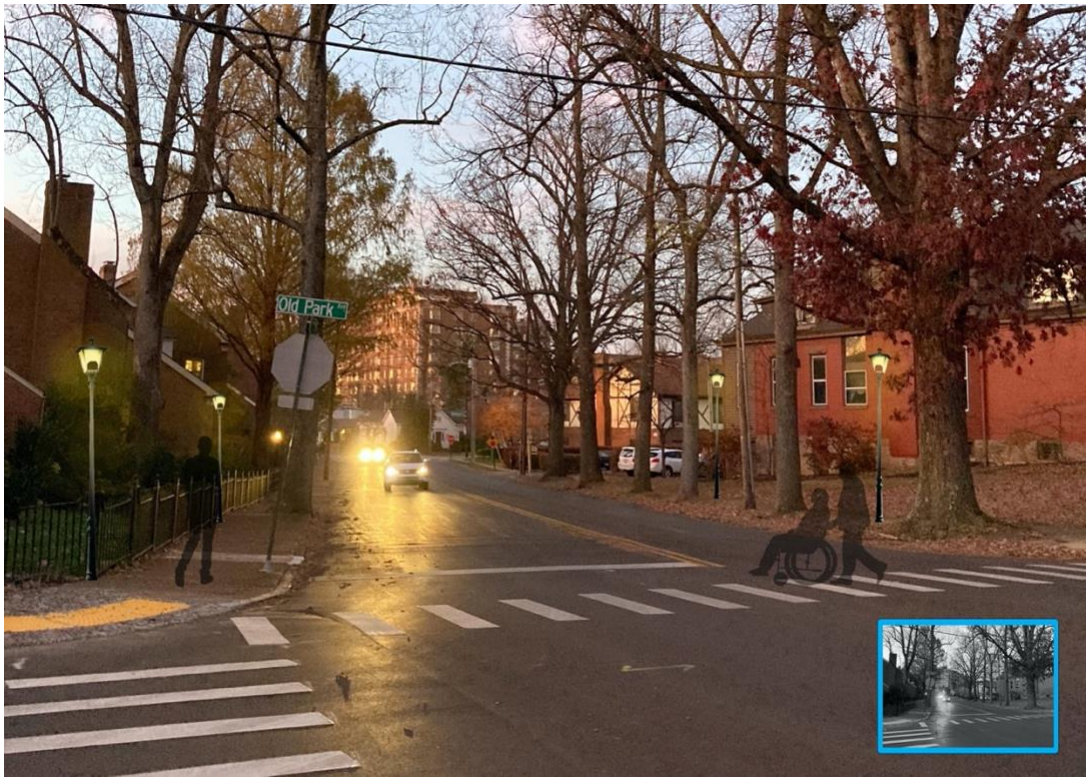

Figure 6.3 Scene 5 Proposal Perspective

Figure 6.4 Scene 5 Existing and Proposed Sections

Historic residential neighborhoods were well-liked by participants for their interesting architecture and landscaping, separation between sidewalk and street, calm traffic, and sense of safety. Though not mentioned in comments, walking in residential neighborhoods may instill a sense of not being alone- that someone is inside a house and may be available for assistance, if necessary. Chances of seeing other pedestrians are high, and participants who live in or near the neighborhoods pictured in the scenes may see someone they know.

Regular maintenance is necessary for historic neighborhoods to remain walkable. Brick sidewalks should be monitored for any damage or unevenness, and sidewalks and lawns should be kept clear of debris from the mature tree canopy.

6.1.2 Modern Suburban Commercial Areas – Scene 2

Many cities, like Lexington, Kentucky, are in the process of reevaluating land use practices of the late 20th and early 21st century. This includes addressing sprawl and car-centric development patterns. Scene 2 depicts a common sight in modern suburban commercial areas- no sidewalk, no shade, and a lot of parking. The space itself seems confused and is what some urban planners may refer to as a "stroad," a combination of a people-centric street and a vehicle-centric road (Strong Towns, 2018).

Figure 6.5 Scene 2 Proposal Perspective

Survey participants indicated a desire for protection from traffic, reduced noise, seating and shade, dedicated sidewalks, and increased building frontage. Figure 6.5 shows recommendations for higher density and mixed uses of infill, immediately adjacent to the pictured side road, parallel to a major traffic artery. This improves safety, proximity, and navigation for residents of the area and for vehicles traveling along the corridor by reducing conflicts between pedestrians and drivers.

Figure 6.6 Scene 2 Existing and Proposed Sections

By adding dedicated walking space, shade and landscaping, seating, and encouraging businesses to relocate parking to behind commercial buildings in order to limit conflicts with pedestrians, older adults may feel more welcome walking for recreation or transportation along modern corridors. The recommended improvements visible in Figure 6.5 introduce urban design elements to improve safety, enhance comfort and aesthetics, provide adequate facilities, and improve proximity and navigation by bringing buildings closer to the street and clear pathways to access those buildings. Additionally, by narrowing the existing street space to add sidewalks, side street traffic may be calmed.

6.1.3 Downtown Business Core – Scene 3

Figure 6.7 Scene 3 Proposal Perspective

With heavy volumes of high-speed vehicular traffic, many driveways crossing over sidewalks, and little vegetation, downtown business cores can be uninviting to persons not walking downtown out of necessity. Scene 3 prompted mostly negative comments across every category. To mitigate negative aspects and encourage older adults to walk downtown, a number of urban design interventions are proposed.

First, the vacant parking garage to the left should be filled in. This garage has not been in use for several years and no downtown parking spaces would be lost. A few options exist for this space: one is to use the garage as framework for a building and another is to cover the façade with a mural. In Scene 7, featuring a mural, several positive comments were collected regarding the artwork. The mural both improves comfort and sense of safety for pedestrians, by removing the parking garage, and enhances the aesthetics in this predominately gray, concrete part of town. Bench seating, flowers, and lamp flags also work together to create a more aesthetically pleasing place to walk.

Both navigation and comfort can be improved with the light gray leading lines on either side of the sidewalk. These lines may subconsciously encourage pedestrians to walk within the lines, a foot or two away from traffic, with the sense of a physical barrier. The lines also lead a pedestrian toward downtown. Comfort is further enhanced with the addition of a grassy buffer in the street shoulder on both sides of the street. The buffer both separates traffic and reduces lane size, which may slow traffic on this one-way urban arterial road. The division between pedestrian and vehicles spaces is further marked by bollards along the grassy curb. Bollards are

regularly used in bicycle infrastructure to create a physical barrier between cyclists and motorists, even though both users are sharing the same physical road. Bollards should be reflective and clearly placed to prevent collisions.

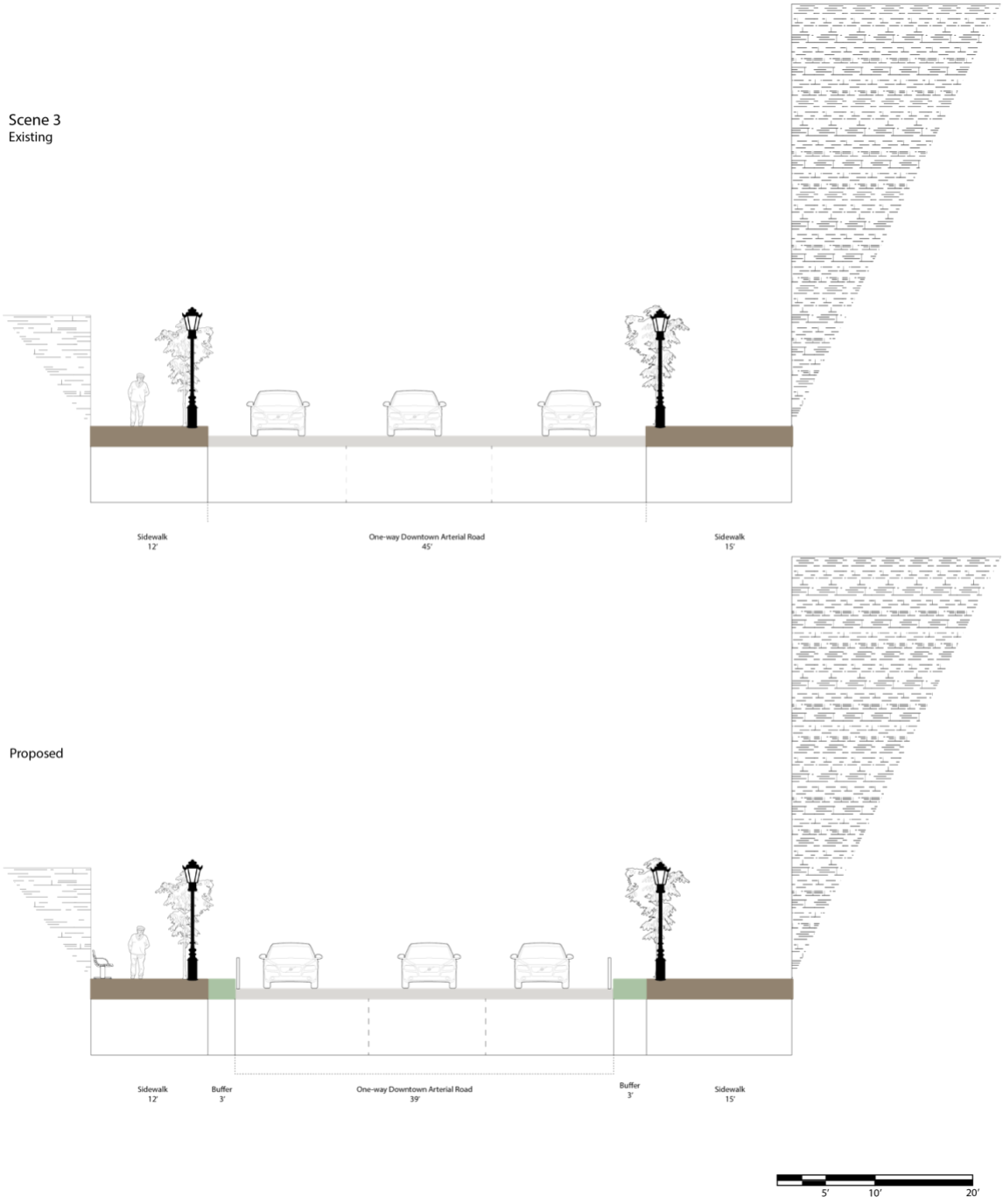

Figure 6.8 Scene 3 Existing and Proposed Section

6.1.4 Edge or Transition Zones – Scenes 4 and 7

The edges of commercial and residential districts often have some gray area with respect to where pedestrians belong. Not quite "stroads," tight spaces are shared by vehicles and pedestrians. Some edge areas are busier than others, as witnessed through comparing Scenes 4 and 7, and require individualized adjustments to allow traffic to still flow and pedestrians to feel more welcome.

The inadequacy of dedicated walking space, uncomfortable proximity of sidewalk users to moving traffic, and lack of seating, shade, and street lighting were often cited in the survey comments.

In Scene 4, a grassy buffer replaces the existing sidewalk, and the new sidewalk is shifted to the right of the scene. To address concerns about the steep grass lawn, a retaining wall is proposed to contain the yard, give opportunity for landscaping or addition of other interesting things to look at, and provide seating for those who are passing by. Sidewalk lighting is added to improve safety and comfort, and the new sidewalk is concrete and should be regularly maintained to prevent tripping. Not pictured in Figure 6.9 but seen in 6.10 is a recommendation for building frontage to be closer to the street, as also recommended in Scene 2.

Figure 6.9 Scene 4 Proposal Perspective

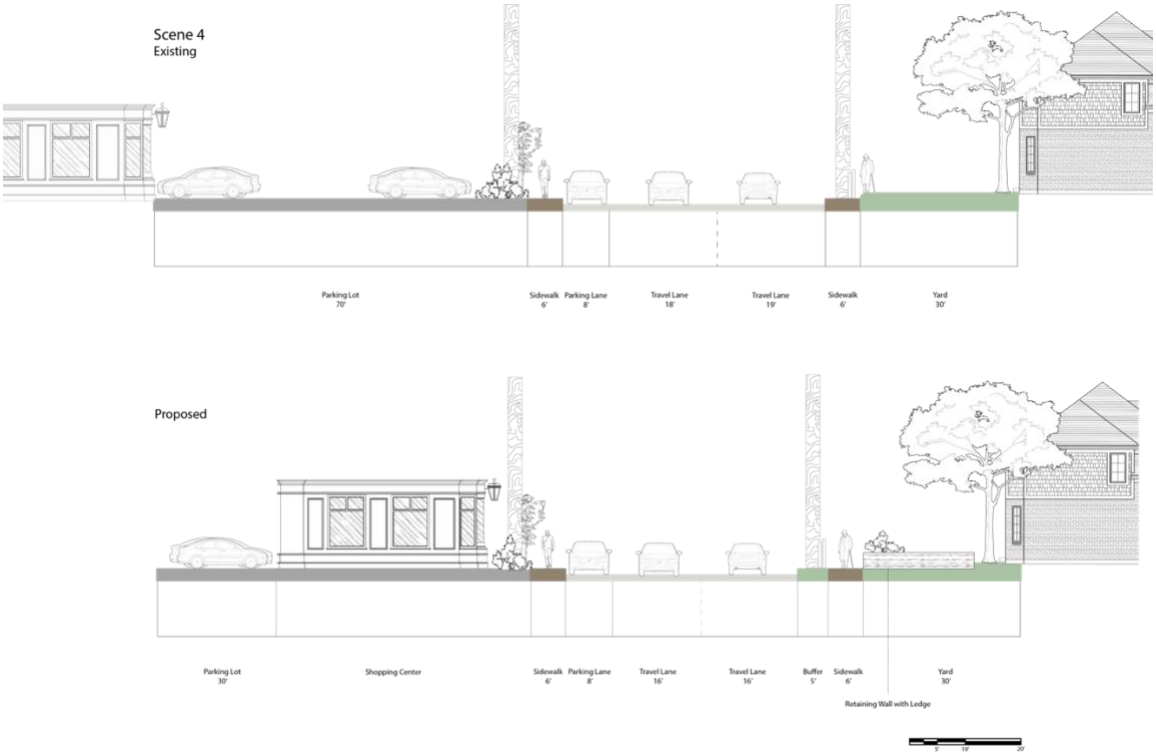

Figure 6.10 Scene 4 Existing and Proposed Sections

Scene 7, the snow-covered sidewalk between a residential neighborhood and the downtown business district, was considered by participants to be boring, deserted, and unsafe. To mitigate this, a grass buffer with street trees is added in the existing vehicular right-of-way to both slow traffic and provide a barrier between vehicles and pedestrians. In place of existing underutilized parking lots, a mix of residential and commercial development should be infilled to improve density and proximity, put eyes on the street, and add interesting things for passerby to look at. It is critical that sidewalks be regularly cleared to prevent snow and ice buildup in the winter months, especially due to the amount of afternoon shade created by the existing buildings.

Encouraging property owners to clear and maintain sidewalks and to treat grassy buffers as an extension of their personal property can help to create buy-in in the physical environment of the neighborhood, in addition to improving the experience of pedestrians passing through. In these connection settings in cities, minimal urban design changes can create maximum impact.

Figure 6.11 Scene 7 Proposal Perspective

Figure 6.12 Scene 7 Existing and Proposed Sections

6.1.5 Shared-use Recreational Trails – Scene 6

Scene 6, a shared-use trail on the back side of a rehabilitated commercial building, received some complex comments and scores. Several participants were cyclists or pedestrians familiar with the trail and thought highly of this scene. Others, though, were unfamiliar and intimidated by the industrial, remote appearance of the trail. This scene is a strong example of how pedestrian facilities alone are not enough to encourage people to use a path.

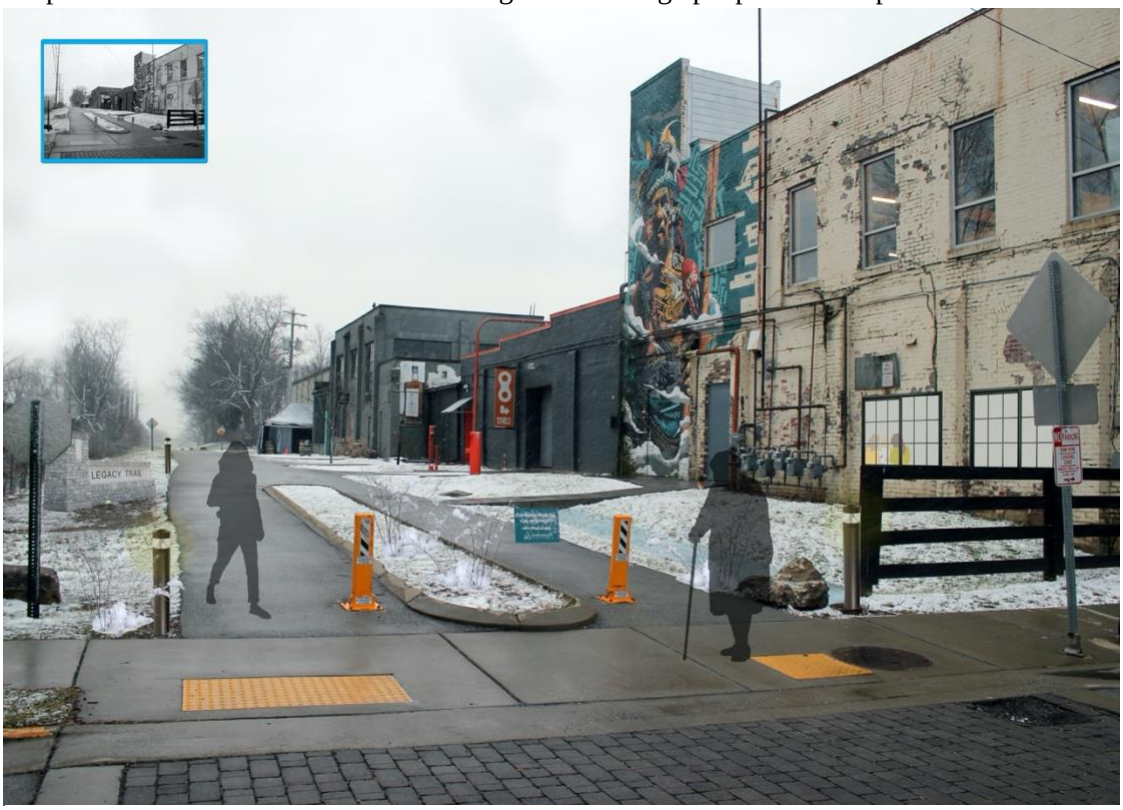

Figure 6.13 Scene 6 Proposal Perspective

Activation of this site is necessary. Windows on the ground level of the building engage users of indoor and outdoor spaces with each other. The trail is in the surveillance zone of the building, and visibility in and out of the building is necessary for safety, comfort, and a sense of belonging for users of both spaces (Rowles, 1981). A stream or water feature between the path and building may promote acoustic comfort, promoting “freshness” and “calmness” (Jeon, Lee, & You, 2012). Minor landscaping improvements around the entrance may make the trail seem more like a trail, and not just an unclear road or path. Signage, as several participants mentioned, also assists in navigating and interpreting the trail. In nice weather, business owners along the trail could expand their business activities outdoors to help reduce fear of harm by others and improve feelings of overall safety.

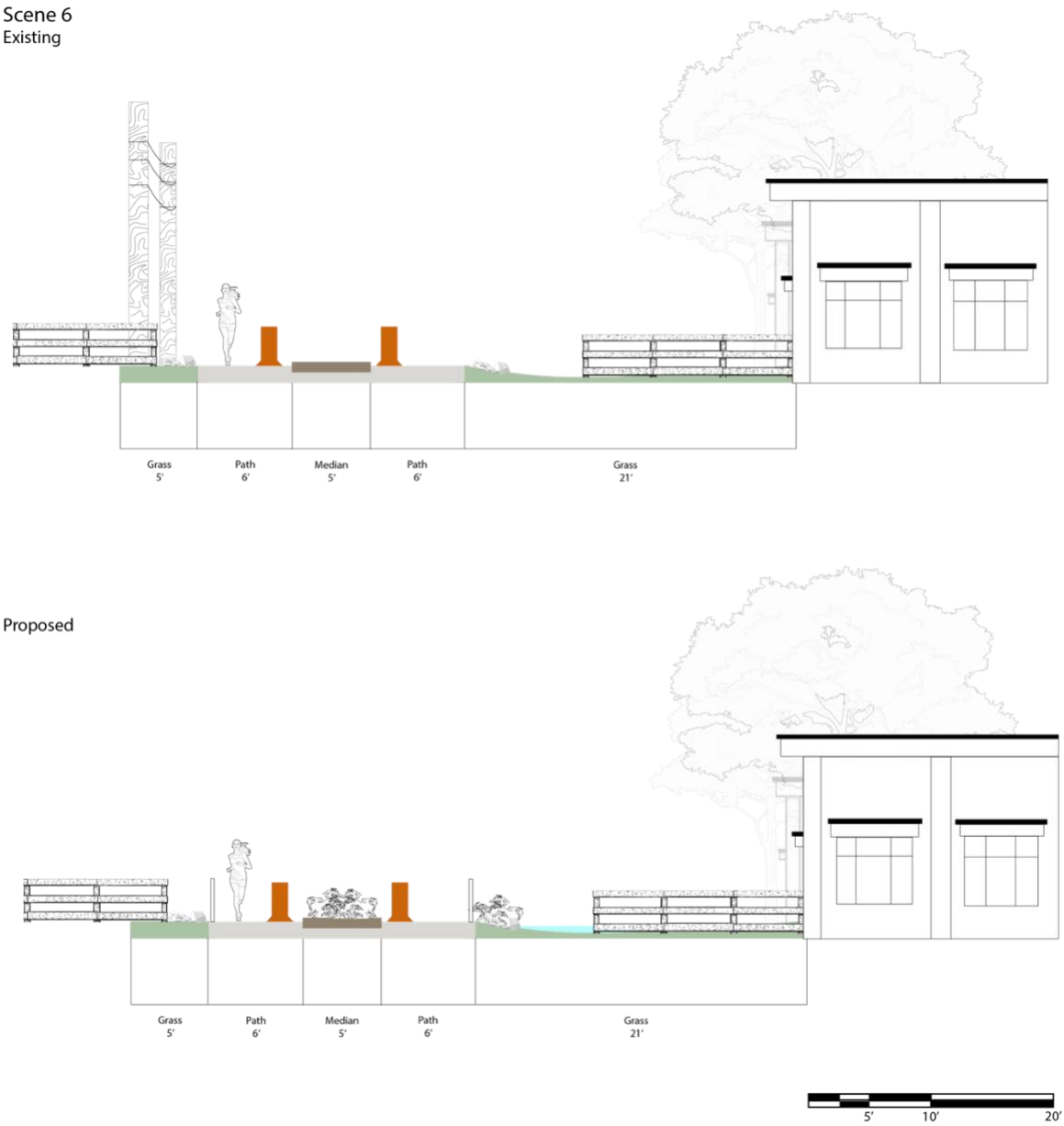

Figure 6.14 Scene 6 Existing and Proposed Sections

6.2 Intervention Phasing

These recommendations cannot be achieved overnight. While progress can continually be made toward achieving ideal pedestrian environments, three distinct phases are recognized.

Figure 6.15 Phasing Diagram

In less than a year or two, short-term improvements like landscaping, regular sidewalk maintenance, installation of seating options along paths, and installation of street lighting on darker streets can be achieved with limited political buy-in or community encouragement. While not always “easy” or “cheap” to spend public dollars on streetscapes, these elements can be implemented with relative ease compared to the next phases.

In the midterm, selected streets can be narrowed to slow traffic and widen pedestrian facilities. Private developers may be encouraged to infill vacant or parking lots in Lexington’s urban areas, especially as foot traffic and property values increase. Certain utilities may be buried, especially as buildings and streets are already being constructed.

Long-term, over decades or even generations, cultural shifts are necessary to create pedestrian environments that are fully welcoming. This includes, but is not limited to, encouraging people to make short trips by foot or bike even if driving is convenient, workplaces incentivizing commutes made by active transportation modes, and improving county-wide health outcomes and physical activity levels. As consumers’ retail preferences shift, shopping centers may be reconstructed closer to the street and with a mix of residential and commercial uses. Finally, zoning amendments and building regulations across the county should be changed to accommodate big buildings on little lots, no parking minimums, and mid-rise multifamily housing, like the fourplexes that were common in the city’s post-war suburban development.

Items in each phase may shift to be nearer or further away but can generally be lumped in the three phases presented in Figure 6.15.

6.3 Study Limitations

A more diverse sample is necessary to fully represent the public. In the online survey, only persons who identified themselves as white or Caucasian met the age minimum and completed all questions. In future iterations of this study, researchers should distribute the online survey link to broader audiences to attempt to capture a greater variety of participants.

6.4 Future Direction of Research

Many options present themselves as clear next steps with this research. First, proposed scene changes could be presented for feedback by older adults, in a similar format as the online survey of the existing scenes. Additional changes can be proposed using older adults' comments and rankings of the six themes.

Further statistical analysis is warranted with a larger, more diverse sample. Significant relationships may be found between certain demographic groups, perceptions of neighborhood quality and community, reported health and activity levels, and different responses to each scene. Understanding predictors of responses to each scene may be helpful to city leaders in tailoring urban design to individual communities' needs.

As mentioned as a study limitation, this sample set could be expanded to include more diverse participants. More specific questions could be asked about the type of neighborhood settings participants live in (urban, suburban, rural), physical activity and health, and about different sets of photographs, not limited to Lexington, Kentucky scenes.

Geographic information systems (GIS) are available to researchers to ask participants about preferred paths and modes of travel to daily errands and entertainment, cognitive mapping and memory, and differences in behavior based on where participants live and recreate.

Finally, the recommendations posited in this paper may be presented to the public through the same channels as the initial survey. Feedback could be collected on the recommended changes to each scene and further refined to be more inviting to everyone from 8 to 80 and beyond.

7 CONCLUSION

In conclusion, older adults strongly value safety, comfort, and aesthetics in their walking environment. While most walk in their home neighborhoods, the provision of adequate pedestrian facilities and welcoming walking environments in different areas around town may increase walking for recreation or transportation in older adults.

Across six themes of safety, comfort, pedestrian facilities, aesthetics, navigation, and proximity, broad urban design interventions are proposed. These interventions can be easily applied to any setting in any city, with appropriate adjustments for each case. The seven scenes presented in this study should serve as case studies for other researchers and community leaders.

Over time, urban design improvements may influence community-wide walking behavior. When places are designed according to 8 80 Cities' mission of creating public spaces that are welcoming to children and older adults, all people in the community benefit. By making changes in Lexington's five distinct types of urban settings (residential, commercial, urban core, recreational, and edge-type), more members of the city may feel invited to walk. While the recommendations presented in this study encompass multiple facets of complete urban environments, interventions are not limited to those proposed here. Bold leadership, political will, and community buy-in are necessary to create change. Studies involving vulnerable groups in Lexington, like this one, can help people feel seen and build public support for change.

APPENDIX

Primary Categories - Comments on Scene 1 (600 block of West Short Street)

Positive	Negative
Safety	
looks safe to walk there	I feel unprotected from cars/street traffic.
Building fronts close to the sidewalk and the use of street trees contribute to the feeling of a safe walking environment. Narrow street also important	The neighborhood looks like a nice place to walk however the snow on shrubs makes me think it might be icy.
	the brick sidewalks cause tripping
	I don't like snow.
	Very slippery when wet or frozen
Comfort	
comfortable walking area	There is no place to sit and rest.
Shade is good	I would have to use a mobility scooter.
Facilities	
Sidewalk and separation from traffic encourage walking. Trees are nice.	Current sidewalk appears smooth, but too narrow between trees and street.
Sidewalks keep one away from traffic and vegetation provides a nicer view.	
Nice sidewalk and vegetation	
Aesthetics	
Looks like a clean or a nice neighborhood to live in	
I like older neighborhoods	
interesting looking neighborhood	
a pleasant, leafy street, unencumbered	
Natural outdoors appearance	
Looks like a very nice old neighborhood.	
Pleasant looking place and street	
Nice clean walk. Beautiful homes.	
Historical houses and trees and greenery improve any	
love older neighborhoods looks clean and maintained	
a lovely neighborhood	
I like the tree lined brick road.	
It looks appealing and relatively quiet for walking.	
Like walking in residential areas	
Navigation	
Proximity	
Other	
Inviting sidewalk but the photographer makes it inviting with a "leading line".	
I grew up with brick sidewalks.	
Building engage the street	
my choices above and below are for daytime hours. in the dark i would answer differently.	
I walk this block often	

Primary Categories - Comments on Scene 2 (2200 block of Nicholasville Road)

Positive	Negative
Safety	
	All looks unsafe.
	it is not a safe place to walk
	Not a fun place to walk
	Does not look like a generally safe place to walk.
	No safe place to walk
Comfort	
you can use the bathroom at BK	Possible heavy traffic
	This would not be an area I would want to walk in.
	Even tho few cars this looks like a potentially high traffic area. I avoid traffic areas for walking. I could walk to areas like this but would not.
	This area looks too busy for me to walk.
Facilities	
	NO place for walking, only cars.
	No sidewalks
	no sidewalks, no crosswalks
	Parking lots are wasted space to a walker
	not made for walking, would have to walk in street
	No sidewalk
	No sidewalk
	no sidewalk
	No sidewalk! Wide road with likely fast traffic.
	no actual sidewalk, construction barrels blocking the way
	No sidewalks. Wide unmarked street encourages high traffic speeds and is a negative for walking.
	no sidewalks
	Traffic from drive-thru and lack of sidewalks would discourage me.
Aesthetics	
The median helps relieve an otherwise unattractive area.	NO appeal.
I like the trees. Again if I used a scooter.	too commercial
	it is too commercial for my taste
	Ugly
Navigation	
	CONFUSING.
	Can't tell if wide space is a road or a walkway or bike path.
Proximity	
Other	
looks ok for a hotel stay	
I would definitely pass on walking here.	
Totally opposite from the prior scene as all the elements in it are missing here.	
The photographer is basically inviting me to walk in the street. Not going to do that.	

Primary Categories - Comments on Scene 3 (200 block of East Vine Street)

Positive	Negative
Safety	
	Feels unsafe. Sidwalk has too many uneven areas, narrow-ness. No protection from street/cars.
	It looks wet and slippery
	there is a chance that someone could toss something over the RAIL
	Wide sidewalk and streetlamp add to security, but structure to left provides provides hiding places for wrongdoers.
	scary parking garage
	Might be dangerous.
	Responses are for daytime. at night I would avoid this when alone
	Wide, fast, one-way highway.
	dark garage, multiple lanes to cross but would be okay walking on other side of street
	it looks dangerous for my walker and wheelchair
Comfort	
	Again with a mobility scooter.
	Too much traffic
	Uncontrolled access to parking is a negative factor for walking.
	I do not like walking on Vine Street even though it has sidewalks. Feels like a freeway. The empty parking lot on the left is very unappealing.
	clearly downtown with dense population or use. Designed for cars not people.
	Same as prior scene. Totally not a pedestrian friendly environment
Facilities	
wide sidewalks	Sidewalk appears narrow.
wide sidewalks are an invitation to walk	Sidewalk is uneven
	A downtown area with no trees and traffic does not appeal to me
Decent width sidewalk	
Wide sidewalk with lighting at night	
Aesthetics	
	ugly
	not enticing
	Not interesting.
	Few plants/trees
	Nothing aesthetically appealing
Navigation	
Proximity	
Other	
No problem. Just a standard sidewalk on a downtown street.	
Very typical place to go to work.	
Would walk here if I needed to.	

Primary Categories - Comments on Scene 4 (800 block of East High Street)

Positive	Negative
	Safety
	somewhat dangerous, tripping hazards, chances of falling.
	Not safe. Might fall.
	Comfort
	Heavy traffic and uneven walkway
	Not good for a scooter
	Dirty. Too much traffic
	It's not pedestrian friendly. Not an area respected by its users. Not designed to accommodate walkers safely.
	Too much traffic.
	Sidewalk too close to vehicle traffic
	Don't see any trees.
	A difficult walk.
	YIKES! Uneven sidewalk, steep grassy bank, dirty mask/trash, NO protection from cars :(
	Facilities
	The sidewalk does not look very wide
	Sidewalk a little tight but at least it's a sidewalk.
	The sidewalk provides a place to walk, but there is no separation from traffic.
	Another narrow walk and detour to get to curb.
	Not all walkways are inviting
	Narrow area in which to walk
	Sidewalk too narrow and too close to traffic
	sidewalk ends in poles, just a cut through, so would get muddy
	Uneven sidewalk surface and lack of separation from traffic are negative factors.
	uneven sidewalks, trash ,missing part - dangerous for walker, wheelchair
	Does not have a continuous sidewalk.
	Narrow sidewalks.
	sidewalk ends at utility pole.
	Aesthetics
	Yuck!
	Generally unappealing.
	Boring.
	Not much to look at.
	Navigation
	Proximity
	Other
Same as prior scene.	
Would walk here if it was the route I needed to get to a specific place.	

Primary Categories - Comments on Scene 5 (500 block of Central Avenue)

Positive	Negative
Safety	
	Not well lit, narrow sidewalk only on one side, no protection from vehicles.
	Lighting is bad thus not safe. Dangerous
	no street lights
	I would not be here when dark enough for headlights. low visibility.
	slick and risk of falling
	There appears to be no street lights for nighttime walking
Comfort	
Fairly pleasant walking area	sidewalk is not well separated from traffic.
	Heavy traffic
	Traffic appearssomewhat calmed. Residential area.
Facilities	
crosswalks appear to be marked good.	sidewalk obscured by items.
standard corner with a crosswalk. Looks OK to me if I'm careful.	
Nice crosswalk.	
Safe area to cross the streets.	
Good crosswalks!	
sidewalk on one side only but trees make it nice and plenty of crosswalks	
Even though sidewalk is close to street, there are street trees, it's a short block so speed not an issue,well-marked crosswalks.	
Aesthetics	
Trees and sidewalk are inviting	
Looks inviting	
Navigation	
Proximity	
Other	
so so	
Left side May be ok to walk in. Hard to tell	
n/a	
Again on a mobility scooter.	
No sidewalks	
Home neighborhood	

Primary Categories - Comments on Scene 6 (Legacy Trail at West Sixth Street)

Positive	Negative
Safety	
	not a very good part of town....must be very careful at all times.
	high risk of falling
Comfort	
seems a little deserted but probably nice for walking	It looks deserted.
	This area seems more inviting in warmer weather. It does not look appealing in the winter.
	not a big fan of the backside of industrial type buildings
	Looks like an isolated warehouse area
Facilities	
The view is Broke Spoke on the Legacy Trail. I've done this many times. Great trail.	
bicycle/walking path is good	
Nice wide walk.	
Nice wide trail apart from any streets	
Aesthetics	
I like the mural on the building	It looks broken down
building murals are nice but other parts need paint	Mural is helpful but pealing paint on the rest of the building shows lack of care.
Murals are very nice to look at while walking	This area is just ugly! If that is a bike path leading from the street, it needs signage and decorative foliage.
	Same. Not an attractive walking environment.
	building unsightly and no sidewolks
	ugly
	no trees
	Power lines, ? building no trees or bench. Looks like in middle of nowhere.
Navigation	
The surfaces look navigable so that doesn't seem to be an issue.	Terrain is unclear and unmarked
	Confusing --are paved areas for pedestrians.
	Hard to judge situation here. Light industrial?
Proximity	
	no destination
Other	
Responses are for daytime. would be different at night	
I'm not sure what this is so it's hard to judge comfort level.	
I would have no reason to walk here.	

Primary Categories - Comments on Scene 7 (100 block of Central Avenue)

Positive	Negative
	Safety
	The sidewalk on the left has snow, could cause people to fall
	sidewalk hazardous with snow present.
	Lack of snow removal while typical does not encourage walking by older people.
	snow-covered walks not safe
	Uncleared sidewalk extremely dangerous.
	Would avoid this side of street because of the snow.
	Dangerous
	Sidewalk not cleared of snow is a problem.
	high risk of falling
	Sow on walkway would discourage me.
	I would walk slowly
	Snow covered brick not safe to walk on
	need to remove snow
	Comfort
	ice and snow
	Feels remote
	Looks isolated.
	nothing appealing about this area despite the sidewalks, maybe too isolated
	Facilities
	Narrow sidewalk, no protection from street.
	Aesthetics
At least, there are sidewalks.	No nature.
	overhead wires ugly
	Navigation
	Proximity
	Other

Looks adequate minus the snow!!
Nice, apart from the snow covered sidewalks
Daytime responses
With a mobility scooter.
Ditto all prior comments and rankings as prior pedestrian unfriendly scenes.
not unless I had to go...

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