TRANSFORMING AUTO-CENTRIC COMMUNITIES INTO WALKABLE NEIGHBORHOODS: WALKABILITY AUDITS OF TWO NEIGHBORHOODS IN SAN JOSÉ

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TRANSFORMING AUTO-CENTRIC COMMUNITIES INTO WALKABLE NEIGHBORHOODS: WALKABILITY AUDITS OF TWO NEIGHBORHOODS IN SAN JOSÉ

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Table of Contents

List of Figures

List of Tables

Chapter 1: Introduction to the Research Project

1.1. Project Overview

Walkable neighborhoods are becoming increasingly desirable for both local governments and residential communities. Walkable neighborhoods have healthier residents, higher levels of social capital, higher property values, and environmentally friendly qualities.[1] Nonetheless, 60 percent of the U.S. population does not get the recommended 30 minutes of physical activity each day, contributing to higher rates of obesity and other serious health problems such as heart disease.[2] Additionally, over 90 percent of travel trips one to two miles in length are made by private automobiles.[3] Public interest and advocacy from the urban planning and public health disciplines are bringing attention to the need to improve walkability in American cities.

It is widely known throughout the planning field that post-World War II U.S. urban and suburban development centered on automobile accessibility at the expense of other transportation modes.[4] San José, California, is a classic example of a city that largely developed during the automobile age, leaving behind a legacy of mid-20th century planning policies and an auto-centric environment. A key question for planners, public officials, and researchers is how to reverse this legacy and transform these communities into active, pedestrian-friendly cities.

This research utilizes a modified version of Clifton et al.'s Pedestrian Environment Data Scan (PEDS) instrument,[5] referred to simply as the Walkability Audit Instrument (WAI) to audit the walkability of two San José neighborhoods with contrasting urban form patterns. The Five Wounds/Brookwood Terrace (FWBT) neighborhood contains compact, rectilinear pre-World War II development and the West Evergreen (WE) neighborhood consists of sprawling, post-World War II suburban development.

This research project is one of few to apply the PEDS instrument in a practical setting. Results from this research will be of interest to planning practitioners, public health

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[1] Joe Cortright, and Impresa Inc, *Walking the Walk: How Walkability Raises Home Values*, (CEOs for Cities, August 2009).
Kevin M. Leyden, "Social Capital and the Built Environment: The Importance of Walkable Neighborhoods," *American Journal of Public Health* 93, no. 9 (September 2003): 1550.
Michael Southworth, "Designing the Walkable City," *Journal of Urban Planning and Development* 131, no. 4 (2005): 248.

[2] Kristen Day, "Active Living and Social Justice: Planning for Physical Activity in Low-Income, Black, and Latino Communities," *Journal of the American Planning Association* 72, no. 1 (Winter 2006): 88.

[3] John Pucher and Lewis Dijkstra, "Promoting Safe Walking and Cycling to Improve Public Health: Lessons from the Netherlands and Germany," *American Journal of Public Health* 93, no. 9 (2003): 1509.

[4] Southworth, "Designing the Walkable City," 247.

[5] Kelly J. Clifton et al., "The Development and Testing of an Audit for the Pedestrian Environment," *Landscape and Urban Planning* 80 (2007).

officials, and researchers across the U.S. facing similar questions of how to reconfigure their auto-centric neighborhoods into walkable communities.

There are three main objectives for this project:

1. Provide an example of the effect of urban form on walkability in San José
2. Provide fine-grained pedestrian environment data for each public street segment in the FWBT and WE neighborhoods
3. Provide recommendations to improve walkability in the subject neighborhoods which can also be applied to other San José neighborhoods.

This report consists of eight chapters. Chapter 1 introduces the project, its methodology, and explains its relevance. Chapter 2 analyzes literature on the built environment's effect on walking. Chapter 3 reviews current literature on walkability audits. Chapter 4 reviews the City of San José's and respective neighborhoods' major planning documents related to pedestrians. Chapter 5 provides more background on the two neighborhoods and discusses current walkability concerns. Chapter 6 provides an overview of PEDS, the WAI, and the methodology used in the audit. Chapter 7 details the audit findings and recommendations, and Chapter 8 concludes the report.

There are four appendices at the end of the report. Appendix A explains the dynamics and administration protocol for each item of the WAI. Appendix B lists each street segment that was audited, its numeric score, and rating. Appendix C shows detailed audit result tables broken down by each item of the WAI. Appendix D identifies street segments and intersections that lack sidewalks and provisions for Americans with Disabilities Act (ADA) accessibility.

1.2. What can a Walkability Audit do for San José?

Walkability audits are a primarily objective assessment of features within the pedestrian environment, such as sidewalks, land uses, and pedestrian amenities.[6] Although some question the subjective elements of walkability audits, they are a generally reliable tool and are one way of developing planning strategies to improve walkability.[7] The Walkability Audit Instrument (WAI) is used in this report to assess built environment conditions for each public street segment in the two neighborhoods from a pedestrian's perspective.

Each item of the WAI is worth a certain number of points, and the final score represents the adequacy of walking conditions on the segment. The scores of each street segment are visualized on maps that show the locations of satisfactory and unsatisfactory street

[6] Walkinginfo.org, "Assessing Walking Conditions with Audits," Pedestrian and Bicycle Information Center, http://www.walkinginfo.org/problems/audits.cfm (accessed September 7, 2009).
[7] Clifton et al., "The Development and Testing," 96.
Marcia Scott et al., *Healthy Communities: A Resource Guide for Delaware Municipalities* (University of Delaware: Institute for Public Administration, 2008), 37.

segments. The audit results also show a breakdown of each item on the WAI, such as the number of segments within a neighborhood that lack buffers between the curb and sidewalk and which streets are deficient in ADA accessibility. The audit results can help supplement each community's neighborhood improvement plans.

Walkability audits have already helped cities determine where they need to employ improvements. In Orlando, Florida, audits of streetscape conditions led to an update in streetscape guidelines to require pedestrian street enhancements in new development projects.[8] Alexandria, Virginia, used a GIS-based pedestrian needs assessment to rate street segments' walkability scores.[9] The assessment helped the city prioritize both immediate and long-term capital improvement projects. In Louisville, Kentucky, walkability assessments have helped local communities update their neighborhood plans and plan for streetscape improvements.[10] Tucson, Arizona used an assessment of sidewalk conditions and ADA access along all major roadways to help structure the regional transit agency's pedestrian plan, which has resulted in the earmarking of $30 million for pedestrian and ADA improvements.[11]

The City of San José is seeking to reverse its history of auto-oriented sprawl by improving citywide walkability through the current 2040 General Plan update. By 2040, the city would like to have interconnected, healthy neighborhoods, which are easily accessible by walking, biking, and transit.[12] Other recent efforts include the mayor's Green Vision for San José, a 15-year plan to create a sustainable city.[13] The City Council's 2008 incorporation of the Private Sector Green Building Policy implements part of the Green Vision by mandating pedestrian-friendly green building measures in all new developments.[14] The city is also in the process of updating its pedestrian master plan and ADA sidewalk transition plan, to be reviewed by the City Council in 2010.[15]

Five Wounds/Brookwood Terrace and West Evergreen are in need of walkability improvements and a shift of travel priorities. According to the 2000 U.S. Census, 82 percent

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[8] Walkinginfo.org, "Downtown Orlando Transportation Plan," Pedestrian and Bicycle Information Center, http://drusilla.hsrc.unc.edu/cms/downloads/PLA.DowntownOrlandoTransportationPlan.pdf (accessed September 3, 2009).

[9]Dan Goodman, Robert Schneider, and Trevor Griffiths, "Put Your Money Where the People Are," *Planning*, June 2009, 35.

[10] Walkinginfo.org, "Case Study Compendium," Pedestrian and Bicycle Information Center, http://drusilla.hsrc.unc.edu/cms/downloads/pbic_case_study_compendium.pdf (accessed September 7, 2009).

[11] Ibid.

[12] Envision San José 2040, "Draft Vision," City of San José, http://www.sanjoseca.gov/planning/gp_update/meetings/1-28-08/Envision2040_Vision_Graphic.pdf (accessed September 6, 2009).

[13] Office of Mayor Chuck Reed, "Mayor Reed's Green Vision for San José," City of San José, http://www.sanjoseca.gov/mayor/goals/environment/GreenVision/GreenVision.asp (accessed September 6, 2009).

[14] Office of the City Clerk, "Private Sector Green Building Policy (Council Policy 6-32)," City of San José, http://www.sanjoseca.gov/clerk/cp_manual/CPM_6_32.pdf (accessed September 6, 2009).

[15] John Brazil, Bicycle and Pedestrian Program Coordinator with the City of San José, interview by author, San José, CA, February 22, 2010.

of FWBT and 86 percent of West Evergreen commuter trips to work were made by automobile.[16] Only two percent of commuter trips were made by walking in both neighborhoods. Recognizing these facts, the need to improve walkability is addressed in their respective neighborhood improvement plans. One of the five guiding principles of FWBT's neighborhood improvement plan is to enhance walkability and build upon the neighborhood's small town character.[17] The community realizes that walkability and pedestrian-oriented designs and uses are necessary to ensure safe, livable neighborhoods. The goals that guide the West Evergreen community vision include creating a safe street environment for pedestrians, improving park and trail connectivity, creating attractive streets, and improving retail areas.[18]

FWBT and WE are currently connected to each other by a major Santa Clara Valley Transportation Authority (VTA) bus line. The 22 line begins at Eastridge Mall on the eastern edge of WE and runs through FWBT, through Downtown San José, and eventually on to Palo Alto.[19] Starting in 2013, the new 522 bus rapid transit (BRT) line will run along the existing 22 line in both neighborhoods.[20] The 522 BRT line will be the first of its kind in the South San Francisco Bay Area. The BRT line is anticipated to be an improvement over the current bus system with faster and more frequent service, better comfort and accessibility, and light rail-like stations complete with ticket vending machines, real-time arrival information, and public art.[21] BRT stations are expected to attract pedestrian-friendly development and bring in streetscape improvements to enhance the livability of the area around them**.**

In addition to BRT, a BART (Bay Area Rapid Transit) extension is planned from the East San Francisco Bay area through FWBT;[22] and the VTA is developing a light rail extension to the eastern boundary of WE.[23] Properties near these planned transit lines are slated for infill and sustainable development, where transit stops will be within walking distance to dense housing, jobs, and a diverse array of daily destinations.[24] The 2040 General Plan update is calling these areas BART and light rail corridors, neighborhood villages, and light rail

[16] U.S. Census Bureau, "American FactFinder Summary File 3 Detailed Tables," http://factfinder.census.gov (accessed August 11, 2009).
[17] Strong Neighborhoods Initiative, *Five Wounds Brookwood Terrace Neighborhood Improvement Plan,* (City of San José, 2002), III-2.
[18] SNI, *West Evergreen Neighborhood Improvement Plan*, 2008 Rev. ed. (City of San José, 2001), 27.
[19] Santa Clara Valley Transportation Authority, "Route 22," http://www.vta.org/schedules/SC_22.html (accessed March 19, 2010).
[20] Transform, "Alum Rock Corridor," http://transformca.org/brt/alum-rock-corridor#map (accessed March 19, 2010).
[21] Transform, "Key Elements of Bus Rapid Transit in the South Bay." http://transformca.org/brt/key-elements-bus-rapid-transit-south-bay (accessed March 19, 2010).
[22] VTA "Fact Sheet: BART to Silicon Valley," http://www.vta.org/bart/documents/other/bart_fact.pdf (accessed August 11, 2009).
[23] VTA, "VTA Facts: 2000 Measure A," http://www.vta.org/projects/dtev/PDF/dtev_ar_2_15_08_fs.pdf (accessed August 12, 2009).
[24] Lee Butler, Planner II with the City of San José, interview by author, San José, CA, February 26, 2010.

villages.[25] In FWBT, there is a planned BART corridor along Santa Clara Street; a neighborhood village along 24th Street between William and San Antonio Streets; and a BART village near the proposed BART station at Julian and 28th Streets. In West Evergreen, there is a planned commercial village at King and Tully Roads; and two light rail corridors along Capitol Expressway—one south of Eastridge Mall and the other between Silver Creek Road and Aborn Road.[26]

San José is on the right track towards ushering in a more walkable city. Stronger emphasis on planning for pedestrians is anticipated in the upcoming general plan update. Also, future transit developments in FWBT and WE will open up opportunities for pedestrian improvements.

1.3. Overview of Project Methodology

Walkability audits are a research component of the built environment's effect on walking behavior. Walkability audits can be used to determine the likelihood that certain built environment features contribute to increased walking. 40 peer-reviewed articles from urban planning and public health journals were consulted in order to understand the relationship between the built environment and the likelihood of walking. Peer-reviewed articles related to walkability audits were also reviewed, although they are not as widely researched as the built environment's effect on walking. Articles were extracted from the San José State University Library's Articles and Databases web site. The literature review also led to the selection of the PEDS instrument as the model for the WAI.

San José's pedestrian programs, policies, and procedures needed to be examined to grasp the regulatory environment related to pedestrians in the city. Regulatory and advisory documents such as the general plan and the two neighborhood improvement plans were readily available on the city's web site. Interviews with several city officials and one neighborhood representative were conducted to confirm information in city documents and to gain insight on walkability in the neighborhoods and in San José.

The PEDS instrument was modified to create the WAI and was field tested outside the study neighborhoods along Santa Clara Street between 4th and 17th Streets in San José. Street segments were identified by hand on maps from each neighborhood's neighborhood improvement plan. The audit was conducted by the author in the field during the daytime using paper copies of the WAI.

After the audit, the paper audit sheets were entered into a database that tabulated the cumulative scores for each street segment. Statistics of the findings and individual audit

[25] Department of Planning, Building, and Code Enforcement, "Envision San José 2040 Final Selection of Growth Study Scenarios," City of San José http://www.sanjoseca.gov/clerk/Agenda/20090616/20090616_0403.pdf (May 26, 2009).
[26] City of San José, "Planned and Identified Growth Areas Map," http://www.sanjoseca.gov/planning/gp_update/docs/Growth_Areas_Low-Res.pdf (accessed August 11, 2009).

item results were also analyzed. Recommendations for improvement were based on observations by the author.

1.4. Report Limitations

This report is unable to address all the facets of walkability in FWBT and WE. Many elements are already addressed in the respective neighborhood improvement plans. The following items are not included in this report:

- Pedestrian collision data
- Pedestrian volume data
- Pedestrian level of service (LOS) data
- Block length data
- Street width data
- Safe Routes to School/Transit analysis
- Full ADA accessibility analysis
- Private street, walkway, and trail segment audits
- Pedestrian safety audit/audit of nighttime conditions
- Complete audit data for each individual street segment (however, they are available from the author upon request)
- Specific design ideas for sites and pedestrian facilities
- Funding sources for improvements
- Specific implementation strategies
- Identification of responsible agencies for improvements
- Reliability and validity testing of WAI items
- Regression analysis of individual WAI item's correlation with total walkability score

Chapter 2: Literature Review of the Built Environment and its Relationship to Walkability

2.1. Overview of Built Environment and Walking Literature

The topic of walkability is primarily the concern of researchers in the Urban Planning and Public Health fields. Both fields look at how urban form or the built environment influences the likelihood of walking. The built environment is defined by Handy et al. as the composition of "urban design, land use, and the transportation system, and encompasses patterns of human activity within the physical environment."[27] Planners are interested in increasing walking for transportation and health researchers are interested in increasing walking for recreation or physical activity. Since walking is both a transportation mode and form of exercise, the two fields often collaborate to achieve the desired result—less personal auto use/sedentary lifestyles and more walking.

This chapter primarily discusses the positive correlations of higher residential densities, mixed land uses, and pedestrian-oriented design with the increased likelihood of walking. Cervero and Kockelman refer to these variables as the 3Ds—density, diversity, and design.[28] They say that the 3Ds must coexist to achieve its full synergistic effect on influencing the likelihood of walking. Additionally, due to the multicollinearity and interrelatedness of the 3Ds, it is difficult to pinpoint the contribution of each variable.[29]

There is also some discussion of the effect that non-built environment social factors have on walking, such as perceived safety, attitudes towards walking, and access to automobiles.[30] It should be noted that most researchers make it clear that no causal connections exist between built environment variables and walking, because these studies are observational or cross-sectional in nature.[31]

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[27] Susan L. Handy et al., "How the Built Environment Affects Physical Activity: Views from Urban Planning," *American Journal of Preventative Medicine* 23 (2002): 65.
[28] Robert Cervero and Kara Kockelman, "Travel Demand and the 3Ds: Density, Diversity, and Design," *Transportation Research* 2, no. 3 (1997): 216.
[29] Brian E. Saelens et al., "Environmental Correlates of Walking and Cycling: Findings from the Transportation, Urban Design, and Planning Literatures," *Annals of Behavioral Medicine* 25, no. 2 (2003): 87.
[30] Ryuichi Kitamura et al., "A Micro-Analysis of Land Use and Travel in Five Neighborhoods in the San Francisco Bay Area," *Transportation* 24, no. 2 (May 1997): 156.
Matthew A. Coogan, et al., "The Role of Personal Values, Urban Form, and Auto Availability in the Analysis of Walking for Transportation," *American Journal of Health Promotion* 21, no. 4 (March/April 2007): 365.
[31] Cervero and Kockelman, "Travel Demand and the 3Ds," 216.
Lawrence D. Frank and Gary Pivo, "Impacts of Mixed Use and Density on Utilization of Three Modes of Travel: Single-Occupant Vehicle, Transit, and Walking," *Transportation Research Record* 1466 (1994): 45.
Wendy C. King et al, "Objective Measures of Neighborhood Environment and Physical Activity in Older Women," *American Journal of Preventative Medicine* 28, no. 5 (June 2005): 465.

2.2. The Effect of Dwelling Unit Density on Walking

High population densities allow a large number of people to be concentrated in a small place where it is often easier to walk than drive a car. Dense areas entice businesses and services to locate nearby, making for short travel distances. Lower densities on the other hand require greater land area, thus dispersing the street pattern and travel destinations. It is hard to isolate the contribution of density, but its presence in many studies leaves little doubt that it is a major contributor. One can also infer that another commonly used descriptor, "compact," includes high density. Leslie et al. used "compact" to describe high density in their walkability study.[32]

Researchers have closely linked density to walking for transportation[33], perhaps because it is harder to drive and find parking in dense areas. Additionally, transit modes are often located in dense areas. In their review of the effect of neighborhood characteristics on walking, Saelens et al. confirmed that density was the most constant predictor of walking trips.[34] Cervero and Radisch conducted a comparison of walking rates in two San Francisco Bay Area neighborhoods, urban Rockridge and suburban Lafayette. Rockridge's higher residential densities were associated with a 10 percent higher non-commute walk share than Lafayette's.[35] Kitamura et al. found similar results when examining different neighborhoods, also in the San Francisco Bay Area. High residential densities in North San Francisco were associated with more walking trips while lower density San José was associated with more automobile trips.[36] In the Seattle area, Frank and Pivo found that shopping and commute trips had the highest relationship with population density.[37]

In some studies, living in a denser neighborhood has been shown to correlate with physical activity, which is likely related to walking for recreation. On the same note, total physical activity could include walking for transportation more than recreation, but many self-reported physical activity studies do not disaggregate the two.[38] Frank et al. found a strong association between residential density and total physical activity in Atlanta adults.[39] In the Salt Lake City area, men living in high density neighborhoods were at a lower risk of being overweight, but women were at a higher risk of being obese.[40]

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[32] Eva Leslie et al., "Walkability of Local Communities: Using Geographic Information Systems to Objectively Assess Relevant Environmental Attributes," *Health & Place* 13 (2007): 113.
[33] Esther Cerin et al., "Neighborhood Environment Walkability Scale: Validity and Development of a Short Form." *Medicine & Science in Sports & Exercise* 38, no. 9 (2006): 1689.
[34] Saelens et al., "Environmental Correlates," 84.
[35] Robert Cervero and Carolyn Radisch, "Travel Choices in Pedestrian Versus Automobile Oriented Neighborhoods," *Transport Policy* 3, vol. 3 (1996): 140.
[36] Kitamura et al., "A Micro-Analysis," 139.
[37] Frank and Pivo, "Impacts of Mixed Use," 50.
[38] Handy et al., "How the Built Environment," 72.
[39] Lawrence D. Frank et al., "Linking Objectively Measured Physical Activity with Objectively Measured Urban Form: Findings from SMARTRAQ." *American Journal of Preventative Medicine* 28 (2005): 121.
[40] Ken R. Smith et al., "Walkability and Body Mass Index: Density, Design, and New Diversity Measures," *American Journal of Preventative Medicine* 35, no. 3 (2008): 241.

2.3. The Effect of Mixed Land Uses on Walking

Mixed use is a term used to describe either multi-use buildings/sites or neighborhoods with a variety of uses within a close proximity of one another. Like density, mixed use has traditionally correlated well with increased walking, which is likely due to its wide-ranging definition. Cervero defined mixed use as commercial, industrial, or institutional land uses within 300 feet of a residential unit.[41] Saelens et al. classified it as "the level of integration within a given area of different types of uses for physical space."[42] Mixed use neighborhoods enhance the pedestrian experience by providing a variety of destinations within walking distance.

Researchers regularly explored the relationship between the proximity of retail and commercial uses to residential units. Generally, the closer retail and commercial uses are to residential uses, the greater the chance that people will walk to get there. When controlling for commute distance and median income, Cervero found that the presence of a grocery or drug store within 300 feet greatly increases the possibility of travel walking.[43] In another Cervero study, he and Kockelman found that the probability of commuting on foot increases 75 percent in a neighborhood where residences are within a quarter mile of retail clusters.[44] Southworth contends that varied neighborhood-serving land uses, such as coffee shops and grocery stores within a ½ mile, are among one of the six criteria for walkable cities.[45]

Studies indicate that the intermixing of parks and other recreational facilities into the urban fabric also increase walking for physical activity. Cutts et al. found Phoenix neighborhoods with sufficient park access to be more walkable with lesser pedestrian fatalities.[46] Day reports that Latinos engage in more physical activity when parks and playing fields are nearby.[47] In their literature review of the environmental influences on walking, Owen et al. found that access to public open spaces frequently correlated with walking for recreation. Parks and open spaces are doubly beneficial because people generally walk to get there and then walk for exercise while there.

The presence of mixed land uses and daily destinations has been shown to increase physical activity particularly in the elderly. King found that older women who lived within 1500 feet of post offices and golf courses were more likely to walk for leisure.[48] While the researchers admit that these are not typically walkable land uses, other walkable land uses not measured in the study, such as banks and restaurants, may be located near post offices

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[41] Robert Cervero, "Mixed Land-Uses and Commuting: Evidence from the American Community Survey," *Transportation Research* 30, no. 5 (1996): 365.
[42] Saelens et al., "Environmental Correlates," 81.
[43] Cervero, "Mixed Land Uses," 375.
[44] Cervero and Kockelman, "Travel Demand and the 3Ds," 216.
[45] Southworth, "Designing the Walkable City," 250.
[46] Bethany B. Cutts et al., "City Structure, Obesity, and Environmental Justice: An Integrated Analysis of Physical and Social Barriers to Walkable Streets and Park Access," *Social Science and Medicine* (2009): 4, 6.
[47] Day, "Active Living and Social Justice," 94.
[48] King et al, "Objective Measures," 467.

and golf courses. Berke et al. found that the most important predictors of walkability for older men were short distances to restaurant and retail clusters within one kilometer of their home.[49]

2.4. The Effect of Pedestrian-Oriented Design on Walking

Similar to mixed use, pedestrian-oriented design can take on several forms. Pedestrian-oriented street design consists of shorter blocks, grid street patterns, and an abundance of intersections, connectable with other parts of the city.[50] Pedestrian-oriented streetscapes are heavy on aesthetics, and can include wide sidewalks, visible storefronts, human-scale buildings, landscaping, and street furniture.[51] Large arterial roads with few intersections are the antithesis of pedestrian-oriented design.[52] Since pedestrian-oriented design is more fine-grained and subjective than mixed uses and density, it is often challenging to measure and locate existing data.[53] Fortunately, walkability audits are one way of collecting the data.

The provision of sidewalks is a basic but important step towards walkability. Kitamura et al. stated that there was a clear amount of statistical evidence demonstrating that sidewalks boost levels of non-motorized transportation in San Francisco Bay Area neighborhoods.[54] In another study, sidewalk conditions influenced one-third of pedestrian route choices to transit stations in the San Francisco Bay Area and Portland.[55] Stevens pointed to sidewalks as one of the three most common indicators of walkability around neighborhood parks in Eugene, Oregon.[56] Lastly, Pikora et al.'s Delphi expert panel picked sidewalk continuity as the most important feature for walking.[57]

Visual aesthetics and amenities were also shown to positively impact walking rates. In a pedestrian perceptions study in Salt Lake City, Brown et al. found that "highly walkable" streets included pleasurable features like trees and flowers; amenities such as benches and restrooms; and appealing architectural elements.[58] In another study, Ewing et al. found

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[49] Ethan M. Berke et al., "Protective Association between Neighborhood Walkability and Depression in Older Men," *Journal of the American Geriatrics Society* 55, no. 4 (April 2007): 528.
[50] Southworth, "Designing the Walkable City," 249.
[51] Handy, "How the Built Environment," 66.
[52] Marc Schlossberg and Nathaniel Brown, "Comparing Transit-Oriented Development Sites by Walkability Indicators," *Transportation Research Record: Journal of the Transportation Research Board* 1887 (2004): 39.
[53] James F. Sallis, "Measuring Physical Activity Environments: A Brief History," *American Journal of Preventative Medicine* 36 (2009): 90.
Saelens et al., "Environmental Correlates," 84.
[54] Kitamura et al., "A Micro-Analysis," 143.
[55] Asha Weinstein Agrawal et al., "How Far, By Which Route and Why? A Spatial Analysis of Pedestrian Preference," *Journal of Urban Design* 13, no. 1 (February 2008): 81-98.
[56] Robert D. Stevens, "Walkability Around Neighborhood Parks: An Assessment of Four Parks in Springfield, Oregon" (master's thesis, University of Oregon, 2005) 49.
[57] Terri Pikora et. al, "Developing a Framework for Assessment of the Environmental Determinates of Walking and Cycling," *Social Science & Medicine* 56 (2003): 1700.
[58] Brown et al., "Walkable Route," 52.

long sight lines, detailed building articulation, storefronts, and public art to be conducive to overall walkability.[59]

While pedestrian design features are important, some researchers argue that they by themselves exhibit weak relationships with walking. Cervero and Kockelman explain that once mixed land uses and demographics were accounted for, fine-grained design features had little impact on pedestrian travel demand.[60] They acknowledged that this may be due to the lack of observational data on pedestrian-oriented design. Craig et al. and Southworth mention that pedestrian-oriented design in suburban settings is often ineffective because the suburbs lack the other features of walkable cities, such as higher densities and mixed use neighborhoods.[61]

2.5. The Effect of Non-Built Environment Variables on Walking

In theory, if a neighborhood has higher residential densities, a variety of walkable land uses, and intriguing and functional pedestrian design, it should be rich with pedestrian activity. This may be true to a certain extent, but in many cases automobile use is still the dominant travel mode. There are usually other non-built environment variables that influence a person's choice to walk, such as individual attitudes, perceived safety, and car ownership.

Smith and Clifton note that, "walking behavior is better explained by perceptions than sociodemographics or objective assessments of the environment."[62] Similarly, Kitamura et al. concluded that individual attitudes towards walking were a stronger determinant of actual walking than built environment variables.[63] Coogan et al. noted that those sampled in major metropolitan areas with pro-environmental and urban values walked four times as much as those without the same values.[64] Handy et al. suggest that psychological and social factors such as perceptions of safety and the influence of peer groups may be more important in determining walking behavior.[65]

Perceptions of pedestrian safety also impact the likelihood of walking for transportation. In Brown et al.'s study of Salt Lake City street segments, respondents did not feel safe walking in areas with panhandlers, transients, and people sleeping on the sidewalk.[66] Additionally,

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[59] Reid Ewing et al., "Identifying and Measuring Urban Design Qualities Related to Walkability," *Journal of Physical Activity and Health* 3, sup. 1 (2006): S234.
[60] Cervero and Kockelman, "Travel Demand and the 3Ds," 218.
[61] Cora L. Craig et al., "Exploring the Effect of the Environment on Physical Activity: A Study Examining Walking to Work," *American Journal of Preventative Medicine* 23 (2002): 41.
Southworth, "Designing the Walkable City," 250.
[62] Marc Schlossberg et al., "An Assessment of GIS-Enabled Walkability Audits," *URISA Journal* 19, no. 2 (2007): 9.
[63] Kitamura et al., "A Micro-Analysis," 156.
[64] Coogan et al., "The Role of Personal Values," 365.
[65] Handy et al., "How the Built Environment," 72.
[66] Barbara Brown et al., "Walkable Route Perceptions and Physical Features: Converging Evidence for En Route Walking Experiences," *Environment and Behavior* 39, no. 1 (January 2007): 55.

respondents commented that certain parking garages and transit stops attracted people that made them fearful for their safety. These can be common in urban areas and likely deter people from walking, especially at night. Loukatiou-Sideris cites physical and social incivilities (blight and vagrants, respectively) as responsible for influencing the choice to walk.[67]

The presence of personal autos in a household makes auto travel very convenient, especially when destinations are considerable distances away. Walking for transportation becomes less attractive when time, distance, and weather constraints become apparent. Cervero found that higher vehicle ownership rates strongly increase the amount of personal auto commuting.[68] For instance, four automobiles in a household leads to at least a 90 percent chance of commuting by personal auto, regardless of living in a high density and mixed use neighborhood. Coogan et al. found that the type of neighborhood (compact or sprawled) did not make a difference in walking behavior when auto availability was factored in.[69] Persons living in households with low auto availability made twice as many of their travel trips on foot compared to those with high auto availability.

2.6. Conclusion: The 3Ds Significantly Impact the Likelihood of Walking

While there have been no causal relationships tied to the built environment and walking, the powerhouse of the 3Ds—density, diversity, and design, have consistently correlated well with walkability. The 3Ds individually can have significant effects on walking, but when they coexist in a relatively confined area, their impact can be enormous. It is quite possible that American planning's sacred cow, zoning, will need to be overhauled to allow the 3D's to return to or enter for the first time into American built environments. Transportation and land use planners, engineers, and public health officials will need to team up to facilitate active living and transportation in cities.

Further research into the effect of social variables on walkability is needed to come closer to finding walking causality. The field of environmental psychology will have to intervene to study what effects individual walking behavior. It could be that American's love of the automobile is too powerful to fully achieve a walkable city, but that is yet to be proven.

[67] Anastasia Loukaitou-Sideris, "Is it Safe to Walk? Neighborhood Safety and Security Considerations and Their Effects on Walking," *Journal of Planning Literature* 20, no. 3 (February 2006): 224.
[68] Cervero, "Mixed Land Uses," 369.
[69] Coogan et al., "The Role of Personal Values," 366.

Chapter 3: Planning Professionals' Walkability Audit Tools

3.1. Academia's Strides in Developing Walkability Audits

Walkability audits are a relatively new way to assess the pedestrian environment. As Moudon and Lee have found, checklists and audit instruments have been in use by government agencies and advocacy groups since 1993,[70] with the earliest documented journal article from 2002.[71] Since walkability audits are a new topic of study, the articles reviewed here discuss the development of the audit instrument and spend little to no time on the outcome of an audit in a particular neighborhood. Most audit instruments are meant to be administered by different raters and naturally, results vary by each rater. Thus, the major themes in the walkability audit articles are reliability and validity testing of the instrument, where expectedly, subjective audit items score lower among the various rater responses.[72] Objective items, such as land use characteristics, show the best reliability/validity.[73] The drawback to these articles is that there are no examples of audit usage in practical applications, nor is there mention of their successes in influencing pedestrian policy.

Audit instrument items can range from 162 items, as in the Irvine-Minnesota Inventory[74] to 14 items, as in the Workplace Walkability Audit Tool.[75] Moudon and Lee criticize larger audit instruments because their size alone demonstrates a lack of knowledge of walkable variables.[76] That may be the case, but extensive literature reviews on the built environment's effect on walkability were conducted in almost all of the articles. It could be that certain researchers are trying to stake their claim to documenting all aspects of the pedestrian environment, even if it means overloading audit instruments with seemingly unnecessary items.

Objective, clearly observable land use and pedestrian path items demonstrated the highest reliability. Brownson et al.'s St. Louis Audit Tool showed greater reliability in elements related to transportation and land use,[77] as well as Hoehner et al.'s Active Neighborhood

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[70] Anne Vernez Moudon, and Chanam Lee, "Walking and Bicycling: An Evaluation of Environmental Audit Instruments," *American Journal of Health Promotion* 18, no. 1 (2003): 25-26.
[71] Terri J. Pikora, et al., "Developing a Reliable Audit Instrument to Measure the Physical Environment for Physical Activity," *American Journal of Preventative Medicine* 23, no. 3 (2002): 188.
[72] Yvonne L. Michael et al., "Revising the Senior Walkability Environmental Assessment Tool," *Preventative Medicine* 48 (2009): 249.
[73] Ross C. Brownson et al., "Reliability of Two Instruments for Auditing the Environment for Physical Activity," *Journal of Physical Activity and Health* 1 (2004): 193.
[74] Kristen Day et al., "The Irvine-Minnesota Inventory to Measure Built Environments," *American Journal of Preventative Medicine* 30, no. 2 (2006): 150.
[75] Andrew L. Dannenberg et al., "Assessing the Walkability of the Workplace: A New Audit Tool," *American Journal of Health Promotion* 20, no. 1 (September/October 2005): 43.
[76] Moudon and Lee, "Walking and Bicycling," 33.
[77] Brownson et al., "Reliability of Two Instruments," 204.

Checklist, where land use items exhibited the highest reliability.[78] Clifton et al.'s PEDS instrument also displayed desirable reliability in land use questions, as well as traffic control items and the presence of sidewalks. [79] Emery et al.'s Walking Suitability Form also found that the presence of sidewalks, sidewalk material, and posted speed limits were highly reliable.[80] Land use characteristics are easier to gauge because they are absolute.

The reliability of street characteristics was less conclusive. Some features were easily agreed upon, such as the number of stop signs, but others, such as bike lane safety are not. Day et al.'s Irvine-Minnesota Inventory found street characteristics, such as block width, to be the most reliable[81] along with Pikora et al. finding related results in street characteristic questions in the SPACES instrument.[82] In contrast, Emery et al.'s Walking Suitability Form showed that questions related to buffer width, traffic lanes, sidewalk condition and width, and curb ramps had the lowest reliability.[83] Hoehner et al. found questions about sidewalks, road shoulders, and bike lanes to have the lowest reliability. The researchers attributed the low reliability of these items to the subjectivity of the questions, such as, "Is there a lot/some/a little/broken glass in the gutter?"[84]

As one would expect, the most subjective questions were less reliable. The St. Louis Audit Tool showed poor reliability in questions on aesthetics, physical disorder, and the social environment.[85] Correspondingly, Michael et al.'s SWEAT-R tool showed lower reliability in terms of aesthetics.[86] PEDS tested poorly in the subjective street lighting and building enclosure questions.[87] As an outlier, the Workplace Walkability Audit Tool is reliable in two subjective areas—pedestrian conflicts and street buffer. But, it is also unreliable in other subjective areas like road maintenance and shade.[88] Lastly, Michael et al. found safety questions to be reliable[89] while Pikora et al. did not. [90]

Easily quantifiable audit items, such as the number of trees and crosswalks, will usually have higher reliability results. Subjective items are harder to measure across the board due to varying rater opinion. However, subjective items should be included on audit instruments because they can illustrate raters' perceptions of the street that cannot be

[78] Christine M. Hoehner et al., "Active Neighborhood Checklist: A User-Friendly and Reliable Tool for Assessing Activity Friendliness." *American Journal of Health Promotion* 21, no. 6 (2007): 535.
[79] Clifton et al., "The Development and Testing," 104.
[80] James Emery et al., "Reliability and Validity of Two Instruments Designed to Assess the Walking and Bicycling Suitability of Sidewalks and Roads," *American Journal of Health Promotion* 18, no. 1 (2003): 40.
[81] Day et al., "The Irvine-Minnesota," 150.
[82] Pikora et al., "Developing a Reliable," 189.
[83] Emery et al, "Reliability and Validity," 40.
[84]Hoehner et al., "Active Neighborhood," 535.
[85] Brownson et al., "Reliability of Two Instruments," 204.
[86] Michael et al., "Revising," 248.
[87] Clifton et al., "The Development and Testing," 104.
[88] Dannenberg, "Assessing," 41.
[89] Michael et al., "Revising," 248.
[90] Pikora et al., "Developing a Reliable," 189.

captured with objective items.[91] Pedestrian perceptions of safety and aesthetics are important in determining the choice to walk in a particular area.

3.2. Walkability Audits Designed for Laypersons

Many walkability audit instruments are developed by and for academic and practitioner use, leaving most community members unable to properly utilize them. Moudon and Lee found that only a fraction of the numerous walkability and built environment audit instruments were available for use by the layperson.[92] It is important to involve community members in walkability audits primarily because it engages their awareness of the environmental attributes affecting pedestrians in their neighborhood. Secondly, their responses help planners and researchers understand the issues directly affecting community members. Thirdly, after conducting walkability audits of their neighborhood, community members are more likely to be involved in advocating for improvements.[93]

Since walkability audits are a relatively new area of research in the academic field, it might take longer for audits to be developed for the general public's use, which explains why there are so few currently available. The length of the audit questions are usually short and are simplified to exclude planning jargon and increase understanding of the factors that could help improve walkability. The Pedestrian and Bicycle Information Center (PBIC) Walkability Checklist is written in a conversational manner and only consists of only five questions.[94] The Citrus Heights Neighborhood Walkability Survey builds upon the previous walkability checklist and engages the rater by asking them in plain language questions about the elements they face while walking in the neighborhood.[95]

Non-academic checklists also contain scoring systems that give community members a sense of how walkable their neighborhood is. The CDC Workplace Walkability Audit Tool features a 0-100 scoring system with references to what the scores mean, such as 0-39 points being "high risk and unattractive"; and scores of 70 and above as "pleasant."[96] The PBIC Walkability Checklist also tells raters what the scores represent, such as the higher score indicating, "Celebrate! You have a great neighborhood for walking;" and the lower score bemoaning, "It's a disaster for walking!"[97]

Lastly, above all else, non-academic checklists strive to be informative and encourage community members to get involved in improving neighborhood walkability.

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[91] Cluster for Physical Activity and Health, "Involving the Community in Assessing the Environment," The University of Sydney http://www.cpah.health.usyd.edu.au/research/involve.php (accessed March 20, 2010).
[92] Moudon and Lee, "Walking and Bicycling," 26-28.
[93] Cluster for Physical Activity and Health, "Involving the Community."
[94] Walkinginfo.org, "Walkability Checklist," Pedestrian and Bicycle Information Center, http://drusilla.hsrc.unc.edu/cms/downloads/walkability_checklist.pdf (accessed March 20, 2010).
[95] City of Citrus Heights, "Citrus Heights Neighborhood Walkability Checklist," http://www.ci.citrus-heights.ca.us/docs/indoor_survey_final.pdf (accessed March 20, 2010).
[96] Centers for Disease Control and Prevention, "Healthier Worksite Initiative," http://www.cdc.gov/nccdphp/dnpao/hwi/toolkits/walkability/audit_tool.htm (accessed March 20, 2010).
[97] Walkinginfo.org, "Walkability Checklist."

WALKSanDiego's Walkability Checklist educates community members about how they can personally improve walkability and also provides applicable government agency contact information and websites that can give them more information about walkability.[98] The checklist also provides pictures showing what types of features make for a better walking environment. The PBIC Walkability Checklist shows what individuals can do immediately to address any of the problem items in the checklist and what can be done in the long term.[99]

Walkability audits are a way to fulfill Southworth's recommended action to improve walkability—"...if we are to improve walkability in the American city…first cities and suburbs need to address current walkability conditions for every district of the city and then develop policies and plans for the pedestrian environment."[100] Future literature will have to document examples of audits in neighborhoods where walkability is suffering, so strategies can be developed to improve it.

[98] WALKSanDiego, "Walkability Checklist," http://www.walksandiego.org/pdf/walkability_checklist.pdf (accessed March 20, 2010).
[99] Walkinginfo.org, "Walkability Checklist."
[100] Southworth, "Designing the Walkable City," 254.

Chapter 4: San José's Major Planning Documents and their Relation to Walkability in San José, Five Wounds/Brookwood Terrace and West Evergreen

4.1. Overview of Applicable Major Planning Documents

The City of San José's general plan and zoning ordinance are the most powerful regulatory land use tools in the city. The general plan dictates policy, while the zoning ordinance enforces it. These two major documents were implemented during a time of increased awareness of pedestrian issues. The city adopted its current 2020 General Plan in 1994 and last amended it in 2008.[101] The city is currently in the process of updating its general plan to the year 2040 and is scheduled to go before the City Council in June 2011.[102] The city's current zoning ordinance was adopted in 2001 and last amended in 2009.[103]

The city is also in the process of drafting a pedestrian master plan, which intends to consolidate all of the city's pedestrian policies, procedures, and plans into one document while making recommendations for improvement to existing documents.[104] The city's ADA sidewalk transition plan will be updated concurrently with the pedestrian master plan.[105]

The FWBT and WE neighborhood improvement plans were released shortly after the inception of the Strong Neighborhoods Initiative in 2000. Both plans contain goals for redevelopment and provide direction for future public improvements, building design, and other neighborhood beautification programs.[106] No other specific plans exist for the two neighborhoods.

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[101] Department of Planning, Building and Code Enforcement, "San Jose 2020 General Plan Text," City of San José, http://www.sanjoseca.gov/planning/gp/gptext.asp (accessed December 4, 2009).
[102] Envision San José 2040 Task Force, "Envision San Jose 2040 Task Force Work Program," City of San José, http://www.sanjoseca.gov/planning/gp_update/documents/Work_Program_11-12-09.pdf (accessed December 4, 2009).
[103] Department of Planning, Building and Code Enforcement, "Zoning Ordinance," City of San José, http://www.sanjoseca.gov/planning/zoning/zon_amend.asp (accessed December 4, 2009).
[104] City of San José, "San José Pedestrian Plan: Administrative Draft," Asha Weinstein Agrawal, URBP 256 course web page, http://www.sjsu.edu/faculty/weinstein.agrawal/URBP256_Reading_DraftSanJosePedMasterPlan.pdf (accessed September 20, 2009).
[105] Department of Transportation, "Pedestrian Plan and ADA Sidewalk Transition Plan," City of San José, http://www.sanjoseca.gov/transportation/bikeped/bikeped_Pedestrian_ADA.asp (accessed December 5, 2009).
[106] SNI, *Five Wounds*, Executive Summary.
SNI, *West Evergreen*, 6.

Finally, the Traffic Calming Toolkit serves as a resource for helping to improve the pedestrian environment in the public right-of-way with traffic calming devices to slow auto traffic.[107]

4.2. 2020 General Plan and Envision San José 2040 General Plan Update

2020 General Plan

The 2020 General Plan promotes an active, connected, and comfortable pedestrian environment.[108] The plan states that all streets in the city should have sidewalks, street trees, and pedestrian-oriented facilities that are accessible to all.[109]

The city is looking to transit-oriented development (TOD) and dense infill housing on underutilized parcels to concentrate pedestrian activity within confined areas.[110] Areas around transit stations will be intensified and studied to identify opportunities for reuse in older buildings.[111] Two transit-oriented development corridors are located in the study neighborhoods: the Santa Clara Street/Alum Rock Avenue Corridor through the center of FWBT and the Capitol Avenue/Expressway Corridor along the eastern edge of WE.[112] FWBT is also the location of a future BART node around the intersection of Julian and 28th Streets. The node has been given a "Mixed Use" land use designation, which includes varied housing options, neighborhood retail and personal services, parks, and offices.[113] Residential densities in the two transit areas are encouraged to be at least 40 du/ac and no lower than 20 du/ac.[114]

The two transit areas form the basis for the city's Pedestrian Priority Areas map (Figure 1). The map shows red pedestrian corridor lines and green pedestrian core areas. Pedestrian corridors are streets where pedestrian activity and connectivity is to be increased, while pedestrian cores are areas that support pedestrian corridors and other frequently walked-to destinations, such as light rail stations.[115] FWBT's Santa Clara Street/Alum Rock Avenue is a designated as a pedestrian corridor, with a 3,000 foot Pedestrian Core buffer around the future BART Station. WE does not have any pedestrian cores, but it does have two pedestrian corridors on Tully Road and Capitol Expressway.

Auto-oriented uses, such as drive-thru's, are generally not allowed near transit corridors and other pedestrian-heavy areas. Streets in these areas are directed to institute traffic calming devices and give preference to pedestrian accessibility.[116] The city encourages new

[107] Department of Transportation, *Traffic Calming Toolkit,* (City of San José, 2003), 1.
[108] City of San José, *San Jose 2020 General Plan*, 2008 Rev. ed. (City of San José, 1994), 98.
[109] Ibid, 268.
[110] Ibid, 50.
[111] Ibid, 147-148.
[112] Ibid.
[113] Ibid, 150.
[114] Ibid, 152.
[115] Ibid, 268.
[116] Ibid, 79.

commercial and industrial development to be designed for safe, convenient pedestrian access.[117] Existing strip and suburban-style shopping centers are also encouraged to upgrade in order to be engaging for pedestrians. Site design policies to help obtain these goals include connecting pedestrian pathways to public streets; installing abundant street trees and human-scale lighting; and pedestrian-oriented signage and building orientation whenever possible.[118]

[117] Ibid, 61.
[118] Ibid, 80.

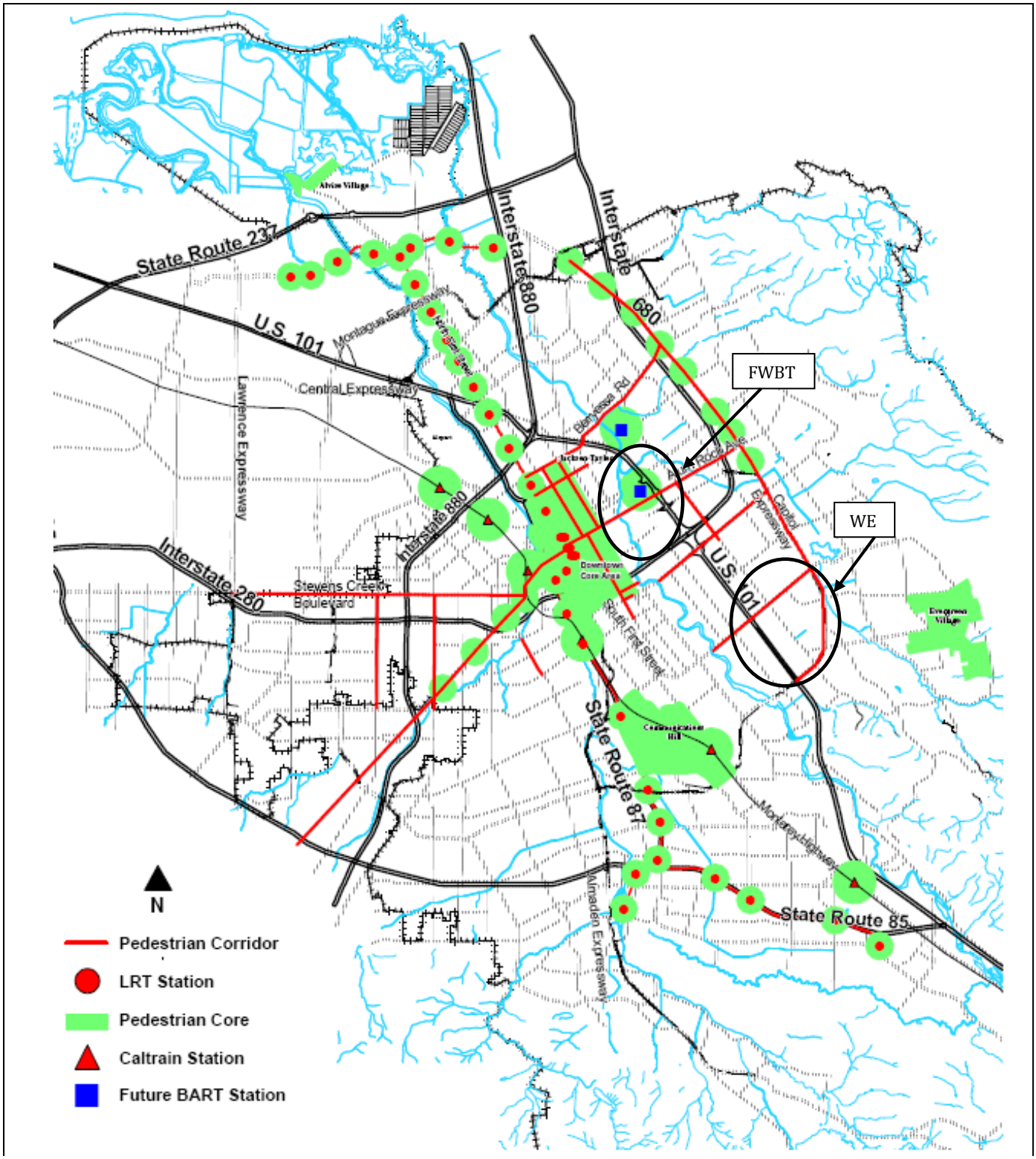

Figure 1. City of San José Pedestrian Priority Areas.
Source: Map from City of San José, San Jose 2020 General Plan, 2008 Rev. ed. (City of San José, 1994), 265.

Envision San José 2040 General Plan Update

The Envision San José 2040 General Plan Update aspires to take the walkable land use, design, and transportation policies contained in the current general plan to the next level. According to the Envision San José 2040 Task Force's working draft of land use/transportation scenario guidelines, two of its seven vision themes relate to better walkability—healthy neighborhoods and the concept of an interconnected city. The healthy neighborhoods vision theme aims to build its land use and transportation framework around walking, biking and close access to parks.[119] The interconnected city vision is to "plan for people, not cars."[120]

To follow up on this vision, the task force introduced the idea of neighborhood villages within existing communities. Neighborhood villages are compact concentrations of housing, jobs, and neighborhood-serving uses where people can easily walk, bike, or take transit to their daily destinations. Many of these will be concentrated in existing commercial centers, complemented with housing, jobs, and services. These existing commercial centers are often in sprawl areas that contain enough underutilized land for heavy redevelopment.[121]

Mode shift goals to increase walking trips are intended through design considerations such as wider sidewalks, lighting improvements, connections through properties, and interesting architecture. The task force is also looking at unbundled, shared, and maximum parking policies to increase walking trips.[122]

4.3. The Zoning Ordinance

The zoning ordinance is not as heavy on pedestrian-oriented content as the general plan, but some regulations specifically focus on generating pedestrian activity. Overall, the zoning ordinance is conventional in nature and does not openly encourage the mixing of land uses, except in the CP and PD zones.

The Commercial Pedestrian (CP) district most closely resembles the pedestrian-oriented goals of the general plan. The district allows pedestrian-serving retail by right and encourages mixed use residential and commercial.[123] "Big box" stores are prevented from

[119] Envision San José 2040 Task Force, "Current Working Draft of Land Use/Transportation Scenario Guidelines, September 15, 2008," City of San José, http://www.sanjoseca.gov/planning/gp_update/docs/Scenario_Guidelines%20_Wrkng_Drft_Sep_08.pdf (accessed December 6, 2009).
[120] Ibid.
[121] Lee Butler, interview by author, February 26, 2010.
[122] Ibid.
[123] City of San José, *Title 20 of the San Jose Municipal Code: Zoning Ordinance*, 2009 Rev. ed. (City of San José, 2001), 53.

locating in this zone by controls such as a maximum front setback and maximum square footages for of retail buildings.[124]

The Planned Development (PD) zone is a flexible zoning district containing site-specific development standards that frequently vary from those in conventional zones. For instance, the maximum density of a regularly zoned Multiple Residence (RM) property is 25 du/ac. [125] The PD zoning designation could allow a developer to potentially increase the maximum density set by the base zoning district (such as RM) to one that is more suitable for the site. PD zoning makes it easier to build dense, diverse, and pedestrian-oriented development.

Sidewalk cafés are the last reference in the zoning ordinance specific to pedestrians. These cafés can enhance the pedestrian experience by having more "eyes on the street." Sidewalk café permits are issued by the Director of Planning and do not have to go through the lengthy and expensive conditional use permit process.[126]

4.4. Draft Pedestrian Master Plan and ADA Sidewalk Transition Plan

The City Council has not yet formally adopted the pedestrian master plan and ADA sidewalk transition plan update,[127] but it is worthwhile to review the drafts to get a sense of where the city currently stands on pedestrian issues.

Draft Pedestrian Master Plan

The draft pedestrian master plan does not examine existing conditions nor identify locations where pedestrian facilities can be improved. Instead, the plan analyzes the city's existing pedestrian policies, programs, and procedures and recommends changes to improve walkability.[128] The plan encourages city departments to collaborate and train each other on pedestrian issues, since many pedestrian deficiencies are caused by disconnects between departments.[129] Next, the plan recommends that regular travel surveys be conducted in the field to study walking behavior and attitudes.

The draft pedestrian master plan encourages the Department of Public Works to incorporate the general plan's pedestrian urban design policies into Public Works' street design standards and sidewalk standard details.[130] The plan recommends that crossing facilities be improved with warning signage, transverse painted pedestrian markings, and better sight line clearances.[131] The plan also calls for increased pedestrian signal crossing

[124] Ibid, 60.
[125] Ibid, 83.
[126] Ibid, 218.
[127] Department of Transportation, "Pedestrian Plan."
[128] John Brazil, interview by author, February 22, 2010.
[129] City of San José, "San Jose Pedestrian Plan," 13.
[130] Ibid, 16.
[131] Ibid, 21-22.

times in heavily-traveled pedestrian areas.[132] Additional car-free and limited vehicle access streets, such as Paseo de San Carlos in downtown, are strongly encouraged.[133]

Some of the suggested changes to the municipal code are prohibiting the location of driveways near intersections and wide curb cuts; requiring curb ramps at all intersections; and establishing procedures to close unused curb cuts and other gaps in the sidewalk.[134] The plan also suggests modifying the development review process to devote closer attention to pedestrian needs.

Draft ADA Sidewalk Transition Plan

The city's draft ADA sidewalk transition plan fulfills a federal requirement to create an action plan to bring existing curb ramps, sidewalks, and pedestrian signals up to compliance with the Americans with Disabilities Act.[135] The plan provides a progress report on the city's ongoing audit of public ADA facilities, which is instrumental in developing priorities for future improvements.[136] Priorities for curb ramp installations are ranked in the following order: citizen requests; facilities near public buildings; locations along routes to major destinations; and all other areas.[137]

4.5. Five Wounds/Brookwood Terrace and West Evergreen Neighborhood Improvement Plans

Five Wounds/Brookwood Terrace and West Evergreen are two neighborhoods that are a part of the Strong Neighborhoods Initiative (SNI) program. SNI is a relatively new neighborhood revitalization program intended to serve communities in need of the most assistance. Each SNI planning area is represented by a community-based neighborhood action coalition (NAC).[138] SNI planning areas have clearly defined boundaries and identifiable contacts within the community and city.

Both neighborhood improvement plans study existing neighborhood conditions; identify specific locations where walkability can be improved; and establish a "top 10" list of improvements. Land use and building guidelines are carefully detailed to help illustrate the plan's vision. WE's plan was updated in 2008, while FWBT's plan has not been updated since its inception in 2002. There was however a draft update to the FWBT plan in 2006 by SJSU students as part of a community assessment course, but the update has yet to be

[132] Ibid, 15.
[133] Ibid, 24
[134] Ibid, 30.
[135] City of San José, "Detailed ADA Transition Plan Update for Sidewalks: Revised Draft- March 20, 2008," Asha Weinstein Agrawal, URBP 256 course web page, http://www.sjsu.edu/faculty/weinstein.agrawal/URBP256_Reading_DraftSanJoseADATransitionPlanSidewalks.pdf (accessed December 5, 2009).
[136] Ibid, 23.
[137] Ibid, 26.
[138] SNI, "Frequently Asked Questions," City of San José Redevelopment Agency, http://www.strongneighborhoods.org/SNI_FAQs_0607.pdf (September 7, 2009).

implemented.[139] The FWBT update should happen sometime after the 2040 General Plan is adopted, according to Paul Pereira, Neighborhood Team Manager, FWBT.[140]

Five Wounds/Brookwood Terrace Neighborhood Improvement Plan

Two of the five guiding principles in the plan are walkability and a transportation system favoring pedestrians, bicyclists, and transit users.[141] The plan states that pedestrian needs should not be sacrificed for those of the automobile.[142] Traffic calming devices, street trees, street furniture and pedestrian-scale lighting are strongly supported and large parking lots are discouraged.[143] Existing commercial areas along Santa Clara Street/Alum Rock Avenue, Julian Street/McKee Road and sections of William Street and 24th Street/McLaughlin Avenue are suggested to undergo streetscape improvements and transform into a "main street" atmosphere, with emphasis added on street trees and sidewalk-fronting buildings.[144]

Several of the plan's top 10 improvement items focus on walkability,[145] some of which were recently deemed complete by the Redevelopment Agency.[146] Among the completed priorities were the site and façade improvements at the William and 24th Street strip shopping center; street tree and pedestrian-scale street light installation along McLaughlin Avenue; and traffic calming along William Street east of Coyote Creek.

Four other long-term redevelopment priorities are envisioned to be walkable mixed-use developments, most notably the San José Steel site along 28th Street between Julian and Santa Clara Streets.[147] Almost all other priorities involve some kind of improvement to pedestrian facilities. The retail redevelopment strategy at the McKee Shopping Center at McKee Road and 33rd Street involves improving the walking environment through reworked storefront appearances and minimizing setbacks from the street.[148] There is also an "on deck" priority to institute streetscape improvements and add upper story housing along existing commercial frontages on the Santa Clara Street/Alum Rock Corridor.[149]

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[139] Department of Urban and Regional Planning, "Five Wounds Brookwood Terrace Draft Neighborhood Improvement Plan Amendment," San José State University, http://www.sjsu.edu/urbanplanning/docs/FWBTNeighborhood_ImprovementPlanAmendment.pdf (accessed December 5, 2009).
[140] Paul Pereira, Neighborhood Team Manager, FWBT, interview with author, San José, CA, February 25, 2010.
[141] SNI, *Five Wounds*, Executive Summary.
[142] Ibid, III-2.
[143] Ibid, III-6.
[144] Ibid.
[145] Ibid, Executive Summary.
[146] San Jose Redevelopment Agency, "Report on the Investment in the Strong Neighborhoods Initiative (SNI) Area, August 2007," City of San José, http://www.sjredevelopment.org/PublicationsPlans/SNISeifelReport2007.pdf (accessed December 5, 2009).
[147] SNI, *Five Wounds*, III-12.
[148] Ibid, VI-14.
[149] Ibid, VI-36.

The plan describes FWBT's existing pedestrian facilities as fair—sidewalks are present on most every street, but they lack the proper treatments for a truly walkable path.[150] The plan intends to make streets a continuous open and green space network, complete with street trees, traffic calming, and street narrowing.[151] Trails will be designed to link together pedestrian networks and provide pathways to schools and parks.[152]

West Evergreen Neighborhood Improvement Plan

WE's recent neighborhood improvement plan update boasts of six top 10 priorities completed since the plan's inception in 2001.[153] Completed priorities relating to walkability include pedestrian crossing and lighting improvements on Aborn Road east of King Road; sidewalk installation along Barberry Lane between King Road and Meadowfair Park; over 70 ADA-compliant curb ramp installations at various locations within the neighborhood; and sidewalk improvements near the KLOK radio station tower site.[154]

A new walkability priority is to create a safe street environment by identifying locations where traffic calming can be considered.[155] A second priority incidentally related to walkability is to beautify the neighborhood and strengthen code enforcement.[156] Neighborhood beautification strategies rely on street tree planting and encouraging single family homeowners to plant trees in their front yards.[157]

Among some of the walkability deficiencies identified in the original plan is the lack of safe pedestrian routes, caused not only by poor design, but also by inappropriate driver behavior.[158] Land use revitalization opportunities were identified in existing commercial shopping centers and on the six-acre KLOX radio station site. The plan also identifies locations for transit-oriented development on the roughly 75 acre Arcadia site along the future light rail line on Capitol Expressway.[159]

Walkability does not seem to be as heavily emphasized in WE as it is in FWBT. This could be due to WE's suburban form, where it is difficult to walk for transportation given its auto-oriented layout. However, both neighborhoods acknowledge that road and streetscape improvements are necessary to encourage pedestrian activity.

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[150] Ibid, II-20.
[151] Ibid, IV-2.
[152] Ibid, IV-25.
[153] Strong Neighborhoods Initiative, *West Evergreen*, 6.
[154] Ibid, 12-13.
[155] Ibid, 20.
[156] Ibid, 17.
[157] Ibid, 23.
[158] Strong Neighborhoods Initiative, *West Evergreen Neighborhood Improvement Plan*, (City of San José, 2001).
[159] Ibid,43.

4.6. Traffic Calming Toolkit

A major improvement theme in FWBT and WE neighborhood improvement plans is traffic calming. The city's Traffic Calming Toolkit outlines traffic calming procedures and describes the different types of traffic calming devices in detail. There are two levels of traffic calming: basic and comprehensive. Basic traffic calming consists of crosswalks and stop signs, while comprehensive traffic calming engages stronger measures such as chokers and medians.[160] Residents can request traffic calming studies through the Department of Transportation. The Department of Transportation considers street speed, traffic volume, speed-related crashes, pedestrian destinations, and unique conditions, such as missing sidewalks or higher than average crash rates as priorities for installing traffic calming.[161]

4.7. Conclusions Drawn from Major Planning Documents Related to Walkability

San José's major planning documents are relatively up to date, having been created or modified within the last 10 years. The documents clearly reflect the city's move towards sustainable transportation policies and improving the existing pedestrian environment. The 2020 General Plan and 2040 Envision San José update draw heavily on pedestrian connectivity and creating "villages" where people can live, work, shop, and play without having to drive. The city's zoning ordinance is more progressive than some of the other cities in the Santa Clara Valley, but it does not fully follow through with the broad pedestrian-oriented goals contained in the general plan. Furthermore, the zoning ordinance does not provide any innovative regulations to effectively increase walkability nor does it require pedestrians to be considered in the development review process.

The draft pedestrian master plan does a thorough job of identifying existing pedestrian plans, policies, and programs and providing recommendations for improvement. However, it does not identify specific locations in the city for improvement. The draft ADA sidewalk transition plan mentions the ongoing process of ADA compliance audits, which have helped the city prioritize its pedestrian accessibility improvements.

Detailed neighborhood improvement plans for FWBT and WE clearly state their vision for the future. It appears as if FWBT is ready for a complete overhaul of its existing land uses and transportation infrastructure, as it has been neglected for so long. WE is also ready for changes, but not to the extent of FWBT's. WE's suburban form and supply of established single-family homes makes it difficult for mixed use developments and compact street patterns to infiltrate the neighborhood. The city's traffic calming toolkit is an effective reference for the different types of traffic calming that can be installed in these neighborhoods.

[160] Department of Transportation, *Traffic Calming Toolkit,* 6.
[161] Ibid, 7.

Chapter 5: Five Wounds/Brookwood Terrace and West Evergreen Background

5.1. Five Wounds/Brookwood Terrace

FWBT is a neighborhood of approximately 20,000 people (as of the 2000 U.S. Census) that is located within a mile east of Downtown San José.[162] The neighborhood is bounded to the north by the Lower Silver Creek flood control; to the south by I-280; to the west by Coyote Creek; and to the east by King Road (north of Alum Rock Avenue) and U.S. 101 (south of Alum Rock Avenue). The major surface street arterials are Santa Clara Street/Alum Rock Avenue (east-west); Julian Street/McKee Road (east-west); 24th Street/McLaughlin Avenue (north-south); and King Road (north-south).

Unfortunately, this report was written during the time of the 2010 Census survey collection. Subsequently, the most recent demographic information for these two neighborhoods comes from the 2000 Census, which may be currently inaccurate. In 2000, FWBT was mainly composed of Latinos/Hispanics at 73 percent of the population and Asians and Pacific Islanders at 14.5 percent. The average household size of 3.5 persons was larger than the San José average of 3.1 persons per household. The median household income was $49,000, and only seven percent of adults over the age of 25 had college degrees.[163]

The neighborhood is mainly residential, consisting of a mix of older single family homes, townhomes, duplexes, mobile homes and apartments.[164] As of the 2000 Census, 55 percent of the neighborhood's 4,492 housing units were single family dwellings, 35 percent were multifamily dwellings, and 10 percent were mobile homes. 98 percent of the total housing units were occupied, and the median year housing was built was 1959.[165] Industrial uses are within close proximity to residential neighborhoods near US 101 and the old Union Pacific right-of-way. The Santa Clara Street/Alum Rock Avenue corridor is the main commercial thoroughfare and retail district that serves as the "heart" of the neighborhood. There are also commercial areas in the north portion of the neighborhood along Julian Street/McKee Road; and at the intersection of 24th and William Streets.[166]

FWBT occupies what was formerly called East San José. East San José was once its own city from 1906 to 1911 and used to be home to dairy farms and food processing factories.[167] Different parts of the neighborhood developed and incorporated into the City of San José over time, leaving behind diverse architectural styles and a mishmash of urban and

[162] SNI, *Five Wounds*, II-25.
[163] Ibid.
[164] Ibid, II-4.
[165] U.S. Census Bureau, "American FactFinder."
[166] SNI, *Five Wounds*, II-4.
[167] Paul Pereira, interview with author, February 25, 2010.

suburban form.[168] There were several infill housing projects completed in the 2000s that can be found along the old Union Pacific rail right of way and near US 101. The neighborhood is subdivided into ten districts/communities that roughly follow the boundary lines of when they were annexed into the city (Figure 2).

[168] San José State University, *Collaborative Plan: Bonita, Brookwood, Five Wounds, McKinley, and Olinder Neighborhoods* (San José State University Community Outreach Partnership Center: 1999), http://www.sjsu.edu/urbanplanning/docs/CollaborativeNeighborhoodPlan.pdf (accessed February 8, 2010), 5-6.

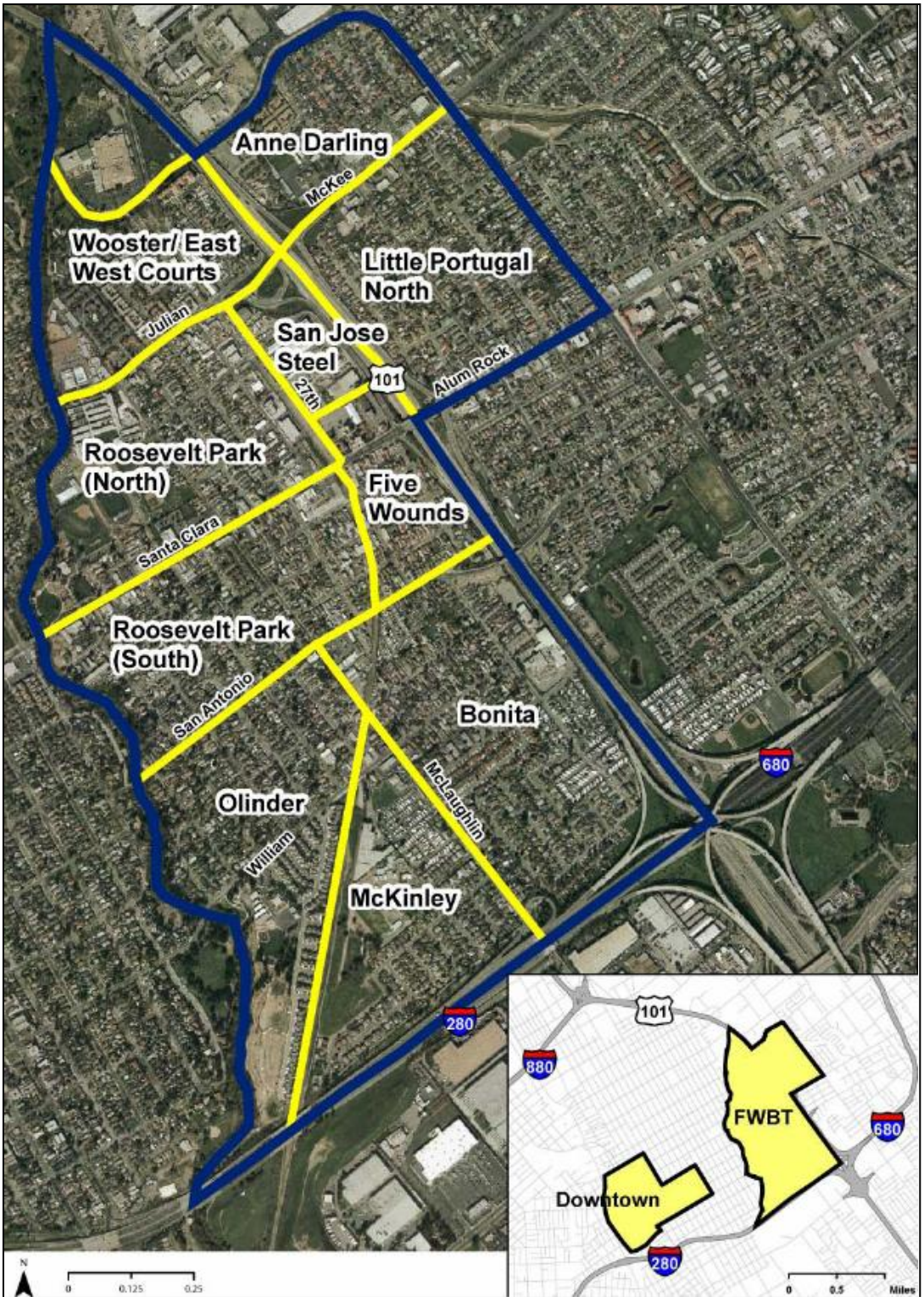

Figure 2. FWBT Communities.
Source: Department of Urban and Regional Planning, "Five Wounds Brookwood Terrace Draft Neighborhood Improvement Plan Amendment," San José State University, http://www.sjsu.edu/urbanplanning/docs/FWBTNeighborhood_ImprovementPlanAmendment.pdf (accessed December 5, 2009).

General plan land use designations in FWBT are predominantly Medium Density Residential (8-16 du/ac), followed by General Commercial, and patches of Neighborhood Commercial. General Commercial has the widest variety of commercial uses, but it also includes auto-oriented uses. Neighborhood Commercial designations generally include community-serving shopping centers and retail uses.[169] Common zoning designations are Two-Family Residence (R2), Single Family Residential (R1), and Multi-family residential (RM) districts. General Commercial (CG) districts mostly run along commercial corridors such as Santa Clara Street, and pockets of Commercial Pedestrian (CP) zones are frequently found at intersections. Large Light Industrial (LI) and Heavy Industrial (HI) parcels are found along US 101.[170]

Current Walkability Concerns

Paul Pereira explained some of the current neighborhood concerns related to walkability in FWBT. Most of them focus on the Anne Darling Neighborhood commercial center on McKee Road. Planning restrictions have kept the commercial center from developing into a walkable, neighborhood-serving shopping hub. Back in the 1990s, the city's Department of Transportation had plans to widen McKee Road to six lanes to accommodate traffic to US 101 but eventually fell through after neighborhood protest. However, a few years later when the Anne Darling Shopping Center's property owner came in to apply for site improvements, the Department of Transportation required a large 17 foot dedication for the future McKee Road expansion. This would also create a situation where the site would become under-parked because of the loss of parking from the dedication. This "planning quagmire" has scared off potential tenants, including a Fresh and Easy grocery store, and has let the site and streetscape around it deteriorate for the past 10 years (Figure 3).[171] There have also been problems with people trying to cross McKee Road, as there are long wait times and a lack of signalized intersections.

Figure 3. McKee Road streetscape.

Figure 4. Ann Darling Drive.

[169] SNI, *Five Wounds*, II-6.
[170] Ibid, II-8.
[171] Paul Pereira, interview with author, February 25, 2010.

Anne Darling Drive borders the east side of the shopping center. It is technically considered a street, but it looks more like an extension of the shopping center's parking lot. There are no sidewalks, curbs, or gutters, and it attracts many abandoned vehicles (Figure 4).

Figure 5. Future BART right of way.

On the other side of US 101, Julian Street's commercial properties are also in disrepair. BART is planned to locate in the area, and property owners do not want to make improvements if BART will eventually take their property (Figure 5).[172] This has caused the pedestrian environment to suffer, where incivilities are found along the sidewalk, with no streetscape enhancements to speak of (Figure 6).

City parking requirements have kept Santa Clara Street from becoming a truly walkable street. Parking lots two to three times larger than the buildings they serve interrupt an otherwise compact street layout. There is little hope for shared parking agreements to reduce surface parking because business owners hardly communicate with one another.[173]

Figure 6. Julian Street streetscape.

FWBT becomes a different place after dark, and adequate lighting is requested by the community to feel safe at night. Currently, most of the neighborhood contains low-pressure sodium lighting, which is not effective in properly illuminating pedestrian areas.[174] Priority areas for lighting are along 24th Street from William to Julian Streets, and in the Wooster community.

[172] Ibid.
[173] Ibid.
[174] Ibid.

5.2. West Evergreen

WE is a neighborhood of approximately 14,500 people (as of the 2000 U.S. Census) that is located approximately three miles southeast of Downtown San José.[175] The neighborhood is bounded to the north by Waverly Avenue (west of Huran Drive) and Tully Road (east of Huran Drive); to the south by Capitol Expressway; to the west by US 101; and to the east by Capitol Expressway and Quimby Road. The major surface street arterials are Tully Road (east-west); King Road/Silver Creek Road (north-south); Capitol Expressway (all directions); Quimby Road (north-south); and Aborn Road (east-west).

Similar to FWBT, as of the 2000 Census, West Evergreen also had large Latino and Asian populations, at 48 percent and 37 percent, respectively. The average household size was considerably larger than FWBT and San José's, at 4.48 persons per household. The median household income was $76,000 and like FWBT, West Evergreen had a low percentage of adults over 25 with college degrees at nine percent.[176]

The neighborhood is predominantly single family residential, with commercial strip centers along major arterials, and only a few industrial properties and parks. As of the 2000 Census, 65 percent of the neighborhood's 4,255 housing units were single family dwellings, 29 percent were multifamily dwellings, and 6 percent were mobile homes. 99 percent of the total housing units were occupied, and the median year housing was built was 1972.[177] Tully Road is the main commercial thoroughfare, and a large shopping area is around the intersection of Tully and King Roads. Sizeable suburban-style shopping centers also line Capitol Expressway between Aborn and Silver Creek Roads. Commercial and residential properties are too far apart from each other to be considered mixed use. A huge vacant area of roughly 75 acres sits on the eastern edge of the neighborhood, called the "Arcadia" property. The vacant six-acre KLOK radio tower site also leaves a sizeable gap in the neighborhood fabric.

WE was long home to orchard fields until it was developed as a suburban residential community during the San José's annexation craze of the late 1950s and early 1960s.[178] Most of the housing that was built was single-family tract ranch homes. The street patterns follow what Southworth calls "warped parallels," which were common in the 1960s.[179] Crime became a major problem in the neighborhood during the 1980s, but it was lessened in the early 1990s with Project Crackdown, a city program to fix code compliance issues and increase police presence.[180] There are eight communities within WE (Figure 7).

Land use designations in WE are comprised mostly of Medium Low Density Residential (8 du/ac), followed by Quasi Public and Public uses, then General Commercial and

[175] SNI, *West Evergreen*, 6.
[176] Ibid, 14.
[177] U.S. Census Bureau, "American FactFinder."
[178] Khanh Nguyen, WE NAC Leader, interview with author, March 2, 2010.
PAC San José, *San Jose Modernism Historic Context Statement*, (PAC San José, 2009), 97.
[179] Southworth, "Designing the Walkable City," 247.
[180] Khanh Nguyen, interview with author, March 2, 2010.

Neighborhood Commercial.[181] Medium Low Density Residential uses are single family dwellings and Medium Density Residential uses are usually duplexes and townhomes.[182] WE is dominated by R1 zoning and is reflective of its suburban development. RM zoning is few and far between, however, PD residential zoning of planned apartment complexes and the like are found in certain areas. Commercial zoning is clustered at major arterial intersections with parcels zoned for CP, CG, and Neighborhood Commercial (CN).[183]

[181] Department of Planning, Building, and Code Enforcement, "General Plan Diagram," City of San José, http://www.sanjoseca.gov/planning/gp_maps/docs/gp_mid.asp (accessed December 5, 2009).
[182] City of San José, *San Jose 2020 General Plan*, 159.
[183] Department of Planning, Building, and Code Enforcement, "Zoning Maps," City of San José, http://www.sanjoseca.gov/planning/zonemap/images/maps/MidZone.asp (accessed December 6, 2009).

Figure 7. WE Communities.
Source: Google Inc., Google Earth, version 5.1.3533.1731 (accessed March 30, 2010).
Department of Planning, Building, and Code Enforcement, "Neighborhood Boundaries Map," City of San José, http://www.sanjoseca.gov/planning/pdf/neigh.pdf (accessed March 30, 2010).

Current Walkability Concerns

Khanh Nguyen, WE Neighborhood Action Coalition leader, was contacted to discuss some of the current neighborhood concerns related to walkability in WE. One of the main concerns is mobility. The suburban form of the neighborhood leaves residential areas separated from neighborhood services by large thoroughfares. If someone chooses to walk to do their shopping, they have to walk along busy, six to eight lane arterials like Tully

Road.[184] This situation alone often discourages pedestrian activity. Nguyen suggests crossing aid improvements, such as more crosswalks, mid block crossings with flashing pedestrian warning signals, and even pedestrian overpasses to overcome the pedestrian problems associated with large suburban arterials.[185]

Figure 8. Recently removed street tree.

Lion Plaza at the southeast corner of Tully and King Roads is a busy suburban-style shopping center that is a hotspot for pedestrian-vehicle conflicts. The site has over nine medium-high volume driveways and the constant traffic in and out of the site makes it dangerous for pedestrians to walk to and around the site.[186] The corner gas station and Starbucks drive-thru exacerbates the problem with heavy ingress/egress traffic volume and driveways extremely close to the intersection.

Many trees are being removed in the neighborhood and are not being replaced by property owners since the city no longer has the funds to maintain street trees (Figure 8). Nguyen states that property owners are apprehensive to install new trees because of cost and maintenance issues, but little do they realize that they are diminishing walkability and quality of life in the neighborhood (Figure 9).[187] This concern is reflected in the recent neighborhood improvement plan, where some strategies to meet the "beautify the neighborhood" priority are to educate property owners about the values of trees and obtain funding for tree planting and proper pruning.[188]


Figure 9. Severely underutilized buffer zone.

[184] Khanh Nguyen, interview with author, March 2, 2010.
[185] Ibid.
[186] Ibid.
[187] Ibid.
[188] SNI, *West Evergreen*, 22.

Chapter 6: Walkability Audit Instrument (WAI) and Audit Methodology

6.1. Pedestrian Environmental Data Scan (PEDS) Instrument

Clifton et al.'s PEDS audit instrument was selected as a starting point for the WAI because of its comprehensiveness, conciseness, and ease of use. Clifton et al. created PEDS after reviewing several other pedestrian audits, such as the Systematic Pedestrian and Cycling Environmental Scan (SPACES), developed by Pikora et al.[189] PEDS is designed to capture street segments' built and natural environment features that pedestrians encounter in the United States.[190] Clifton et al. defines street segments as, "a road or pedestrian path bounded by cross streets or intersections."[191]

The single page audit instrument (Figure 10) consists of 40 items that assess the land use and street block environment, the pedestrian facility, road attributes, and the walking/cycling environment.[192] A separate PEDS protocol aids the administration of the audit by providing detailed instructions for each audit item.[193] PEDS is mostly free of planning jargon and can be filled out by the layperson on a paper version of the instrument. Clifton et al. originally tested the reliability of PEDS in College Park, Maryland with raters using an electronic version of PEDS on personal digital assistants (PDAs). Clifton et al. intended for raters to audit street segments in pairs, not only for safety purposes but also to ensure reliable results.[194]

Clifton et al. did not report the field results of the College Park PEDS audit. The article primarily addressed the development and reliability of the instrument.[195] Schlossberg et al. used PEDS as a base to create a GIS-based pedestrian audit tool, but only discussed the development methodology and administration.[196] Stevens did however show the results of his modified PEDS audit around four neighborhood parks in Springfield, Oregon.[197] He also included a scoring system, which PEDS does not have.

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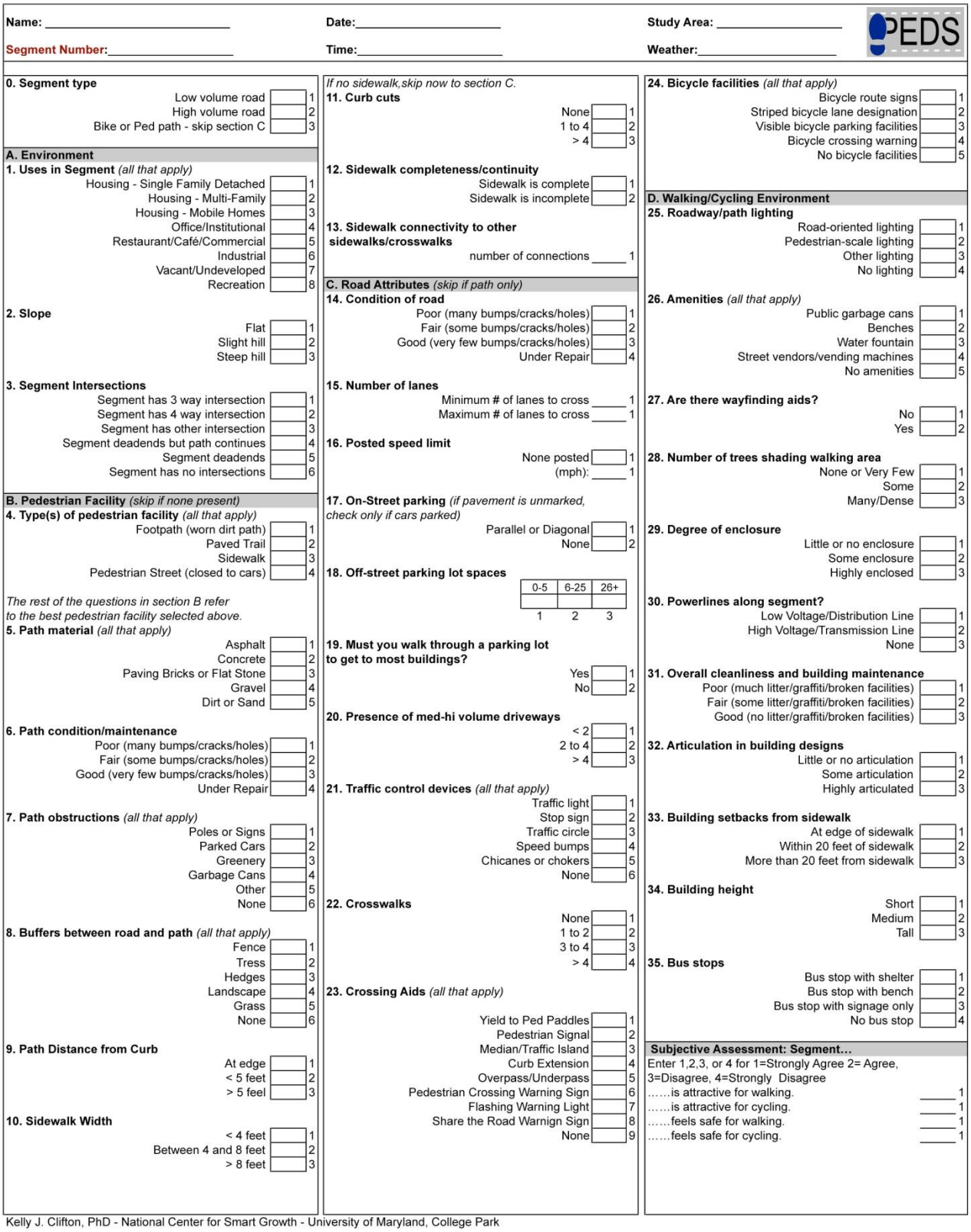
[189] Clifton et al., "The Development and Testing," 98.
Pikora et al., "Developing a Reliable."
[190] Clifton et al., "The Development and Testing," 97.
[191] Ibid, 100.
[192] Ibid, 98.
[193] Andréa D. Livi and Kelly J. Clifton, "PEDS Audit Protocol," Kelly J. Clifton, http://www.kellyjclifton.com/PEDS/AuditProtocol.v.2.pdf (accessed September 24, 2009).
[194] Clifton et al., "The Development and Testing," 101.
[195] Ibid, 96.
[196] Schlossberg et al., "An Assessment."
[197] Stevens, "Walkability Around," 27-43.



Name: _____ Date: _____ Study Area: _____ PEDS

Segment Number: _____ Time: _____ Weather: _____

0. Segment type
- Low volume road [ ] 1
- High volume road [ ] 2
- Bike or Ped path - skip section C [ ] 3

A. Environment

1. Uses in Segment *(all that apply)*
- Housing - Single Family Detached [ ] 1
- Housing - Multi-Family [ ] 2
- Housing - Mobile Homes [ ] 3
- Office/Institutional [ ] 4
- Restaurant/Café/Commercial [ ] 5
- Industrial [ ] 6
- Vacant/Undeveloped [ ] 7
- Recreation [ ] 8

2. Slope
- Flat [ ] 1
- Slight hill [ ] 2
- Steep hill [ ] 3

3. Segment Intersections
- Segment has 3 way intersection [ ] 1
- Segment has 4 way intersection [ ] 2
- Segment has other intersection [ ] 3
- Segment deadends but path continues [ ] 4
- Segment deadends [ ] 5
- Segment has no intersections [ ] 6

B. Pedestrian Facility *(skip if none present)*

4. Type(s) of pedestrian facility *(all that apply)*
- Footpath (worn dirt path) [ ] 1
- Paved Trail [ ] 2
- Sidewalk [ ] 3
- Pedestrian Street (closed to cars) [ ] 4

The rest of the questions in section B refer to the best pedestrian facility selected above.

5. Path material *(all that apply)*
- Asphalt [ ] 1
- Concrete [ ] 2
- Paving Bricks or Flat Stone [ ] 3
- Gravel [ ] 4
- Dirt or Sand [ ] 5

6. Path condition/maintenance
- Poor (many bumps/cracks/holes) [ ] 1
- Fair (some bumps/cracks/holes) [ ] 2
- Good (very few bumps/cracks/holes) [ ] 3
- Under Repair [ ] 4

7. Path obstructions *(all that apply)*
- Poles or Signs [ ] 1
- Parked Cars [ ] 2
- Greenery [ ] 3
- Garbage Cans [ ] 4
- Other [ ] 5
- None [ ] 6

8. Buffers between road and path *(all that apply)*
- Fence [ ] 1
- Tress [ ] 2
- Hedges [ ] 3
- Landscape [ ] 4
- Grass [ ] 5
- None [ ] 6

9. Path Distance from Curb
- At edge [ ] 1
- < 5 feet [ ] 2
- > 5 feel [ ] 3

10. Sidewalk Width
- < 4 feet [ ] 1
- Between 4 and 8 feet [ ] 2
- > 8 feet [ ] 3

If no sidewalk,skip now to section C.

11. Curb cuts
- None [ ] 1
- 1 to 4 [ ] 2
- > 4 [ ] 3

12. Sidewalk completeness/continuity
- Sidewalk is complete [ ] 1
- Sidewalk is incomplete [ ] 2

13. Sidewalk connectivity to other sidewalks/crosswalks
- number of connections _____ 1

C. Road Attributes *(skip if path only)*

14. Condition of road
- Poor (many bumps/cracks/holes) [ ] 1
- Fair (some bumps/cracks/holes) [ ] 2
- Good (very few bumps/cracks/holes) [ ] 3
- Under Repair [ ] 4

15. Number of lanes
- Minimum # of lanes to cross _____ 1
- Maximum # of lanes to cross _____ 1

16. Posted speed limit
- None posted [ ] 1
- (mph): _____ 1

17. On-Street parking *(if pavement is unmarked, check only if cars parked)*
- Parallel or Diagonal [ ] 1
- None [ ] 2

18. Off-street parking lot spaces

0-5	6-25	26+
1	2	3

19. Must you walk through a parking lot to get to most buildings?
- Yes [ ] 1
- No [ ] 2

20. Presence of med-hi volume driveways
- < 2 [ ] 1
- 2 to 4 [ ] 2
- > 4 [ ] 3

21. Traffic control devices *(all that apply)*
- Traffic light [ ] 1
- Stop sign [ ] 2
- Traffic circle [ ] 3
- Speed bumps [ ] 4
- Chicanes or chokers [ ] 5
- None [ ] 6

22. Crosswalks
- None [ ] 1
- 1 to 2 [ ] 2
- 3 to 4 [ ] 3
- > 4 [ ] 4

23. Crossing Aids *(all that apply)*
- Yield to Ped Paddles [ ] 1
- Pedestrian Signal [ ] 2
- Median/Traffic Island [ ] 3
- Curb Extension [ ] 4
- Overpass/Underpass [ ] 5
- Pedestrian Crossing Warning Sign [ ] 6
- Flashing Warning Light [ ] 7
- Share the Road Warnign Sign [ ] 8
- None [ ] 9

24. Bicycle facilities *(all that apply)*
- Bicycle route signs [ ] 1
- Striped bicycle lane designation [ ] 2
- Visible bicycle parking facilities [ ] 3
- Bicycle crossing warning [ ] 4
- No bicycle facilities [ ] 5

D. Walking/Cycling Environment

25. Roadway/path lighting
- Road-oriented lighting [ ] 1
- Pedestrian-scale lighting [ ] 2
- Other lighting [ ] 3
- No lighting [ ] 4

26. Amenities *(all that apply)*
- Public garbage cans [ ] 1
- Benches [ ] 2
- Water fountain [ ] 3
- Street vendors/vending machines [ ] 4
- No amenities [ ] 5

27. Are there wayfinding aids?
- No [ ] 1
- Yes [ ] 2

28. Number of trees shading walking area
- None or Very Few [ ] 1
- Some [ ] 2
- Many/Dense [ ] 3

29. Degree of enclosure
- Little or no enclosure [ ] 1
- Some enclosure [ ] 2
- Highly enclosed [ ] 3

30. Powerlines along segment?
- Low Voltage/Distribution Line [ ] 1
- High Voltage/Transmission Line [ ] 2
- None [ ] 3

31. Overall cleanliness and building maintenance
- Poor (much litter/graffiti/broken facilities) [ ] 1
- Fair (some litter/graffiti/broken facilities) [ ] 2
- Good (no litter/graffiti/broken facilities) [ ] 3

32. Articulation in building designs
- Little or no articulation [ ] 1
- Some articulation [ ] 2
- Highly articulated [ ] 3

33. Building setbacks from sidewalk
- At edge of sidewalk [ ] 1
- Within 20 feet of sidewalk [ ] 2
- More than 20 feet from sidewalk [ ] 3

34. Building height
- Short [ ] 1
- Medium [ ] 2
- Tall [ ] 3

35. Bus stops
- Bus stop with shelter [ ] 1
- Bus stop with bench [ ] 2
- Bus stop with signage only [ ] 3
- No bus stop [ ] 4

Subjective Assessment: Segment…

Enter 1,2,3, or 4 for 1=Strongly Agree 2= Agree, 3=Disagree, 4=Strongly Disagree
- ……is attractive for walking. _____ 1
- ……is attractive for cycling. _____ 1
- ……feels safe for walking. _____ 1
- ……feels safe for cycling. _____ 1

Kelly J. Clifton, PhD - National Center for Smart Growth - University of Maryland, College Park

Figure 10. PEDS Instrument, version 2.
Source: Kelly J. Clifton, "PEDS- Pedestrian Environmental Data Scan," Kelly J. Clifton, http://kellyjclifton.com/?page_id=38 (accessed September 24, 2009).

6.2. Walkability Audit Instrument Development

A goal of this project is to rate streets according to how walkable they may or may not be. While the PEDS instrument provides a fine-grained inventory of the pedestrian environment, it does not feature a scoring system. The desired end product of this project is a cumulative walkability score for each street segment, much like the walkability scores on the popular website Walk Score.com. Walk Score uses algorithms to assign points to "amenities," such as grocery stores and schools that are within a quarter mile to a mile away from a sample address.[198] Walk Score's scoring system ranges from 0—"Car-Dependent (driving only)" to 100—"Walker's Paradise." Walk Score admits that there are many limitations to the scores they offer. Walk Score does not have on–the-ground raters audit each street; therefore it does not take into account pedestrian design features, road attributes, and street design.[199] The WAI developed by the author combines the ground level data collection of PEDS with a scoring system similar to Walk Score.

Scoring System

The scoring system is based on an intuitive scale of 0-100 points and is organized into the categories, "Excellent" (90 points and above); "Good" (75-89 points); "Fair" (60-74 points); and "Poor" (0-59 points). Points are distributed amongst the six sections of the WAI as shown below:

Section 0: Segment type	5 points possible out of 100
Section A: Environment	20 points possible out of 100
Section B: Pedestrian facility	20 points possible out of 100
Section C: Road attributes	20 points possible out of 100
Section D: Walking/Cycling Environment	20 points possible out of 100
Section E: Subjective assessment	15 points possible out of 100
	100 points possible

Section 0 is assigned the least number of points because it only contains one item. Section E was allocated a lesser number of points due to the subjective nature of its questions and that it contains fewer items than sections A-D. Raters are to skip Section B (Pedestrian facilities) if there are no pedestrian facilities within the segment.

More weight is given to variables that represent an ideal walking environment or variables that the literature review found as conducive to walking. Raters should score subjective items based on how items would hold up to an ideal pedestrian environment, not relative to a particular area. For example, if a building is well articulated for the area, but is not considered well articulated in an ideal walking environment, it would not count as well articulated. Individual item scores range from 0 to 4, except for Section 0 (segment type) which is a 5 point item. With the exception of the subjective assessment section, there is no

[198] Walk Score, "How it Works," http://www.walkscore.com/how-it-works.shtml (accessed March 7, 2010).
[199] Walk Score, "How it Doesn't Work: Known Issues with Walk Score," http://www.walkscore.com/how-it-doesnt-work.shtml (accessed March 7, 2010).

Likert scale scoring for each of the items. In other words, a checked box will be worth the number to the right of it.

Realizing that it would be difficult for segments to come close to obtaining the full 100 points, there are opportunities for bonus points (51 total) throughout the WAI. Bonus points are given for additional built environment features that help improve safety and make for an attractive pedestrian environment. Built environment features that do not promote walking are usually not worth any points. One of these items even deducts points from the total score.

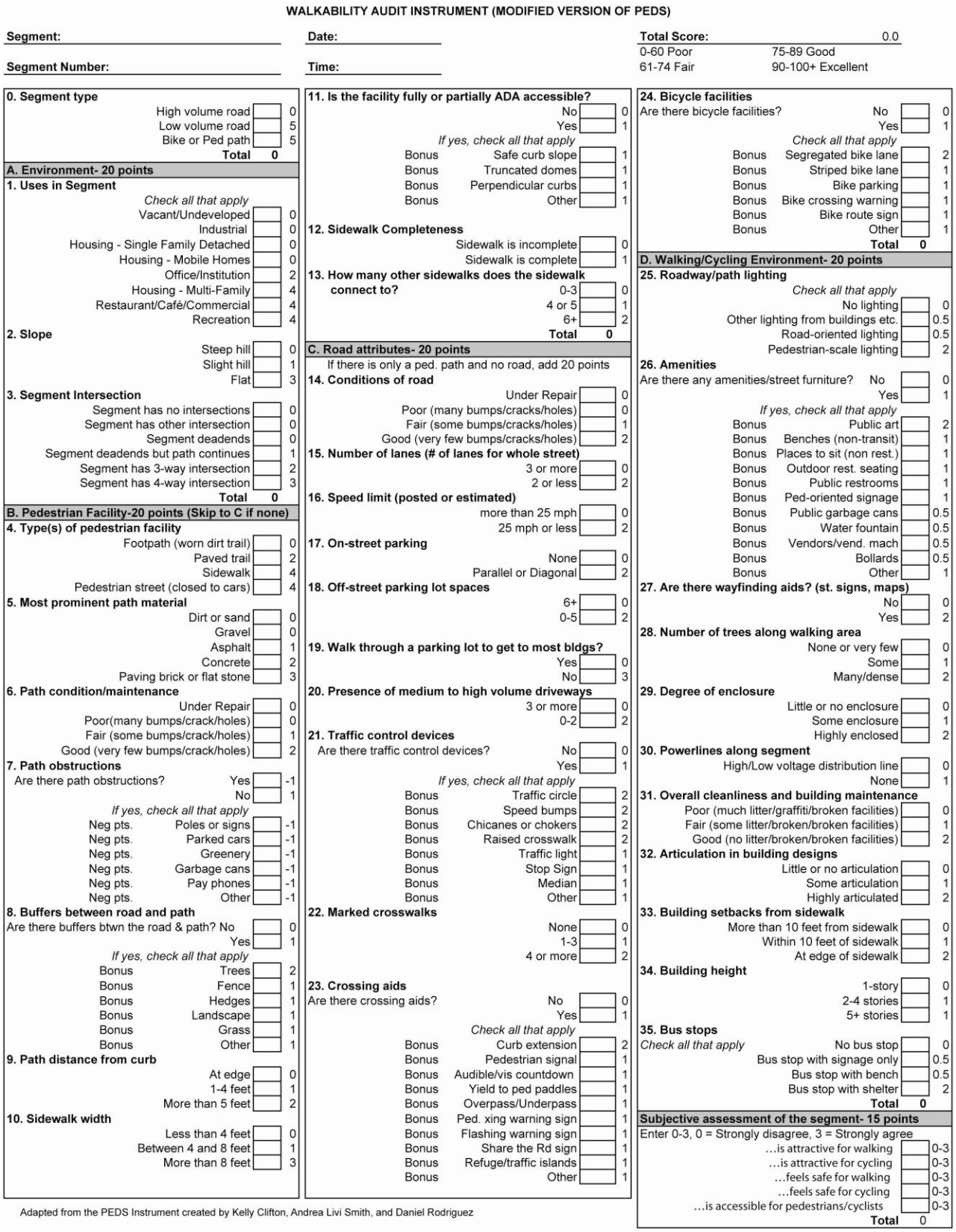
Major Features

The six sections of the WAI are essentially the same as in PEDS with the exception of wording changes and rearrangements made for clarity and to capture a wider array of built environment elements (Figure 11). Appendix A has a detailed item-by-item description of the WAI along with each item's scoring justification and comparison to PEDS.

Section 0 consists of one item pertaining to the potential traffic volume intensity of the segment. Section A contains three items that assess the land uses, slope, and type of intersection within the segment. Section B is made up of ten items that are used to assess the segment's type of pedestrian facility; the most prominent material and physical condition of the path; whether there are any path obstructions or buffers between the road and path; the path distance from the curb; and the sidewalk's width, completeness, connectivity, and ADA accessibility.

Section C is comprised of 11 items that look at the number of lanes and crosswalks, the speed limit, and physical condition of segment roadways. Also included are the count of off-street parking spaces and high to medium volume driveways; assessing whether there is on-street parking; if most buildings are only accessible through a parking lot; and whether there are traffic control devices, crossing aids, and bicycle facilities.

Section D is also made up of 11 items that evaluate the type of roadway/path lighting, bus stops, and building setbacks; the degree of building enclosure, cleanliness, and articulation; the number of trees and building stories; and whether there are amenities, wayfinding aids, and power lines on the segment. Section E asks the rater to give a subjective rating to whether the street segment is attractive, safe, and accessible for walking and cycling.



WALKABILITY AUDIT INSTRUMENT (MODIFIED VERSION OF PEDS)

Segment: _____ Date: _____ Total Score: 0.0

0-60 Poor 75-89 Good

Segment Number: _____ Time: _____ 61-74 Fair 90-100+ Excellent

0. Segment type

High volume road		0
Low volume road		5
Bike or Ped path		5
Total	**0**	

A. Environment- 20 points

1. Uses in Segment

Check all that apply

Vacant/Undeveloped		0
Industrial		0
Housing - Single Family Detached		0
Housing - Mobile Homes		0
Office/Institution		2
Housing - Multi-Family		4
Restaurant/Café/Commercial		4
Recreation		4

2. Slope

Steep hill		0
Slight hill		1
Flat		3

3. Segment Intersection

Segment has no intersections		0
Segment has other intersection		0
Segment deadends		0
Segment deadends but path continues		1
Segment has 3-way intersection		2
Segment has 4-way intersection		3
Total	**0**	

B. Pedestrian Facility-20 points (Skip to C if none)

4. Type(s) of pedestrian facility

Footpath (worn dirt trail)		0
Paved trail		2
Sidewalk		4
Pedestrian street (closed to cars)		4

5. Most prominent path material

Dirt or sand		0
Gravel		0
Asphalt		1
Concrete		2
Paving brick or flat stone		3

6. Path condition/maintenance

Under Repair		0
Poor(many bumps/crack/holes)		0
Fair (some bumps/crack/holes)		1
Good (very few bumps/crack/holes)		2

7. Path obstructions

Are there path obstructions?	Yes		-1
	No		1
If yes, check all that apply			
Neg pts.	Poles or signs		-1
Neg pts.	Parked cars		-1
Neg pts.	Greenery		-1
Neg pts.	Garbage cans		-1
Neg pts.	Pay phones		-1
Neg pts.	Other		-1

8. Buffers between road and path

Are there buffers btwn the road & path?	No		0
	Yes		1
If yes, check all that apply			
Bonus	Trees		2
Bonus	Fence		1
Bonus	Hedges		1
Bonus	Landscape		1
Bonus	Grass		1
Bonus	Other		1

9. Path distance from curb

At edge		0
1-4 feet		1
More than 5 feet		2

10. Sidewalk width

Less than 4 feet		0
Between 4 and 8 feet		1
More than 8 feet		3

11. Is the facility fully or partially ADA accessible?

	No		0
	Yes		1
If yes, check all that apply			
Bonus	Safe curb slope		1
Bonus	Truncated domes		1
Bonus	Perpendicular curbs		1
Bonus	Other		1

12. Sidewalk Completeness

Sidewalk is incomplete		0
Sidewalk is complete		1

13. How many other sidewalks does the sidewalk connect to?

0-3		0
4 or 5		1
6+		2
Total	**0**	

C. Road attributes- 20 points

If there is only a ped. path and no road, add 20 points

14. Conditions of road

Under Repair		0
Poor (many bumps/cracks/holes)		0
Fair (some bumps/cracks/holes)		1
Good (very few bumps/cracks/holes)		2

15. Number of lanes (# of lanes for whole street)

3 or more		0
2 or less		2

16. Speed limit (posted or estimated)

more than 25 mph		0
25 mph or less		2

17. On-street parking

None		0
Parallel or Diagonal		2

18. Off-street parking lot spaces

6+		0
0-5		2

19. Walk through a parking lot to get to most bldgs?

Yes		0
No		3

20. Presence of medium to high volume driveways

3 or more		0
0-2		2

21. Traffic control devices

Are there traffic control devices?	No		0
	Yes		1
If yes, check all that apply			
Bonus	Traffic circle		2
Bonus	Speed bumps		2
Bonus	Chicanes or chokers		2
Bonus	Raised crosswalk		2
Bonus	Traffic light		1
Bonus	Stop Sign		1
Bonus	Median		1
Bonus	Other		1

22. Marked crosswalks

None		0
1-3		1
4 or more		2

23. Crossing aids

Are there crossing aids?	No		0
	Yes		1
Check all that apply			
Bonus	Curb extension		2
Bonus	Pedestrian signal		1
Bonus	Audible/vis countdown		1
Bonus	Yield to ped paddles		1
Bonus	Overpass/Underpass		1
Bonus	Ped. xing warning sign		1
Bonus	Flashing warning sign		1
Bonus	Share the Rd sign		1
Bonus	Refuge/traffic islands		1
Bonus	Other		1

24. Bicycle facilities

Are there bicycle facilities?	No		0
	Yes		1
Check all that apply			
Bonus	Segregated bike lane		2
Bonus	Striped bike lane		1
Bonus	Bike parking		1
Bonus	Bike crossing warning		1
Bonus	Bike route sign		1
Bonus	Other		1
	Total	**0**	

D. Walking/Cycling Environment- 20 points

25. Roadway/path lighting

Check all that apply

No lighting		0
Other lighting from buildings etc.		0.5
Road-oriented lighting		0.5
Pedestrian-scale lighting		2

26. Amenities

Are there any amenities/street furniture?	No		0
	Yes		1
If yes, check all that apply			
Bonus	Public art		2
Bonus	Benches (non-transit)		1
Bonus	Places to sit (non rest.)		1
Bonus	Outdoor rest. seating		1
Bonus	Public restrooms		1
Bonus	Ped-oriented signage		1
Bonus	Public garbage cans		0.5
Bonus	Water fountain		0.5
Bonus	Vendors/vend. mach		0.5
Bonus	Bollards		0.5
Bonus	Other		1

27. Are there wayfinding aids? (st. signs, maps)

No		0
Yes		2

28. Number of trees along walking area

None or very few		0
Some		1
Many/dense		2

29. Degree of enclosure

Little or no enclosure		0
Some enclosure		1
Highly enclosed		2

30. Powerlines along segment

High/Low voltage distribution line		0
None		1

31. Overall cleanliness and building maintenance

Poor (much litter/graffiti/broken facilities)		0
Fair (some litter/broken/broken facilities)		1
Good (no litter/broken/broken facilities)		2

32. Articulation in building designs

Little or no articulation		0
Some articulation		1
Highly articulated		2

33. Building setbacks from sidewalk

More than 10 feet from sidewalk		0
Within 10 feet of sidewalk		1
At edge of sidewalk		2

34. Building height

1-story		0
2-4 stories		1
5+ stories		1

35. Bus stops

Check all that apply	No bus stop		0
	Bus stop with signage only		0.5
	Bus stop with bench		0.5
	Bus stop with shelter		2
	Total	**0**	

Subjective assessment of the segment- 15 points

Enter 0-3, 0 = Strongly disagree, 3 = Strongly agree

…is attractive for walking		0-3
…is attractive for cycling		0-3
…feels safe for walking		0-3
…feels safe for cycling		0-3
…is accessible for pedestrians/cyclists		0-3
Total	0	

Adapted from the PEDS Instrument created by Kelly Clifton, Andrea Livi Smith, and Daniel Rodriguez

Figure 11. Walkability Audit Instrument.

6.3. Audit Methodology

A three-step process took place after the development of the WAI. First, data was collected during field audits in January and February 2010. Next, data from the audit sheets were entered into a Microsoft Excel spreadsheet and the results were analyzed. Lastly, the audit results were visualized through maps produced in ArcGIS and Adobe Illustrator.

Typical Audit Session

Only one area of a neighborhood was audited during a typical audit session, which usually lasted up to three hours. The audits took place in the daytime to ensure that all features of the pedestrian environment were visible. It took approximately five minutes to administer the WAI for each segment, and usually 10 segments were able to be completed within an hour when factoring in the time needed to travel from segment to segment.

Before going out into the field, the following materials were gathered:

- An ample supply of audit sheets
- The PEDS/WAI protocol
- Neighborhood map denoted with the street segment numbers
- Aluminum clipboard with form holder to carry audit sheets, the map, and PEDS/WAI protocol
- Backpack to carry water, snacks, pens & pencils, a notepad, and measuring tape
- Cellular phone
- Digital camera

The name of the segment, detailing where it is located within a street, such as, "X Street between 1st and 2nd Street" was written on the audit sheet upon entering a street segment. The segment number as it corresponds to the neighborhood segment map was also noted, as well as the date and time.

The PEDS protocol states that the rater should walk the segment once to get a feel of the surroundings, and then walk it again while filling out the audit instrument.[200] This is the optimal approach; however, when covering a long segment, it was more efficient to walk the segment once while filling out the audit instrument. The small font of the audit instrument often made it easy to skip over questions, so it was verified for completeness before moving on to the next segment.

In the occasion when actual street segments were not on the map, a new number was added to the map and the segment was audited on an extra audit sheet. This happened several times in this project, which explains why some street segments are numbered out of sequence from the street segments near it. A notepad was used to record observations and other features or problems that were not addressed on the WAI.

[200] Livi and Clifton, "PEDS Audit Protocol," 2.

Pros and Cons of the Pen and Paper Approach

The WAI is intended to be used by laypersons that do not have sophisticated PDAs with GIS capabilities; hence the pen and paper approach was used for this project. Other reasons for the pen and paper approach included its economy and the avoidance of potential technological problems that may come with PDAs. However, the benefits of a simple pen and paper audit turned sour when it came to generate data after the audits were completed. Extensive data entry was required, involving iterations of manually sorting through the audit sheets to enter the results of each of the 36 items. Schlossberg et al. warned that the pen and paper approach would involve this type of time commitment to digitize the pen and paper data.[201]

Data Entry

The audit instrument was created in Microsoft Excel with different tabs for each segment. Since the audit sheets and the Excel readout were identical, it was simple to transfer the data from the paper sheet to the electronic database. However, instead of checking a box in Excel, the author had to enter the value of the variable inside the box to have it calculate the cumulative score. After a sheet was entered in Excel, the cumulative score was written on top of the audit sheet. After all sheets were entered, a summary tab was created to show the cumulative scores for each street segment.

Statistical Results

An item-by-item breakdown of the results was thought to be useful in depicting neighborhood walkability. There did not appear to be a way to automatically build a table to show the breakdown, so it had to be done manually. All audit sheets were sorted through and separated by variable for each audit item. The segment number and cumulative score for each sheet were entered in a new Excel tab pertaining to the item and variable. After this was complete, the total number of segments that pertained to each variable were added up and divided by the total number of neighborhood segments to obtain the percentage of the item that corresponded to certain variables. The mean and median score was also taken for each variable within an item.

Maps

Base maps of the FWBT and WE neighborhoods were created in ArcGIS using road and neighborhood boundary shapefiles from the City of San José. Due to its ease of use, Adobe Illustrator was used to draw and color the street segments onto the base maps.

[201] Schlossberg et al., "An Assessment," 10.

Chapter 7: Audit Findings and Recommendations

This chapter provides an item-by-item rundown of the audit findings and recommendations. The pictures shown in this chapter were taken during the audits. Maps of each neighborhood's walkability scores are shown and analyzed in section 7.2. The effects of the 3Ds on walkability are discussed in section 7.3. The top and bottom five street segments (based on cumulative walkability score) are identified in section 7.4. Common observations not addressed in the WAI are noted in section 7.5. Appendix B shows tables with the cumulative walkability scores for all the audited street segments within the neighborhoods.

7.1. Summary of Findings

A total of 349 public street segments were audited in both neighborhoods; 196 in FWBT and 153 in WE. Table 1 shows the main audit results. FWBT was found to be the more walkable neighborhood by a small margin. FWBT's median walkability score was 56 and WE's was 51, with a combined neighborhood median walkability score of 53.5. Both neighborhoods have "poor" median walkability scores, but they are in the high range of the "poor" scoring category. Additionally, there is a large standard deviation for the cumulative scores in both neighborhoods, indicating a vast range of scores.

Table 1. Overall Walkability Audit Statistics

	Median score	Mean score	Standard deviation	Minimum score	Maximum score	% "Poor"	% "Fair"	% "Good"
FWBT	56	55	12.3	23	83.5	61	34	5
WE	51	50	10.2	12	76.5	82	17	1
Combined	53.5	53	11.7	12	83.5	70	27	3

Most street segments in the two neighborhoods tallied "poor" ratings. FWBT had twice as many "fair" segments as WE, but both were low when compared to the high number of "poor" segments. Only a miniscule percentage of street segments attained "good" scores.

7.2. Maps of Audit Results

Maps on the next few pages (Figure 12 and Figure 13) display the street segment scores. Street segments with "good" scores (75-89 points) are shown in green; "fair" scores (60-74 points) are shown in yellow; and "poor" scores (0-59 points) are shown in red. No streets attained an "Excellent" rating, thus the rating is not shown on the map. The maps are discussed in more detail in the following pages.

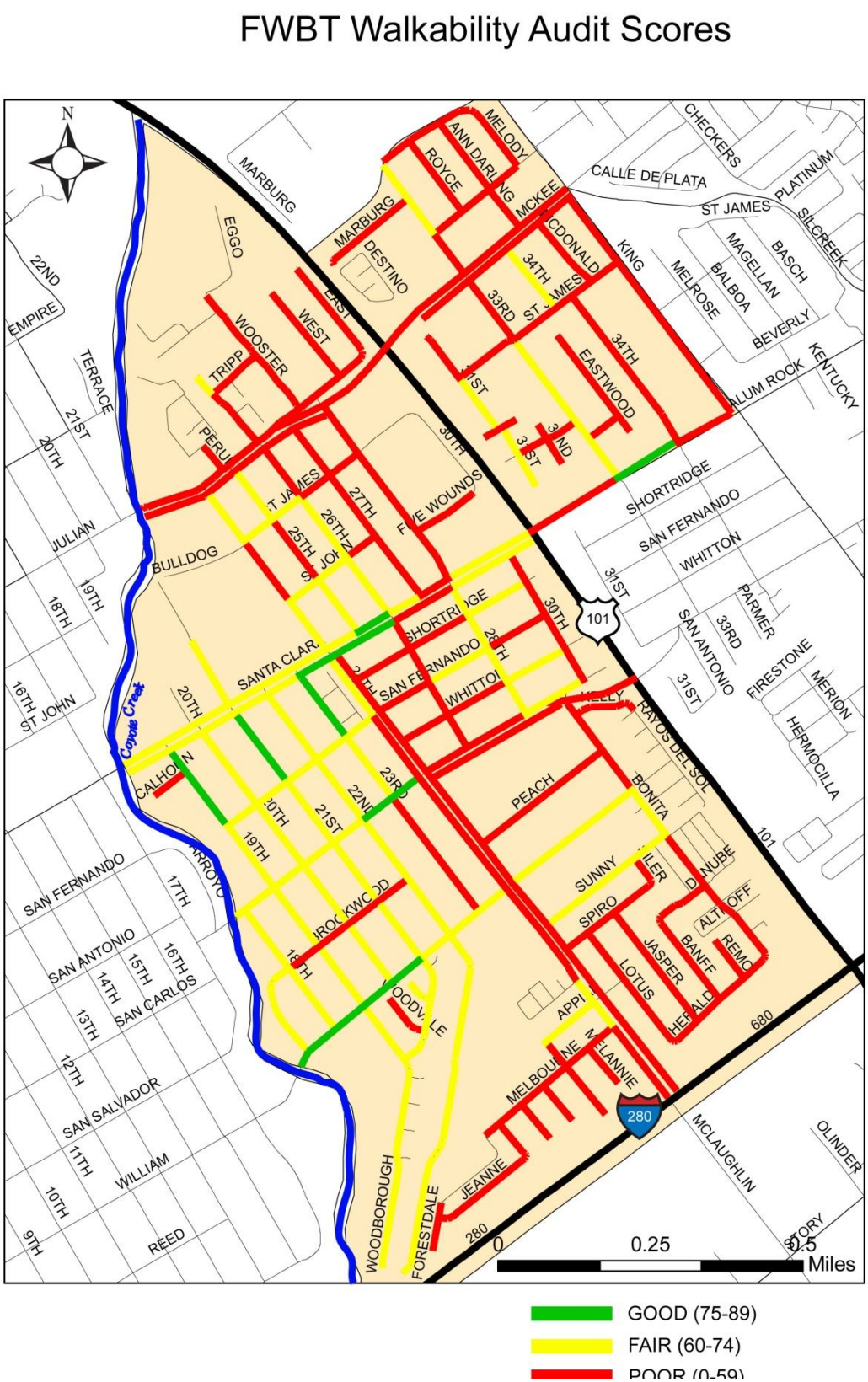


Figure 12. Map of FWBT walkability scores.

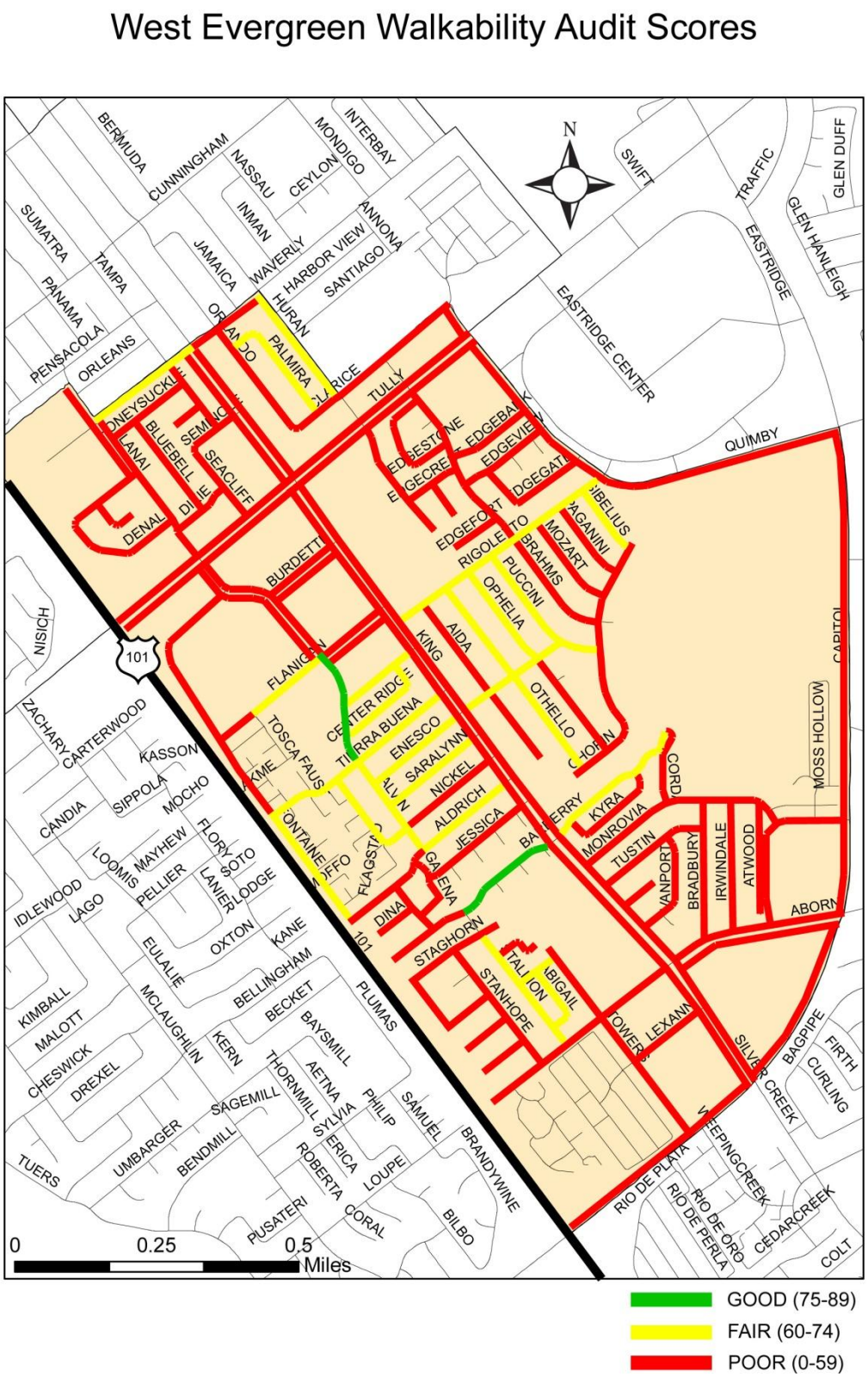


Figure 13. Map of WE walkability scores.

Map Findings

Both maps are dominated by red, indicating the majority of "poor" street segments throughout the neighborhoods. Some streets are shown on the map without a color overlay meaning that they were not audited because they were private streets, closed off, or were too small to be audited, such as some cul-de-sacs. Double parallel lines represent high volume street segments where each side of the street was audited. Single lines represent low volume roads where both sides of the street were audited at once.

Five Wounds/Brookwood Terrace Map Findings
FWBT is not as overwhelmed with red as WE, but it still has many areas that need improvement. The Wooster and Anne Darling communities along the northern boundary of FWBT (refer to Figure 2 for the community boundaries) are particular examples. The main commercial thoroughfare, Julian Street/McKee Road only contains "poor" street segments. Cross streets through the thoroughfare also fare badly. Only two street segments in the Wooster and Anne Darling communities rate above "poor."

The Bonita and McKinley communities towards the southern end of FWBT are mostly comprised of "poor" street segments. Correspondingly, the 24th Street/McLaughlin Avenue hardly has any street segments with ratings above "poor." The lackluster walking conditions along 24th Street/McLaughlin Avenue spread to streets east of the corridor.

FWBT does have some bright spots, notably the Olinder and Roosevelt Park South communities on the west side of the 24th Street/McLaughlin Avenue corridor. This area shows the strongest cluster of "fair" and "good" street segments. The difference in streets east and west of 24th Street/McLaughlin Avenue is clearly noticeable out in the field where properties and streetscapes are better maintained west of the corridor than east.

The Santa Clara Street portion of the Santa Clara Street/Alum Rock Avenue corridor is the best performing arterial in the neighborhood. Most segments rated "fair" with three "good" segments near the center of the corridor. This corridor is mostly pedestrian-oriented in terms of connectivity and building orientations, which helped contribute to its better ratings.

Recommendations Stemming from the FWBT Map
The walkability of the neighborhood arterials largely determined the walkability of streets which fed into them. The arterials are the most visible and traveled streets in the neighborhood and contain the most commercial destinations. Recent street tree and lighting improvements have been made along 24th Street/McLaughlin Avenue with more scheduled.[202] This corridor is identified in the draft 2040 General Plan as the backbone of a future neighborhood village, so the city should continue to improve walking conditions on this corridor by installing traffic calming measures; extending the length of the CP zoning designation from 24th and William Streets to adjoining light industrial-zoned properties; and pursuing additional right of way for sidewalk extensions.

[202] Paul Pereira, interview with author, February 25, 2010.

The Julian Street/McKee Road corridor should also be a priority for pedestrian upgrades. The corridor and area around it received low ratings partly because sidewalks are narrow, non-ADA compliant and riddled with obstructions. Commercial buildings are uninteresting and uninviting, and there are hardly any street trees. One would expect that the arrival of BART will entice property owners to upgrade their properties, but until then this corridor will continue its decline. The city should consider installing a signalized intersection or at least a mid-block crossing between 24th Street and 28th Street. The city can also look at reclaiming portions of the large front setbacks along the corridor to extend the pedestrian right of way (not the street width). Pedestrian scale lighting should be installed and business owners should be encouraged to remove window bars, pay phones, graffiti, and cluttered window displays to increase the sense of safety while walking through these areas.

Even though Santa Clara Street scored well, the city should still work to upgrade streetscapes, crossing facilities, and assist property owners with façade improvements and signage grants. The Redevelopment Agency should pursue the redevelopment of the Empire Lumber site and other underutilized parcels to usher in mixed use development on the corridor. Santa Clara Street is within walking distance to most communities in FWBT. A small scale grocery store along the corridor would be a great benefit to residents and would create frequent walking trips.

West Evergreen Map Findings
Unfortunately, most of the WE map is covered in red. However, it should be noted that many of its "poor" scores are within a few points of the "fair" rating threshold. The neighborhood's four main commercial arterials—King Road, Tully Road, Capitol Expressway, and Quimby Road do not contain a single street segment with a rating above "poor."

WE's arterials are wide and daunting to cross, plus they attract heavy auto traffic. Block widths are long and exposed to vehicle traffic from the lack of landscaped buffer zones and on-street parking. Pedestrian amenities are non-existent and there are no places to rest or eat outside. No buildings front the street and most are only accessible through parking lots. Most restaurants are of the fast food variety and retail stores are located in suburban-style strip malls.

The lack of connectivity and amenities partially explain why most interior residential streets received poor ratings. Most of these streets, particularly in the Edge community, are hardly arranged in any sort of orderly, connectable pattern. All have sidewalks, but are monolithic and missing street trees. Other communities have buffers but lack a consistent tree canopy. The homogenous tract homes are unarticulated and outside walking distance to major destinations.

Despite the walkability deficiencies in most of WE, there is a noticeable core of better street segments in the center of the neighborhood. The presence of Whaley Elementary and the Safe Routes to School improvements on its neighboring streets helped increase the ratings

within the Whaley community (refer to Figure 7 for community boundaries). The neighborhood's only two "good" segments are also located in Whaley. Streets in the Meadowfair neighborhood, east of King Road earned better ratings partly due to tree-lined buffers, recent ADA improvements, and close access to bus stops.

Recommendations Stemming from the WE Map

As recommended in FWBT, the city should prioritize pedestrian improvements and redevelopment along WE's major arterials. Currently, these streets get little foot traffic, and understandably so since they are unpleasant to walk through. There is no real sense of place since there are no distinct buildings, businesses, or streetscapes. But there is hope. WE's arterials and their adjoining land uses have an advantage over arterials in FWBT by having more space to work with. Tully Road is six to eight lanes wide, King Road is five lanes wide, Quimby Road is four to five lanes wide, and Capitol Expressway is eight to nine lanes wide. The city should consider "completing the street" by dedicating lane(s) towards pedestrian right of way extensions, on-street parking, dedicated bus lanes, wider bicycle lanes and/or medians. Curb extensions and pedestrian refuges should be installed at intersections to provide crossing relief. The city can also extend the pedestrian right of way into the large setbacks of properties along the arterials.

The commercial shopping areas south of Tully Road and west of King Road as well as in the Aborn and King Road vicinity are proposed as future neighborhood villages in the draft 2040 General Plan. These commercial areas were planned for convenient auto access and are currently inaccessible to pedestrians. However, there is room to redevelop these sites because most of the properties are covered with parking lots. New grid-like streets can be planned through the large properties and new communities can be formed through dense housing, recreational spaces, and better designed commercial interfaces. To ensure the proper redevelopment of these large commercial areas, neighborhood village master or specific plans should be developed.

Since it is likely that the existing single-family homes will be a permanent fixture of WE, the city can institute smaller quality of life improvements to improve walkability. This can include pocket parks, rest areas, pedestrian scale lighting, tree planting programs, and additional ADA upgrades. It is also likely that the current street pattern will stay the same. In that case, the city should look at connecting cul-de-sacs and other dead end streets together through a system of pedestrian/bicycle paths, which could possibly funnel into a park extension on the vacant Arcadia property. However, it will be a challenge to get some property owners to dedicate or record easements on their land for pathway access, but it should be something to pursue. Routes to schools and commercial areas should be improved through better crossing safety, warning signage, and landscaping.

7.3. Relationship with the 3Ds (Density, Diversity, and Design)

This project attempts to link the walkability audit scores with the 3Ds (density, diversity, and design)[203]—the common themes of the built environment's effect on walkability literature review. The WAI captures the 3Ds in different parts of the instrument with varying levels of relationships.

'Density' is represented by the multifamily housing variable in item A1, but it may not fully represent the full nature of density, since item A1 does not assess the average number of dwelling units. Moreover, a street segment with just one duplex can count as "housing-multi-family" on the audit sheet. Nevertheless, the percentage of street segments with multifamily housing will be shown for the purposes of this report.

'Diversity' is represented by residential land uses mixed with other types of uses, also found on item A1 of the WAI. 'Diversity' for this project follows Cervero's mixed use definition of commercial, industrial, or institutional land uses within close proximity of a residential unit (within the same street segment for this project).[204]

'Design' is represented by multiple items on the WAI. Pedestrian-oriented design includes any of the following:

- Pedestrian-scale lighting (item D25)
- Any amenities (item D26)
- "Many/dense" trees (item D28)
- Combinations of "some" trees (item D28) and "some" articulation (item D32)
- "High" articulation (item D32)
- Buildings within 10 feet of sidewalk or at the edge of the sidewalk (item D33)

Table 2 below compiles the segments that met each of the 3D criteria and sorts them by neighborhood. It should be noted that segments with two or three of the 3Ds will appear two or three times in the data.

Table 2. Density, Diversity, and Design Audit Results

	Density		Diversity		Design	
	% of total segments	Median score	% of total segments	Median score	% of total segments	Median score
FWBT	53	60.5	36	58.5	56	62.5
WE	9	57	14	52	24	56.5
Combined	34	60.5	26	56	42	60.5

Density
Segments with multifamily housing generally obtained "fair" median scores. On the whole, segments that met the density threshold scored higher than each neighborhood's cumulative score. Over half of the segments in FWBT contained some form of residential

[203] Cervero and Kockelman, "Travel Demand and the 3Ds."
[204] Cervero, "Mixed Land-Uses," 365.

density. On the other hand, a very low percentage of segments in WE contained residential density. These results confirm that FWBT is a denser neighborhood.

Diversity
Residential segments with commercial, office/institutional, and/or industrial uses obtained "poor" median scores, but it should be noted that they are at the higher end of the "poor" spectrum. Diverse street segments in FWBT scored higher than the entire neighborhood's median score. WE scored higher as well, but only by one point. A little over 1/3 of FWBT contains mixed use street segments while only a little over 1/8 of the street segments in WE contains mixed uses. This data confirms that most street segments in WE contain one type of land use.

Design
The literature review showed that pedestrian-oriented design had little impact on walking, possibly because retail or employment destinations nearby are a stronger predictor of foot traffic. [205] Regardless, segments with pedestrian-oriented design features scored better and were more common than segments with density and diversity. This may attributed to the wider selection criteria for pedestrian-oriented design. Almost 60 percent of FWBT's street segments contained elements of pedestrian-oriented design. Segments with these elements also scored 6.5 points better than the median neighborhood score. A greater percentage of WE's street segments were applicable to this item, and they also scored better than the median neighborhood score. It could be said that in this audit, segments with pedestrian-oriented design features are slightly more walkable than segments with density or diversity.

7.4. Top/Bottom Five Street Segments

The top five and bottom five street segments were extracted from each neighborhood to compare results and briefly discuss their characteristics. The full list of scores for each street segment can be found in Appendix B. The segment names are abbreviated in the table, reflecting the shorthand taken in the field and also to conserve space. To avoid confusion, the common abbreviations used were:

- b/w= between
- s, n, w, e/s= south/north/west/east side
- s, n, w, e/o= south/north/west/east of

Table 3. Five Wounds/Brookwood Terrace Top Five Segments

Segment Number	Segment Name	Total Score	Rating
127	William b/w 19th & Coyote Creek	83.5	Good
126	William b/w 19th & 21st	78	Good
136	San Antonio b/w 22nd & 24th	77.5	Good
61	S/S Santa Clara b/w 24th & 26th	76.5	Good
184	N/S Alum Rock b/w 33rd & 34th	76.5	Good

[205] Cervero and Kockelman, "Travel Demand and the 3Ds," 218.

Three of the street segments shown in Table 3—126, 127, and 136, are located within the Olinder community. Two street segments, 126 and 127, are located next to each other (Figure 14). Segments 61 and 184 are located along the high volume Santa Clara Street/Alum Rock Avenue commercial corridor. All of these street segments contain multifamily housing; have four-way intersections; have detached sidewalks with tree-lined buffers that connect to five or more sidewalks on adjoining segments; have buildings that are accessible without having to walk through a parking lot; have traffic control devices, crosswalks, and crossing aids; have amenities; and either have some building articulation or some sense of enclosure.

Figure 14. William Street, east Coyote Creek.

Table 4. Five Wounds/Brookwood Terrace Bottom Five Segments

Segment Number	Segment Name	Total Score	Rating
18	S/S Julian b/w 26th & 27th	23	Poor
27	28th b/w St James & St John	24.5	Poor
20	S/S Julian b/w 25th & 26th	27.5	Poor
8	Wooster s/o Tripp	28.5	Poor
164	S/S McKee b/w McDonald & 34th	28.5	Poor

Segments 18, 20, and 164 in Table 4 are all located on the Julian Street/McKee Road commercial corridor. Segment 8 is located just north of the same corridor. This area was one of the worst to walk through because of incivilities, a lowered sense of security, and dull buildings and streetscapes. All of these street segments have missing or inadequate pedestrian facilities, either in poor condition or with path obstructions; have poor overall cleanliness and maintenance; and are connected to less than three sidewalks. None of these segments are properly ADA accessible, nor have amenities, enclosure or building articulation. All except one of these segments has three or more driveways, and all except one do not have any crossing aids or trees.

Table 5. West Evergreen Top Five Segments

Segment Number	Segment Name	Total Score	Rating
51	Alvin b/w Flanigan & Tierra Buena	76.5	Good
73	Barberry Lane w/o King	75	Good
55	Tierra Buena b/w Alvin & Fontaine	69.5	Fair
60	Alvin b/w Tierra Buena & Aldrich	69.5	Fair
62	Enesco b/w Alvin & King	69.5	Fair

All of the street segments in Table 5 are located near Whaley Elementary School. This area shows traces of Safe Routes to School and ADA improvements, which have helped to make their walkability score the best in the neighborhood. The sidewalk and trail improvements on Barberry Lane were one of the top 10 original priorities of the neighborhood.[206] The improvements were deemed complete in 2007, and now the segment is one of two in the neighborhood that boasts "good" walkability (Figure 15).

Figure 15. Barberry Lane after recent improvements.

All these street segments are located on low volume roads; have four way intersections that connect to five or more sidewalks; have detached sidewalks with wide, tree and grass-lined buffers; have ADA-compliant curb ramps; are located on streets with two lanes, on-street parking, and 25 mph speed limits; have buildings that are accessible without having to walk through a parking lot; have traffic control devices, crosswalks, and crossing aids; and have "good" overall cleanliness and maintenance.

Table 6. West Evergreen Bottom Five Segments

Segment Number	Segment Name	Total Score	Rating
100	Capitol Expy by vacant lot	12	Poor
101	Capitol Expy n/o Whispering Hills Mobile	23	Poor
91	N/S Capitol Expy b/w Towers & 101	25	Poor
102	Quimby b/w Capitol Expy & Rigoletto	30.5	Poor
99	Capitol Expy n/o Aborn	31.5	Poor

All five segments in Table 5 are located on probably the most dangerous street of the neighborhood, Capitol Expressway (Figure 16). This "street" is eight to nine lanes wide and does not have a sidewalk for most of the west side of the street (the WE side). Greenery obstructions from the vacant Arcadia side completely block the dirt path, so if someone were to walk along it, they would have to walk into the roadway to pass the obstructions. Major improvements will have to occur for Capitol Expressway to

Figure 16. Capitol Expressway.

[206] San José Redevelopment Agency, "Report on Investment," 123.

properly support light rail and BRT in the future.

All of these segments are on a high volume road; have path obstructions; do not have any buffers; connect to less than three other sidewalks; and have streets that are wider than three lanes, with no on-street parking, and speed limits more than 25 mph. None of these segments have any trees or amenities. All except one do not have any land uses.

7.5. Common Observation Themes

This section describes the four common observation themes that were made during the audit. The WAI does not include space to write in observations or inventory built environment features not on the checklist. Observations for items not on the WAI were noted on a separate note pad and are summarized here.

Trees

Many street trees were observed to be poorly maintained in both neighborhoods. There was an unsettling amount of "topped" trees, where the canopy is all but removed from the tree (Figure 17). It is assumed that property owners top trees to avoid the regular maintenance that comes with fallen leaves. This practice not only strips the tree of its aesthetic, shade, and environmental value, but it also increases the likelihood that the tree will die. The other negative tree maintenance practice observed was concrete in the buffer zone under the dripline of trees. Property owners likely do this to avoid maintaining landscaping in the public right of way. Impervious surface underneath trees prevents them from getting the water they need to survive.

Figure 17. Topped street trees.

Not all trees were uncared for. A few streets in the older neighborhoods had lush tree canopies. Mature oak trees stood out in WE's Meadowfair and Whaley communities to provide an excellent source of shade and help beautify the neighborhood (Figure 18). The trade-off to these large trees is the damage they cause to the surrounding sidewalk, curb, and gutter. Property owners should consult arborists to seek solutions to prevent roots from uplifting the sidewalk.

Figure 18. Mature Oak tree.

Perceived Fear of Crime
It was not uncommon to find residential properties fortified with high fences and wrought iron driveway gates (Figure 19). There were also plenty of dogs on alert and bars on windows. There were even bars on the second story windows of a house in WE. These types of precautionary measures indicate a perceived fear of crime resulting from a lack of social capital and trust of other members in the community.

Figure 19. High front yard fence and driveway gate.

Signage
Unsightly temporary signs were scattered throughout landscaping areas and inappropriately placed on the sidewalk (Figure 20). These signs are beneficial to businesses, but if cheaply designed and poorly placed, they can degrade the pedestrian experience. The city should enforce its sign ordinance by notifying business owners of their illegal sign practices and requiring better design standards.

Figure 20. Illegal temporary signs.

There was a troubling amount of billboards observed throughout both neighborhoods, often plopped right next to buildings (Figure 21). Santa Clara Street in FWBT seemed to have the most; which is ironic because it is the most pedestrian-oriented street in the neighborhood. Billboards are designed to capture motorists' attention by being large in area and height. However, they negatively impact the pedestrian experience by being brash and out of scale. To make matters worse, many advertise alcohol and fast food, which do not promote the image of a healthy neighborhood.

Figure 21. Poorly placed billboard on residential site.

Abandoned Shopping Carts

There were plenty of abandoned shopping carts found in both neighborhoods, particularly the McKinley community in FWBT and Meadowfair community in WE (Figure 22). Abandoned shopping carts are a nuisance to the city, community members, and retailers because of the blighting factors associated with them and the costs involved in their retrieval. They are also commonly left obstructing the sidewalk. The city has a shopping cart ordinance to prevent this activity, but like graffiti, it will always be a continuous battle. If one good thing is to be taken from abandoned shopping carts, it is that people are actually walking to and from stores to do their shopping.

Figure 22. Abandoned shopping carts on curb ramp.

7.6. Item-by-Item Summary of Findings and Recommendations

This section summarizes the findings and recommendations for each of the 36 WAI items. The recommendations mostly concentrate on potential built environment improvements to improve walkability, but they also suggest regulatory and policy changes. Detailed breakdowns of each of the audit item's scores are in Appendix C.

Item 0- Segment Type

Findings
Both neighborhoods have about the same distribution of high and low volume roads. As one would expect, segments with high volume roads have lower walkability scores. The most dramatic difference is in WE where low volume roads have better median walkability scores by 13.5 points. See Table 13 in Appendix C for more details.

Recommendations

- Examine techniques to reduce noise, width, and traffic exposure associated with high volume roads (Figure 23). Street tree plantings, median installations, speed limit reductions through commercial corridors, and the allowance of on-street parking can help to reduce the nuisances that come with traffic noise. Paul Pereira noted that bus noise detracted patrons from sitting in the outdoor seating area in front of one of the restaurants on Santa Clara Street.[207]

Figure 23. Tully Road in WE, a high volume thoroughfare.

- Consider putting high volume streets on "road diets," where excess traffic lanes are converted into dedicated bus lanes, bike lanes, or are used to widen the pedestrian right of way.[208] Lane conversions could help reduce the visual width of the street in addition to allowing space for alternative transportation modes. Curb extensions and median pedestrian refuges would be effective in reducing the crossing distance.

[207] Paul Pereira, interview with author, February 25, 2010.
[208] Streetswiki, "Road Diet," http://streetswiki.wikispaces.com/Road+Diet (accessed April 18, 2010).

Item A1- Uses in Segment

Findings
FWBT has more mixed land uses than WE, which helps explain its better scores. FWBT has twelve land use categories while WE has eight. FWBT street segments obtained "fair" or near-"fair" median walkability scores on streets with multifamily/commercial/office or institutional land use diversity; single and multifamily residential/recreation land use mixtures; commercial/office or institutional/recreation land use combinations; and single and multifamily/commercial/office or institutional/industrial fusions. WE street segments earned "fair" or near-"fair" median walkability scores on streets with single and multifamily residential mixtures; and single and multifamily residential/recreation combinations. Overall, segments with multifamily residential and recreational land uses scored best.

Figure 24 and Figure 25 on the next page show the land use distribution categories for both neighborhoods. Single and multifamily residential mixtures were the most common category in FWBT at 19 percent of the total neighborhood segments. Multifamily residential/commercial/office or institutional combinations were not far behind at 18 percent of the total neighborhood segments. Single family residential-only land uses also hold a sizable share at 16 percent of the total neighborhood segments. Commercial/office or institutional/recreation land use unions were the least common category at one percent of the total neighborhood segments.

WE's land use distribution chart shows that single family-only uses take up most of the neighborhood at 53 percent of the total segments. Commercial/office or institutional uses are the second most common at 21 percent of the total neighborhood segments. These statistics seem to coincide with what was observed in the field, where it seemed like the only uses were residential and commercial. In stark contrast to FWBT, multifamily residential-only land uses in WE were the least common land use category in WE with only one percent of the total neighborhood segments. It is clear from these charts that the two neighborhoods have dissimilar land use patterns.

See Table 14 in Appendix C for the complete details.

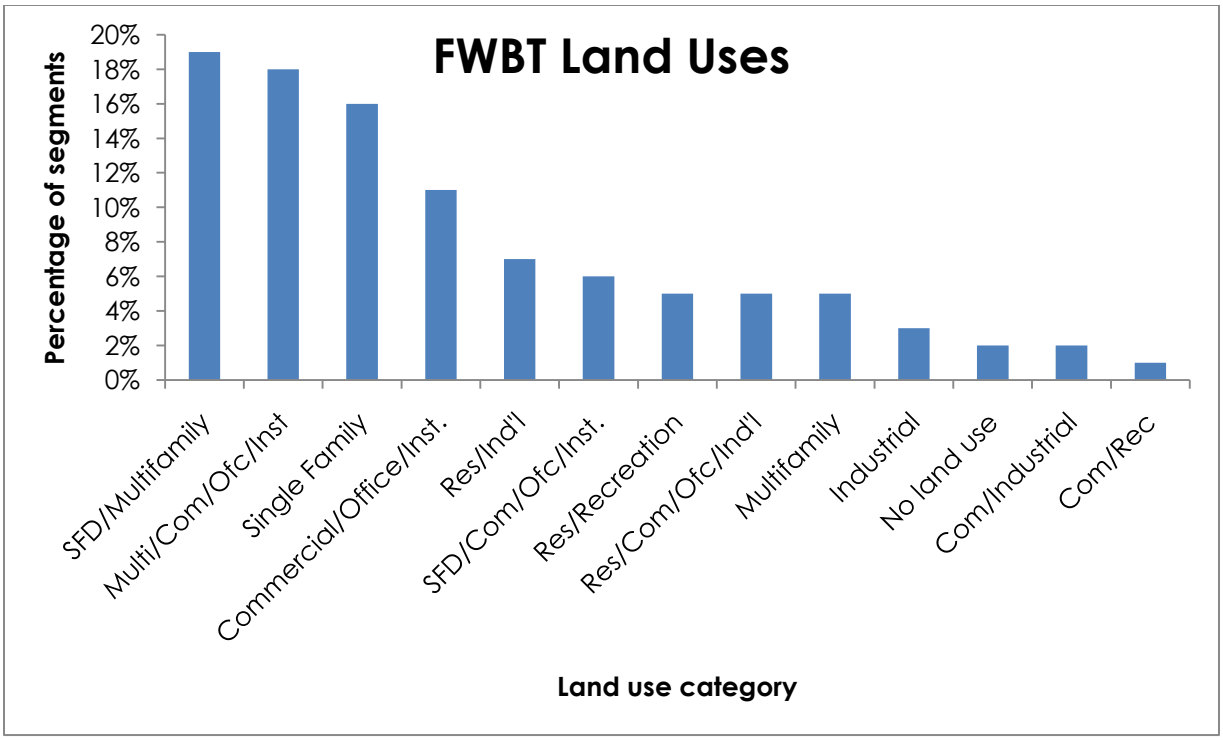


Figure 24. FWBT segments' land use distribution.

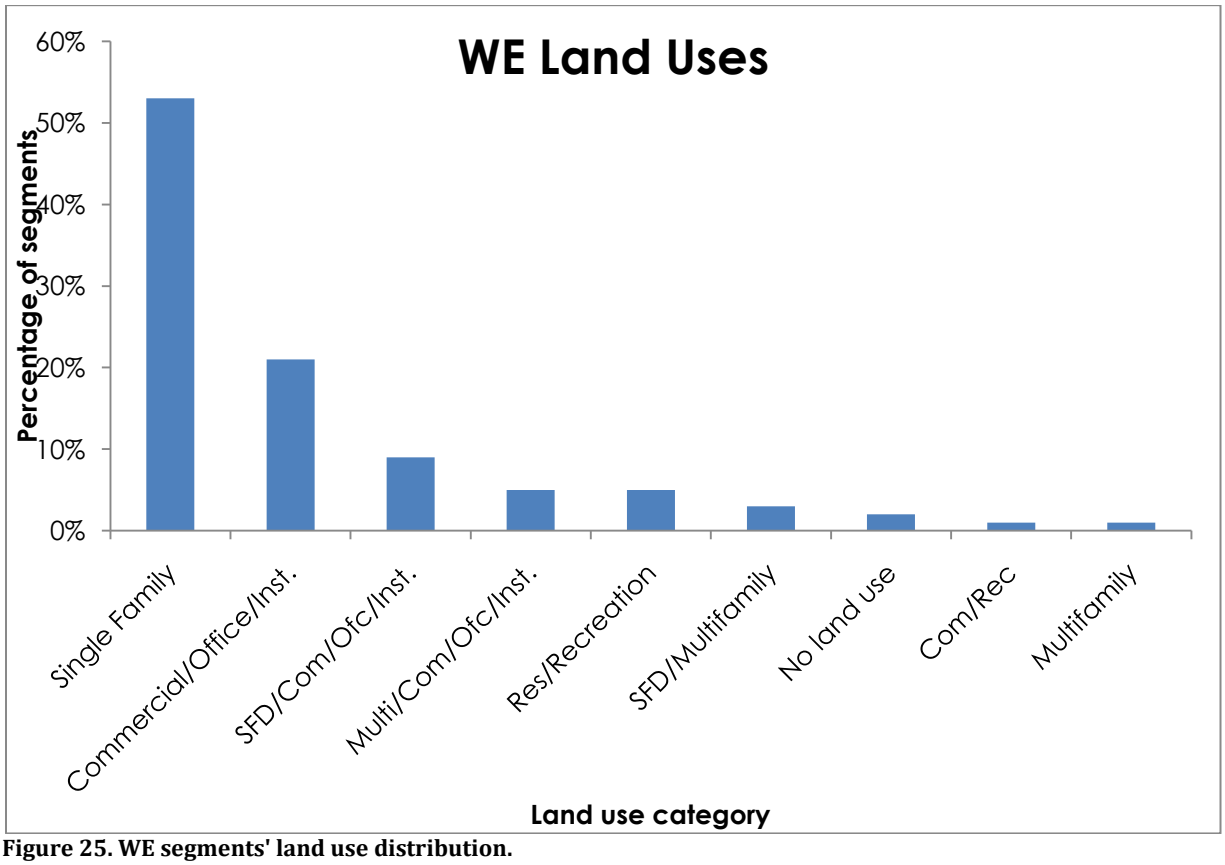


Figure 25. WE segments' land use distribution.

Observations

WE seemed to have endless tracts of single family homes without any neighborhood-serving commercial uses within walking distance (Figure 26). The commercial uses that did exist in WE were only located on arterials and separated from the sidewalk by large parking lots. WE appeared to be in need of denser housing stock with what seemed to be overcrowding in residential areas. Parked cars were packed in along streets with many parked illegally on intersection curb radii and on driveway aprons blocking the sidewalk.

Figure 26. Single family housing in WE.

Figure 27. Newer housing project in FWBT.

Most residential neighborhoods in FWBT contained a variety of single family homes, duplexes, and apartments some of which were in close proximity to commercial uses. Newer attached single family housing projects were present, but in mostly undesirable areas of the neighborhood (Figure 27). Nevertheless, they are well designed and feature nice landscape buffers. Although FWBT had many segments with different types of land uses, there did not appear to be that many mixed use buildings with residential above commercial or office spaces, save for some on Santa Clara Street.

FWBT has many pockets of industrial-zoned properties, several of which are right next to residential properties (Figure 28). Some are well-integrated with the neighborhood by being nondescript and located close to the property line, while others clash with the surrounding land uses. From a walkability standpoint, it might be good on paper to have a place of employment near housing, but in reality most industrial buildings were unattractive and lowered the sense of perceived safety with junked cars, barbed wire, and seedy-looking business operations.

Figure 28. Unsatisfactory residential-industrial interface.

Both neighborhoods have their share of auto-oriented land uses. One such location in FWBT is the 24th and William Street commercial center which contains a suburban-style grocery store, a strip mall, and a car wash (Figure 29). The area is zoned CP (Commercial pedestrian), but its uses and site designs are anything but pedestrian-oriented. Buildings are painted garish colors and its entrances either face away from the street or are separated by parking lots.

Figure 29. Car wash at 24th & William Street.

Figure 30. Lion Liquors building.

The agglomeration of auto-oriented commercial strip malls and isolated building pads near Alvin Avenue and Burdette Drive in WE caused traffic backups in all directions. Apparently this was not a one-time occurrence; Google Street View images showed the area to be snarled with traffic as well. Hardly any of these commercial properties provide walkways for pedestrians, and buildings such as the one that houses Lion Liquors, are poorly maintained and lack curb appeal (Figure 30).

Figure 31. Gas station at 33rd Street & McKee Road.

Gas stations in either neighborhood, or any neighborhood for that matter, are problematic for walkability. Gas stations are notorious for multiple driveways near street intersections with little landscaping and pedestrian treatment. The two gas stations at 33rd Street and McKee Road are one reason why walkability is so poor on McKee Road (Figure 31). These stations are popular because of cheap gas prices, and as a result, cars stack along McKee Road to the US 101 overpass to enter one of the sites. The vehicle backup leading to the stations make walking over the barren US 101 overpass even more unpleasant. Worse are the constant conflicts between pedestrians and vehicles at the driveways.

Recommendations

- Create mixed use and transit-oriented zoning districts or concentrate a variety of different commercial/recreational/office/institutional zoning districts within walking distance of residentially zoned tracts (about a ½ mile or within local streets).[209] This will be a long term endeavor, but over time, a neighborhood's land uses will become more diverse.

- Allow higher densities, neighborhood-serving commercial uses, and high lot coverage ratios; and restrict auto-oriented land uses on areas near existing or proposed transit routes.[210]

- Zone low density residential neighborhoods for small, neighborhood-serving commercial uses, offices, pocket parks, duplexes, secondary units, and residential above commercial.[211]

- Zone medium density residential areas to include neighborhood-serving uses within multifamily housing projects, and discourage low height and low density buildings.[212]

- Zone commercial areas to allow greater floor area ratios, office and retail uses within walking distance, public plazas, and housing above commercial; and limit auto-oriented uses and low-height buildings.[213]

- Pursue the rezoning of CG (General Commercial) properties to CP or PD (Planned Development) to avoid proposals for car washes and other auto-oriented commercial uses.

- When applying for permits for remodeling, require existing gas stations, fast food restaurants, and other auto-oriented uses to incorporate heavy landscaping, architectural features, and other site improvements to disguise its use and make it more attractive to pedestrians.[214]

- Allow retail uses in the front setback area of non-conforming residential properties along arterials.[215] Most existing single family residential properties along arterials are considered non-conforming, because the current zoning only allows for commercial properties. If neighborhood-serving commercial buildings were to be allowed to be built in the front setback, this would create a mixed use property and would help shield homes from the nuisances that come with living on an arterial.

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[209] Mid-America Regional Council, "Creating Walkable Communities: A Guide for Local Governments," http://www.marc.org/Community/pdf/walkable_communities.pdf (accessed September 3, 2009).
[210] Ibid.
[211] Ibid.
[212] Ibid.
[213] Ibid.
[214] David Sucher, *City Comforts: How to Build an Urban Village* (Seattle: City Comforts Inc., 2003), 160.
[215] Ibid, 191.

- Consider form-based zoning on commercial corridors to encourage future development to be oriented towards pedestrians. Form-based codes concentrate on the specific details of site and building design that lead to walkable neighborhoods.[216] A lesser extreme of form-based zoning are traditional neighborhood development ordinances, which also prescribe pedestrian-oriented building orientation and design.[217]

- Consider pedestrian overlay districts along commercial corridors and in future neighborhood village areas. These districts allow creative regulations, such as requiring buildings' ground floor frontages to contain pedestrian-oriented businesses.[218] Overlay districts also provide for shared parking, parking reductions, and minimum densities to ensure compact development.[219]

Item A2- Slope

Findings
All of WE and almost all of FWBT's street segment slopes are flat. The only slopes encountered were while ascending over the US 101 overpasses. Expectedly, these segments attained low walkability scores because they do not have any land uses and are stripped of any pedestrian comfort elements. See Table 15 in Appendix C for more details.

Recommendations
- Ensure that there are no man-made slopes steeper than the ADA-mandated five percent.[220]

Item A3- Segment Intersection

Findings
Segments with four way intersections and segments that dead end but continue the pedestrian path attained "fair" or near "fair" median walkability scores in FWBT. Four way intersections were the most common, found in 61 percent of FWBT and 46 percent of WE's street segments. Segments that dead end but continue the pedestrian path were less

[216] Daniel G. Parolek, et al., *Form-Based Codes: A Guide for Planners, Urban Designers, Municipalities, and Developers,* (Hoboken: John Wiley & Sons, Inc., 2008), 12.
[217] Adrienne Schmitz and Jason Scully, *Creating Walkable Places: Compact Mixed-Use Solutions* (Washington: Urban Land Institute, 2006), 96.
[218] Dena Belzer, et al., "The Transit-Oriented Development Drama and Its Actors," In *The New Transit Town: Best Practices in Transit-Oriented Development*, edited by Hank Dittmar and Gloria Ohland (Washington D.C.: Island Press, 2004), 70.
[219] Ibid, 74.
[220] Mid-America Regional Council, "Creating Walkable Communities."

common, found in only 2.5 percent of FWBT's street segments (Figure 32). Segments with three-way intersections in WE scored four points better than those with four-way intersections. See Table 16 in Appendix C for more details.

Figure 32. Dead end segment with continuous path

Recommendations

- Consider planning a path network to connect isolated local streets and cul-de-sacs with main thoroughfares. The city can pursue small easements along the lot lines of a parcel at the end of a cul-de-sac, which will allow for a pedestrian path to connect to a larger street.[221] Pedestrian paths should have proper lighting and receive periodic maintenance.

- Strive for new streets to be connected with as many four way intersections as possible.

Item B4- Type of Pedestrian Facility

Findings

Fortunately, just about every street in FWBT and WE has a sidewalk. Only 2 percent of FWBT's street segments are completely missing sidewalks (Figure 33). The only segments entirely missing sidewalks in WE are on the stretch of Capitol Expressway along the Arcadia site. Differences in walkability scores between streets segments with and without sidewalks were undoubtedly drastic. There was a 27 point median score difference in FWBT and a 34 point difference in WE. See more Table 17 in Appendix C for more details. Listed in Appendix D is an inventory of street segments without any sidewalks and segments with missing sections of sidewalks or sidewalks on only one side of the street.

Figure 33. Street segment without a sidewalk.

Recommendations

- Install sidewalks on streets that are currently without them. This will increase pedestrian safety, help narrow the road width, and will bring these streets into ADA compliance. Streets without sidewalks attract illegally parked vehicles, as in the case with Ann

[221] Lee Epstein, "The Path to Pedestrianization," *Planning*, May 2005, 23.

Darling Drive in FWBT. Installing sidewalks will help improve the appearance of streetscapes and reduce nuisances for community members. Dirt footpaths along public streets should be converted to sidewalks and cleared of obstructions.

Item B5- Most prominent path material

Findings
The results of this item are almost the exactly the same as item B4, because most sidewalks are composed of the same material, namely concrete. Concrete sidewalks were present in 97 and 98 percent of FWBT and WE street segments respectively. Only four total street segments with pedestrian paths did not have concrete. Paver blocks were not found in either neighborhood. See Table 18 in Appendix C for more details. "N/a" for this item in Table 18 and the rest of the items in Section B represent the streets that are completely missing pedestrian facilities.

Recommendations
- Consider installing decorative paver blocks or brickwork along sidewalks in retail corridors or on streets that get a significant amount of foot traffic. If installing decorative surfaces, special care needs to be taken to ensure they meet ADA requirements. The city should replace the few asphalt sidewalks and dirt walkways with Portland cement concrete because of its durability.[222]

Item B6- Path condition/maintenance

Findings
Pedestrian paths in "fair" condition were the most common at 60 and 61 percent of street segments in FWBT and WE, respectively. Paths in "poor" condition were the least common, but since FWBT is an older neighborhood, it has a larger share of pedestrian paths in "poor" condition than WE (Figure 34). Pedestrian paths in "good" condition contributed to higher scores both neighborhoods, especially in FWBT (Figure 35). See Table 19 in Appendix C for more details.

Figure 34. Sidewalk in poor condition.

[222] Mid-America Regional Council, "Creating Walkable Communities."

Recommendations

- Set aside a small budget to fix immediate sidewalk hazards, such as uplifts, gaps, and broken concrete and educate property owners about the importance of sidewalk maintenance. Currently, individual property owners are responsible for monitoring the condition of the sidewalk.[223] While this policy saves the city money, individual property owners may not address sidewalk maintenance issues with high regard. The city should provide outreach to property owners with resources how to fix sidewalk issues. City inspectors should also periodically inspect sidewalk conditions and notify property owners of needed repairs.

Figure 35. Sidewalk in good condition.

Item B7- Path obstructions

Findings

Most street segments were free of obstructions, but an unsettling amount did have obstructions. 41 percent of FWBT and 34 percent of WE's street segments were obstructed in some way. Obstruction percentages this large reflect how little attention is paid to the pedestrian environment in both neighborhoods. Obstructions make a significant difference in a street segments' walkability. Those without obstructions had median walkability scores that were ten points higher than those with obstructions.

Figure 36. Utility box obstruction near intersection.

Poles or signs constituted 32 percent of the total obstructions and were the most common type of obstruction in both neighborhoods. Segments with "other" types of obstructions had the lowest median scores. The most common types of "other" obstructions were bus benches/shelters and utility boxes (Figure 36). See Table 20 in Appendix C for more details.

[223] Department of Transportation, "Services: Sidewalks & Parkstrips," City of San José http://www.sanjoseca.gov/transportation/s_sidewalks.asp (accessed April 18, 2010).

Recommendations

- Designate corners as "obstruction-free" areas where utility boxes, poles, and the like are prohibited. This is to keep sight lines open to avoid collisions between motorists and pedestrians.[224] Unobstructed sight lines can also be preserved with sight distance triangles, where no landscaping or structures can be built within a certain distance of the intersection.[225]

- Prohibit poles, signs, utility boxes, trash cans, bus stops, etc. on sidewalks' main path of travel. Relegate these items to the buffer zone or the building right of way zone to the left of the main path of travel.[226]

Figure 37. Greenery obstruction.

- Step up code enforcement efforts to cite property owners with greenery obstructions and/or have private contractors remove obstructions and bill property owners (Figure 37).[227]

- Install small bulb-outs around obstructions on narrower sidewalks. Fire hydrants were frequently found to obstruct sidewalks in residential areas. Some sidewalks were treated with a sidewalk bulb-out to provide space around it, which is an acceptable solution.

- Consider drafting utility placement guidelines for other public agencies to refer to when installing infrastructure such as fire hydrants and bus benches.

Figure 38. Pay phone obstruction.

- Consider drafting an ordinance requiring the removal of all exterior pay phones near the sidewalk or require standards for better design and placement (Figure 38).

[224] Mid-America Regional Council, "Creating Walkable Communities."
[225] City and County of Denver, *Pedestrian Master Plan*, (City and County of Denver, 2004), 30.
[226] Mid-America Regional Council, "Creating Walkable Communities."
[227] Ibid.

Item B8- Buffers between the road and path

Findings
Fortunately, most street segments in the two neighborhoods contained buffers. About ¾ of FWBT and 61 percent of WE street segments have buffers. Street segments with buffers scored considerably higher than those without, particularly in FWBT where there was an 18 point median score difference. Additionally, street segments with buffers in FWBT had "fair" walkability scores. See Table 21 in Appendix C for more details.

Recommendations

- Convert monolithic sidewalks to detached sidewalks with landscaped buffers (Figure 39). This will be easier to do on sidewalks wider than five feet, but will require dedication of private property or roadway space on narrower sidewalks. Nevertheless, the conversion will be a worthy effort because it allows room for landscaping and trees; poles and utility boxes; and proper ADA cross slope requirements.[228]

- Require detached sidewalks and landscaped buffers for new sidewalk installation, subdivisions, major permits, and site modification proposals (Figure 40).

- Encourage non-profit groups such as Our City Forest to conduct tree planting drives in areas with underutilized buffer zones. The city can educate property owners about the value of trees to the neighborhood and to property values.

Figure 39. Monolithic sidewalk.

Figure 40. Detached sidewalk with landscaped buffer.

[228] Ibid.

Item B9- Path distance from curb

Findings

These results largely mirror the results in item B8, where the statistics for "at edge" are the same as "no buffer." Segments with buffers were disaggregated in this item into buffers that are one to four feet wide and more than five feet wide. Most buffers (69 percent) in FWBT are one to four feet wide (Figure 41). Buffers of this width have "fair" median walkability scores in the neighborhood. The most common path distances from the curb in WE were split between paths at the edge and buffers wider than five feet at 38.5 percent each. Only seven percent of buffers in FWBT were more than five feet wide. See Table 22 in Appendix C for more details.

Figure 41. 1-4 foot path distance from the curb.

Recommendations

- Strive to make buffer zones as wide as possible, but usually buffers three to four feet in width are adequate for a decent shade tree.

Item B10- Sidewalk width

Findings

Sidewalk widths were between four and eight feet wide throughout the two neighborhoods, and as high as 99 percent in WE (Figure 42). There were no sidewalks wider than eight feet in WE, and only six percent were so in FWBT. Those that were wider than eight feet obtained "fair" median walkability scores. See Table 23 in Appendix C for more details.

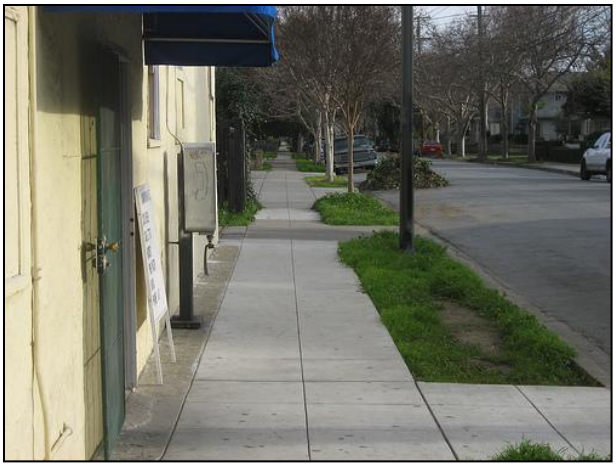

Figure 42. Sidewalk between four and eight feet wide.

Recommendations

- Seek ways to widen sidewalks, particularly along commercial corridors and on freeway overpasses. Sidewalk widths should be enough to accommodate two couples walking abreast to pass each other without conflict.[229] Extensions can reclaim excessive road widths and/or

[229] Sucher, 31.

parking lot setback areas. This will allow more room for outdoor seating, rest areas, and street vendors.

Item B11- ADA Accessibility

Findings
Most street segments had curb ramps—the minimum provision needed to count the segment as fully or partially ADA accessible. 99 percent of WE's street segments are fully or partially ADA accessible whereas FWBT's are 80 percent. Appendix D contains an inventory of intersections with missing curb ramps, all of which are in FWBT. The median score of street segments in FWBT with ADA accessibility is 13 points higher than the median score of street segments without ADA accessibility. See Table 24 in Appendix C for more details.

Recommendations

- Ensure new curb ramps connect to crosswalks' main path of travel. One way to do this is to convert existing diagonal curb cuts to perpendicular curb cuts (Figure 43).[230]

- It was noticed during the audit that numerous driveway curb cuts in front of single family homes were steep enough to potentially cause problems for persons in wheelchairs. City inspectors should ensure that new driveway apron installation conforms to ADA standards.

- Continue ADA accessible curb ramp installation and audits of existing curb ramps. The city has already made tremendous progress with installing ADA-compliant curb ramps at intersections. Its ADA Sidewalk Transition Plan mandates periodic audits of existing curb ramps and schedules improvements to non-compliant curb ramps (Figure 44).

Figure 43. Perpendicular curb ramps with truncated domes.

Figure 44. Non-ADA accessible curb.

[230] Mid-America Regional Council, "Creating Walkable Communities."

Item B12- Sidewalk Completeness

Findings
88 percent of FWBT and 92 percent of WE's street segments have complete sidewalks. There was a 14 point median score difference between complete and incomplete FWBT street segments. WE had a much smaller difference in median scores. See Table 25 in Appendix C for more details. Appendix D contains an inventory of street segments with missing sidewalk sections or with a sidewalk on only one side of the street.

Recommendations

- Ensure that sidewalks are installed on both sides of the street, even if pedestrian traffic is expected to be low. Sidewalks on both sides of the street reduce instances of pedestrians needing to cross the street and allows for pedestrians to face both directions of traffic.[231]

- Encourage property owners to install missing sections of sidewalks (Figure 45). The city should also work with property owners to dedicate portions of their property frontage for sidewalk continuity, or at least require it for building permits.

Figure 45. Incomplete sidewalk.

Item B13- Sidewalk connectivity

Findings
The results confirmed that FWBT has greater connectivity than WE. Only 37 percent of street segments in WE are connected to more than four sidewalks while 52 percent of FWBT's street segments meet the criteria. The suburban street pattern in WE is mostly to blame for its low connectivity. The few street segments that are connected to six or more other sidewalks received particularly high median walkability scores; 67.5 in FWBT and 69.5 in WE. See Table 26 in Appendix C for more details.

Recommendations

- Pursue opportunities to create pedestrian paths through current barriers. A great example is at the west terminus of Chopin Avenue adjacent to Liberty Baptist Church in WE. Chopin Avenue is prevented from connecting to King Road because of the church's walled-in parking lot. The city and church should work together to create an opening through the wall and construct a direct path from Chopin to King.

[231] Ibid.

- Identify direct pedestrian routes to schools, places of employment, parks, libraries, bus stops, and other neighborhood destinations.[232]

- Upon redevelopment/subdivision of large sites, encourage new streets to be laid out in a grid pattern to increase connectivity within the project area and outside to other streets.[233]

Item C14- Road conditions

Findings
Road maintenance seems to be more valued that sidewalk maintenance, since very few street segments were in "poor" condition. The majority of street segments in both neighborhoods were in "good" condition. WE has a 75 to 25 percent share of "good" to "fair" condition roads. FWBT is about 50-50, with "good" condition roads taking up 51 percent of the share. There was not much difference in median walkability scores between the different types of road conditions. See Table 27 in Appendix C for more details.

Figure 46. Buckled asphalt at curb ramp.

Recommendations

- Ensure that roads are free of potholes at intersections, mid-block crossings, and in bicycle travel areas.

- Repair buckled asphalt at curb ramps so pedestrians in wheelchairs can pass seamlessly (Figure 46).

Item C15- Number of lanes

Findings
In what could be attributed to the residential nature of both neighborhoods, most streets were two lanes or less. WE has a greater number of arterials than FWBT, and accordingly, there are more street segments with three lanes or more in WE than FWBT. Median segment scores in either neighborhood fare much better when there are two or less lanes. There is a 9.5 point median score difference in FWBT and a 13 point difference in WE. See Table 28 in Appendix C for more details.

[232] City and County of Denver, *Pedestrian Master Plan.* 29.
[233] City of Minneapolis, *Pedestrian Master* Plan, (City of Minneapolis, 2009), 28.

Recommendations

- Narrow the width of individual lanes on wider streets. Wide travel lanes make it easier for vehicles to speed.[234]

- Consider a complete streets policy for multi-lane arterials to make them multimodal and accessible to all users. Complete streets have accommodations for motorists, transit users, bicyclists, and pedestrians, as well as those with disabilities.[235]

Item C16- Speed limit

Findings

Again, since most street segments in the two neighborhoods are residential, the most common speed limit is 25 mph. In fact, most of the same street segments from C15 directly transfer to this item. Street segments with more than three lanes have higher speed limits than those with two lanes. Approximately 75 percent of FWBT and 67 percent of WE's street segments have speed limits of 25 mph or less. Median walkability scores were also much better for segments with 25 mph or less speed limits, notably with a 15 median score point difference in WE. See Table 29 in Appendix C for more details.

Recommendations

- Consider reducing speed limits to 25 to 30 mph on as many nonresidential streets as possible.

Item C17- On-street parking

Findings

The majority of street segments in the two neighborhoods have on-street parking—83 percent in FWBT and 68 percent in WE. WE has a lower percentage most likely because many of its arterials do not allow on-street parking. Streets with on-street parking in FWBT attained median scores that were 19 points higher than those without on-street parking. Similarly, streets with on-street parking in WE had median scores that were 15 points higher. See Table 30 in Appendix C for more details.

Recommendations

- Allow on-street parking along commercial corridors. On-street parking should be allowed at least during evenings and weekends.[236] On-street parking helps to give the appearance of a narrower street and cause drivers to slow down. A row of parked vehicles also shields pedestrians from vehicle traffic.

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[234] Matthew Ridgway, "Pedestrian Master Plans," (lecture, URBP 256 Local Transportation Planning, San José State University, February 25, 2010).
[235] Barbara McCann, "Complete the Streets!" *Planning*, May 2005, 18.
[236] Sucher, 87.

- Consider angled on-street parking on certain low-speed streets.[237] Angled parking can help calm vehicle traffic and serve as an additional sidewalk buffer.

- Consider paving on-street parking areas with colored concrete or paver blocks for aesthetics and to help reduce the visual width of the road.[238]

Item C18- Off-street parking lot spaces

Findings
Parking lots with six or more spaces were the minority in both neighborhoods, but they were not uncommon, taking up 34 percent of FWBT's and 40 percent of WE's street segments. There was also not much of a median score difference for segments with parking lots with five or less parking spaces and those with six or more. See Table 31 in Appendix C for more details.

Figure 47. Parking lot with an excessive amount of parking.

Recommendations

- Support shared parking agreements and parking lot consolidation to reduce the number of required spaces and allow more room for buildings and amenities. As a long term goal, the city could allow off-site parking such as shared parking garages where property and business owners can pay into a fund to support their construction and maintenance.[239]

- Consider reducing off-street parking requirements for certain land use types and by instituting parking maximums in mixed-use areas, higher residential housing, and near transit routes.[240]

- Use landscaped berms to shield parking lots that are up to the edge of the sidewalk.[241]

- Encourage parking lot surfaces other than asphalt, such as paver blocks and stones, for at least the area of the parking lot that is visible from the sidewalk.[242]

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[237] City of Sacramento, *Pedestrian Master Plan: Making Sacramento the Walking Capital* (City of Sacramento, 2006), 41.
[238] City of San Francisco, *Draft Better Streets Plan: Policies and Guidelines for the Pedestrian Realm,* (City of San Francisco, 2008), 135.
[239] Ibid, 89.
[240] Todd Littman, "Parking Management: Strategies, Evaluation, and Planning," Victoria Transport Policy Institute, http://www.vtpi.org/park_man.pdf (accessed April 21, 2010).
[241] Sucher, 167.
[242] Ibid, 172.

- Pursue the redevelopment of existing parking lots that front the sidewalk on sites with excess amounts of parking (Figure 47). Portions of parking lots close to the right of way could be dedicated for sidewalk and buffer zone extensions. New buildings can also be constructed in this area.

Item C19- Have to walk through a parking lot to get to most buildings

Findings
As in the previous few items, most street segments in the two neighborhoods are residential in character and are not separated from the sidewalk by parking lots. Street segments with buildings accessible directly from the sidewalk attained significantly better median walkability scores, like FWBT with a 17.5 point difference (Figure 48). A considerable portion (30 percent) of WE's street segments are only accessible through parking lots. On the other hand, only eight percent of FWBT's street segments are only accessible through parking lots. WE's high percentage likely represents the multitude of commercial strip centers along its arterials. See Table 32 in Appendix C for more details.

Recommendations

- Prohibit parking lots in front of new buildings. To quote David Sucher, "save the front for people."[243] A pedestrian friendly environment will never be realized where people have to navigate through parking lots to get to building entrances.

Figure 48. Directly accessible building from the sidewalk.

- Encourage property owners to create diagonal, landscaped pedestrian shortcuts within large shopping center parking lots. This will help create a safe and expedient path towards the building entrances that are set back far from the sidewalk.[244]

Item C20- Presence of medium to high volume driveways

Findings
About 20 percent of the street segments in both neighborhoods have more than three medium to high volume driveways. Segments with two or fewer medium to high driveways attained walkability scores 10 points higher than those with three or more. See Table 33 in Appendix C for more details.

[243] Ibid, 49.
[244] Ibid, 84.

Recommendations

- Provide proper pedestrian treatment at medium to high volume driveways including extending sidewalk material across the driveway (Figure 49), reducing curb radii, and reducing driveway widths.[245] Landscaping buffers can also be extended to reduce the width of these driveways.[246]

Figure 49. Driveway with sidewalk material extended over it.

- During the development review process, require developers to close up excess driveways, particularly those near crosswalks and intersections.[247]

- Require placement of stop signs at medium to high volume driveway exits.[248] Also consider signage to the effect of "watch for pedestrians," to increase motorist awareness of passing pedestrians.

Item C21- Traffic control devices

Findings

Over 80 percent of street segments in both neighborhoods contained some sort of traffic control devices. Streets with traffic control devices had median walkability scores six to eight points higher (in FWBT and WE respectively) than those without them. See Table 34 in Appendix C for more details.

Figure 50. Landscaped median.

Recommendations

- Consider installing landscaped traffic circles within residential areas to calm vehicle traffic.[249] Traffic circles can reduce the amount of vehicle-pedestrian conflicts and lessen wait times to cross.[250]

[245] Mid-America Regional Council, "Creating Walkable Communities."
[246] Sucher, 170.
[247] Mid-America Regional Council, "Creating Walkable Communities."
[248] New Hampshire Department of Environmental Services, *Innovative Land Use Planning Techniques: A Handbook for Sustainable Development*, (State of New Hampshire, 2008), 333.
[249] Sucher, 78.

- Install raised crosswalks on low volume streets near schools and parks.[251] This is both a crossing aid and traffic calming device, as it increases pedestrian visibility and acts as a speed hump to slow vehicle traffic.

- Install landscaped medians on wider, high volume streets (Figure 50). A tree-lined median is visually appealing and it provides a mid-street refuge for crossing pedestrians. Medians also help to give the impression of a narrower street, which helps to slow traffic.[252]

- Decrease the corner turning radius at certain intersections, particularly those with a history of pedestrian collisions. The benefits of decreased turning radii are threefold. First, they force motorists to reduce speeds while negotiating turns. Second, they allow more sidewalk space, increasing pedestrian visibility and reducing crossing distances. Third, they allow for perpendicular curb ramp placement and alignment with crosswalks.[253]

Item C22- Marked crosswalks

Findings

WE was found to have a greater percentage of marked crosswalks than FWBT, but only by a small margin. 56 percent of WE's street segments have marked crosswalks and FWBT has 52 percent. Interestingly, street segments without crosswalks in WE attained median scores eight points higher than those with one to three crosswalks. Furthermore, there was no difference in median score between segments without crosswalks and segments with one to three crosswalks in FWBT. This suggests that crosswalks were not a strong predictor of walkability in these two neighborhoods. However, the few segments with four or more marked crosswalks obtained "fair" median scores in both neighborhoods. See Table 35 in Appendix C for more details.

Figure 51. Colored crosswalk paving material.

[250] Dan Burden, "Walkability Audit: City of Albert Lea," http://www.cityofalbertlea.org/aarpblue-zones-city-health-makeover/walkability-audit (accessed March 21, 2010).
[251] Sucher, 80.
[252] John LaPlante, "Retrofitting Urban Arterials," Paper presented at the 3rd Urban Street Symposium, Seattle, Washington, June 24-27, 2007.
[253] City of Oakland, *Pedestrian Master Plan*, (City of Oakland, 2002), 76.

Recommendations

- Utilize high visibility crosswalk markings, such as "zebra" stripes and colored concrete paving material ideally at all crosswalks (Figure 51),[254] but at least those at freeway on/off-ramps and along school routes, commercial corridors, and near parks.

- Install additional crosswalks only when road and traffic conditions are deemed safe to do so. Crosswalks can help promote walking, but several studies have found that pedestrian collisions are higher at marked crosswalks.[255]

- Consider reopening closed crosswalks and prevent any future crosswalk removals.[256]

Item C23- Crossing aids

Findings

A slight majority of both neighborhoods' street segments do not have crossing aids. Only 45 percent of FWBT and 49 percent of WE's street segments are supplemented with crossing aids. Surprisingly, street segments without crossing aids in WE had median scores eight points than those with crossing aids. Moreover, median scores were about the same in FWBT. One reason why streets without crossing aids scored higher could be that most crossing aids are located on arterials which almost always had low cumulative scores. See Table 36 in Appendix C for more details.

Figure 52. Curb "bulb-out."

Recommendations

- Install curb extensions or "bulb-outs" at intersections along wide arterials (Figure 52).[257] Curb extensions will reduce the turning radius at intersections, which helps to slow traffic, shorten crossing distances and increase the pedestrian visibility.

- Consider eliminating free-flow or right turn slip lanes at intersections.[258] These right turn lanes are problematic for pedestrians because they are designed for vehicles to make right turns without stopping, which often also leads to drivers not looking for pedestrians. If it is not feasible to eliminate slip lanes, consider installing raised

[254] Sucher, 84.
[255] City of Oakland, *Pedestrian Master Plan*. 61-62.
[256] City of San Francisco, *Draft Better Streets Plan*, 108.
[257] Ibid, 71.
[258] LaPlante, "Retrofitting Suburban Arterials."

crosswalks from the street curb to the "pork chop" crossing refuge to the left of the right turn slip lane.[259]

- Continue to upgrade pedestrian crossing signals with consideration given to accessible signals and leading pedestrian intervals.[260] The city has done a commendable job of installing countdown clocks at most signalized intersections. To further improve pedestrian signals, the city could seek out certain intersections to install accessible (audible) signals for the visually impaired and leading pedestrian intervals to give crossing pedestrians a "head start" before vehicles can make right or left turns at green lights.

- Install mid-block crossings along long stretches of road without signalized intersections to shorten the distance between crosswalks (Figure 53).[261] The mid-block crossings should provide a solid level of protection, including signage, bollards, lighting, flashing lights, and possibly even stop lights.

Figure 53. Mid-block crossing with flashing warning lights.

- Decrease wait times to cross major arterials and provide median refuges or increase pedestrian signal timing.[262] Long wait times encourage jaywalking and inconvenience pedestrians.

- Provide warning signage (such as StreetSmarts signage) directed at motorists, pedestrians, and bicyclists to exercise caution at high volume intersections. Signage should warn motorists and bicyclists to look for pedestrians crossing the street; and warn pedestrians to wait their turn and look both ways before crossing.[263]

- Prohibit vehicles from making right turns on red lights in areas with higher pedestrian volumes. Right turns on red lights have been responsible for a fair share of pedestrian collisions due to motorists failing to stop and look both ways before they turn.[264]

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[259] Walkinginfo.org, "Improved Right-Turn Slip-Lane Design," Pedestrian and Bicycle Information Center, http://www.walkinginfo.org/engineering/crossings-design.cfm (accessed April 30, 2010).
[260] LaPlante, "Retrofitting Suburban Arterials."
[261] Ibid.
[262] Sucher, 95.
[263] Ibid, 106, 108.
Street Smarts, "A Smart Program for Safer Streets," City of San José, http://www.getstreetsmarts.org/street_smarts/index.htm (accessed May 2, 2010).
[264] City of Cambridge, *City of Cambridge Pedestrian Plan,* (City of Cambridge, 2000), 4.10.

Item C24- Bicycle Facilities

Findings

About 85 percent of both neighborhoods' street segments lack bicycle facilities. Street segments with bicycle facilities in FWBT attained "fair" median scores, and scored nine points higher than those without. Conversely, in WE, street segments with bicycle facilities scored 13.5 points lower than those without. The reason for this peculiarity is because WE's bicycle facilities are only located on arterials such as Tully Road and Capitol Expressway, both of which received low cumulative scores. See Table 37 in Appendix C for more details.

Figure 54. Bicycle parking within the buffer zone.

Recommendations

- Provide more bicycle infrastructure along existing bicycle lanes such as bicycle parking and bicycle crossing buttons accessible to cyclists (Figure 54). Also pursue efforts to expand routes and connect them with others.

- Require placement of bicycle parking near building entrances for convenience and security.[265]

Figure 55. Pedestrian scale lamppost.

Item D25- Roadway/path lighting

Findings

Pedestrian scale lighting was few and far between, especially in WE where only one percent of its street segments have pedestrian lighting. FWBT has slightly more with 5.5 percent of its total street segments. Road-oriented lighting was present on almost every street, even on those with pedestrian scale lighting. Street segments with pedestrian scale lighting earned "fair" median walkability scores while street segments with only road-oriented lighting earned "poor" median walkability scores. Only a small fraction of street segments were without street lights. See Table 38 in Appendix C for more details.

[265] New Hampshire Environmental Services, *Innovative Land Use Planning*, 335.

Recommendations

- Install more pedestrian scale lighting, especially at intersections, driveway entrances, bus stops, mid-block/median refuge crossings, and along commercial thoroughfares (Figure 55).[266]

- Increase illumination in high crime areas and on freeway overpasses by using metal halide or LED lamps that emit white light.[267]

Item D26- Amenities

Findings

Akin to the availability of pedestrian scale lighting, pedestrian amenities were hardly present in the two neighborhoods. About 80 percent of FWBT and 90 percent of WE's street segments did not have any amenities. Street segments with amenities in FWBT had median scores that were nine points higher than those without. But in WE, street segments without amenities fared better by 4.5 median score points. That the only amenities in WE are located mostly on arterials (such as newsstands and garbage cans) probably explains why street segments with amenities scores were lower. See Table 39 in Appendix C for more details.

Recommendations

- Identify opportunities for places to sit, primarily along commercial corridors. Places to sit can be located in right of way buffer zones, such as raised landscape planters; or at the edge of buildings, such as outdoor restaurant seating (Figure 56).[268]

Figure 56. Outdoor restaurant seating.

- Educate restaurant owners about sidewalk café permits, and encourage them to apply for them. Also allow sidewalk vendors to set up in the buffer zone. Sidewalk vendors draw pedestrian activity and socialization.[269]

- Lessen the negativity of walking over freeway overpasses by extending the walkway and integrating public art and landscaping onto protective fences.[270]

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[266] Mid-America Regional Council, "Creating Walkable Communities."
[267] City of San Francisco, *Draft Better Streets Plan*, 196.
[268] Sucher, 40.
[269] Ibid, 128.
[270] Jane Lin, "The Future of Winchester Boulevard," (lecture, URBP 201 Community Assessment, San José State University, September 16, 2009).

- Allow artists and community members to paint utility boxes to transform them into public art pieces. The Long Beach Redevelopment Agency has had great success with this program, where unsightly utility boxes on the sidewalk are painted with imagery representing the neighborhood or a historical aspect of the city.[271] Artists can also paint/design manhole covers and bicycle racks.[272]

- Install decorative clocks in the buffer zone near intersections with high foot traffic.[273]

- Install restrooms, water fountains, and places to sit within the buffer zone to create pedestrian rest areas.[274]

- Allow artists and community members to paint murals on blank walls (Figure 57). Also encourage property owners to install lattices and/or vines on blank walls.[275]

Figure 57. Mural painted on a blank wall.

- Consider bollards in commercial pedestrian zones to ensure greater protection from vehicles. Bollards double as an attractive street furniture element.[276]

Item D27- Wayfinding aids

Findings

Almost every street segment contained wayfinding aids since they were defined to include street identification signs. As mentioned in Appendix A, a future revision to the WAI will include actual wayfinding aids such as maps and directional signs. Nevertheless, streets with wayfinding aids had median scores 3.5 and 6 points higher (FWBT and WE respectively) than those without. See Table 40 in Appendix C for

Figure 58. Gateway sign identifying a neighborhood

[271] Long Beach Development Services, "Utility Box Program Showcases Work of Local Artists," *Building a Better Long Beach*, September 2009, http://www.lbds.info/civica/filebank/blobdload.asp?BlobID=3057 (accessed May 2, 2010).
[272] Sucher, 198.
[273] Ibid, 102.
[274] Ibid, 143-144.
[275] Ibid, 173, 199.
[276] City of Cambridge, *Pedestrian Plan,* 3.1.

more details.

Recommendations

- Encourage neighborhood and business groups to work with the city to develop gateway signs and banners, like the Brookwood and Little Portugal communities in FWBT have done (Figure 58).[277] Gateway signs should be permanent ground signs informing pedestrians that they are in a certain neighborhood. Banners can be installed on street lights usually to indicate a certain business district, like the East Santa Clara Street Business Association has done along Santa Clara Street (Figure 59). This effort not only helps with wayfinding, but also instills a sense of neighborhood pride.

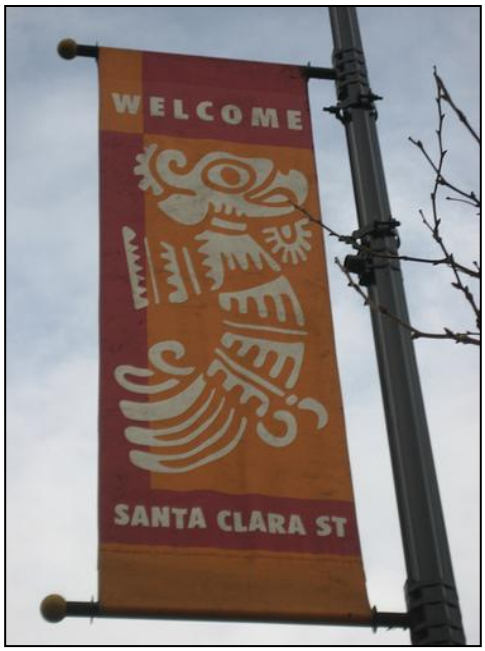

Figure 59. Business district banner.

- Place wayfinding kiosks with maps near the sidewalk in commercial districts.[278] These kiosks could feature maps of businesses and landmarks within a certain area, which could be very helpful to pedestrians that are new to the area or are just visiting.

Item D28- Number of trees along walking area

Findings

FWBT is the "leafier" neighborhood with 60 percent of its street segments having "some" to "many" street trees (Figure 60). These streets segments achieved a "fair" median walkability score. WE has more street segments without trees than it does with trees. Additionally, only one street segment in WE has dense tree cover. Street segments with trees scored at least ten median points higher than those without trees. See Table 41 in Appendix C for more details.

Figure 60. Street segment with dense tree cover.

[277] Sucher, 109.
[278] City of Minneapolis, *Pedestrian Master Plan*, 30. Sucher, 119.

Recommendations

- Pursue efforts to plant non-invasive, native, low-maintenance street trees ensuring adequate planting distance from places where visibility is critical, such as intersections, driveway entrances, and near essential signage.[279]

- Require maximum planting distances and a mix of tree species for street trees to ensure a consistent canopy and better resistance to disease.[280]

Item D29- Degree of enclosure

Findings

The majority of street segments in both neighborhoods had little to no sense of enclosure (Figure 61). 30 percent of street segments in FWBT had some enclosure while there only seven percent that fit that criterion in WE (Figure 62). No street segments in either neighborhood were considered highly enclosed. Street segments with some enclosure achieved "fair" median walkability scores. See Table 42 in Appendix C for more details.

Figure 61. Street segment with no enclosure.

Recommendations

- Enclosure can be achieved through locating buildings close to the street and having buffer zones with trees and street furniture.

Figure 62. Street segment with some enclosure.

[279] Mid-America Regional Council, "Creating Walkable Communities."
[280] New Hampshire Environmental Services, *Innovative Land Use Planning,* 331.

Item D30- Power lines along segment

Findings
The power line results are interesting because the two neighborhoods have completely different statistics. The high percentage of power lines in FWBT (71 percent of total segments) reflect its old age while only 20 percent of WE's street segments have power lines (Figure 63). However, median walkability scores for segments with and without power lines were about the same. Street segments without power lines in FWBT earned slightly higher median walkability scores. See Table 43 in Appendix C for more details.

Figure 63. Street segment draped in power lines.

Recommendations
- Consider requiring the undergrounding of existing power lines for development permits. This should not be a high priority however, as power lines do not have as much of an impact on walkability as other variables, such as trees and building articulation.

Item D31- Overall cleanliness and building maintenance

Findings
Most street segments in the two neighborhoods had "fair" overall cleanliness and building maintenance. Each neighborhood had about a 20 percent share of street segments with "poor" and "good" overall cleanliness and building maintenance. As expected, street segments with "good" overall cleanliness and building maintenance earned the best walkability scores out of the three categories. See Table 44 in Appendix C for more details.

Recommendations
- Educate community members about the importance of property maintenance. Most walkability improvements take time (such as zoning changes) and money (infrastructure upgrades), however adequate property maintenance costs little time and money and can have just a great of an impact on walkability as bigger ticket items (Figure 64). Incivilities, overgrown landscaping, and unkempt properties give the appearance of a rough neighborhood, which is intimidating for pedestrians (Figure 65).

- Encourage commercial property owners to form a property business improvement district (PBID) along shopping corridors. Property owners in Downtown San José formed a PBID and contract a maintenance company to clean all public spaces, which greatly enhances its pedestrian experience.[281] Property owners would have to agree to a small property tax increment in order to fund a maintenance company.

Figure 64. Well-maintained property.

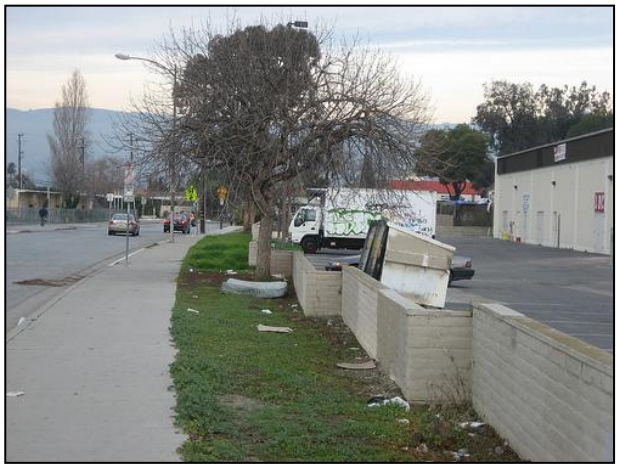

Figure 65. Poorly maintained property.

Item D32- Articulation in building designs

Findings

Most street segments in the two neighborhoods lacked articulated buildings, especially in WE, where 81 percent of its street segments had little to no articulation. FWBT had a higher share of buildings with some articulation at 44 percent of its total street segments (Figure 66). None of WE's segments had mostly highly articulated buildings whereas three percent of FWBT's segments did. Street segments with some articulation earned median scores at least ten points higher than segments without any articulated buildings. See Table 45 in Appendix C for more details.

Figure 66. Highly articulated single family home.

Recommendations

- Encourage property owners to install awnings and/or trellises, possibly even arcades on building frontages to provide articulation and shade for pedestrians.[282]

[281] San José Downtown Association, "PBID-Groundwerx," http://www.sjdowntown.com/PBID-Groundwerx.html#PBID (accessed May 2, 2010).
[282] Sucher, 29.

- Require the ground floor of commercial buildings to contain a certain percentage of window area. Additionally, prohibit the use of mirrored or obstructed windows.[283] Cluttered or obstructed windows do not promote visual interest, and they are also a crime hazard because a robbery could take place inside a store without any passing pedestrians being able to witness it. Furthermore, buildings are more attractive when they have fenestration. Windows on the ground floor open up the building to pedestrians, where they can see life inside the building and window shop.

Figure 67. Unarticulated building with blank walls.

- Discourage designs with blank walls, especially those visible from the public right of way (Figure 67).[284]

- Consider incorporating design guidelines for certain neighborhoods and business districts.

Item D33- Building setbacks from sidewalk

Findings
Every street segment in WE, and the majority of street segments in FWBT (about 80 percent) had buildings that were more than ten feet away from the sidewalk. Median scores for street segments with buildings at the edge and within ten feet of the sidewalk in FWBT were "fair." See Table 46 in Appendix C for more details.


Figure 68. Building at the edge of the sidewalk.

Recommendations

- Require new buildings to front the sidewalk. Building close to the sidewalk allows for social interaction, eyes on the street, and gives businesses better exposure

[283] Ibid, 48-49.
[284] City of Sacramento, *Pedestrian Master Plan,* 39.

(Figure 68).[285] The best but most challenging way to do this is to institute form-based zoning districts along select commercial corridors. Other ways include persuading developers early in the planning stages to locate new buildings along the sidewalk.

- Require property owners proposing building expansions to expand towards the sidewalk. If the property has a street behind it, require them to expand to the rear and provide a sidewalk-facing entrance.[286]

Item D34- Building height

Findings
The majority of street segments in the two neighborhoods (about 80 percent) had buildings that were mostly one story high. Median scores for street segments with mostly two to four story buildings were 7.5 points greater than those with one story. There were no segments with a prevailing pattern of buildings with five stories or more. See Table 47 in Appendix C for more details.

Recommendations
- Allow higher building heights for dense, varied uses along commercial and transit corridors.

Item D35- Bus stops

Findings
90 percent of FWBT and 80 percent of WE's street segments were without bus stops. The second most common category in the two neighborhoods was bus stops with benches at seven percent and 14 percent (FWBT and WE respectively) of total street segments (Figure 69). Though FWBT had fewer shares of bus stops than WE, the neighborhood earned more "fair" median walkability scores than WE. WE's segments with bus stops probably received low cumulative scores because they are mostly located along its unwalkable arterials. See Table 48 in Appendix C for more details.

Figure 69. Bus stop with bench and signage only.

[285] Sucher, 33.
[286] Ibid, 58.

Recommendations

- Work with the VTA to allow frequently-used bus stops to be equipped with small scale services such as coffee stands and newspaper kiosks.[287] This will help attract pedestrians to bus stops and may entice more people to take transit.

- Work with the VTA to provide seating and shelters at every possible bus stop, as well as a map and a bus schedule. Riders should at least be able to enjoy basic accommodations in exchange for patronizing the VTA and helping to reduce vehicle usage. Seating and shelters will be especially helpful to riders waiting for bus service in inclement and hot weather.

- Ensure that there are crossing facilities near bus stops.[288] Transit riders often need to cross the other side of the street when embarking/debarking buses and should be able to do so safely and conveniently.

- Encourage more community members to participate in VTA's Adopt-a-Stop Program so that more bus shelters will be kept clean and welcoming to transit riders.[289]

[287] Ibid, 37.
[288] Mid-America Regional Council, "Creating Walkable Communities."
[289] VTA, "Adopt-A-Stop Program," http://www.vta.org/services/adopt_a_stop.html (accessed May 2, 2010).

7.7. Summary of Recommendations by WAI Section

Table 7. Recommendations sorted by Section 0 and Section A of the WAI.

Audit item	Recommendation	Possible locations
Segment type (0)	Examine techniques to reduce noise, width, and traffic exposure	All high volume roads
	Consider road diets	" "
Uses in segment (A1)	Create mixed use zoning districts or concentrate a variety of different zoning districts within walking distance of residentially zoned tracts	Neighborhood village/BART/Light rail corridor areas; neighborhoods with a connected pattern of arterials, collector and local streets
	Intensify density and diversity; and restrict auto-oriented land uses on areas near existing or proposed transit routes	Neighborhood village/BART/Light rail corridor areas
	Zone low density residential neighborhoods for small increases in density and allow for neighborhood-serving nonresidential uses	Roosevelt and Olinder communities in FWBT; Meadowfair, Whaley, and Stallion communities in WE
	Zone medium density residential areas to include neighborhood-serving uses within multifamily housing projects, and discourage low height and low density buildings	Wooster and Bonita communities in FWBT; Lanai and Whaley communities in WE
	Zone commercial areas for a mix of commercial uses, public spaces, and residential; and limit auto-oriented uses and low-height buildings	Any existing commercial area
	Pursue the rezoning of CG properties to CP or PD zoning	CG-zoned properties
	Require auto-oriented uses to incorporate site improvements	All auto-oriented uses, particularly those at 33rd St. & McKee Rd. in FWBT; and Tully & King Rd. in WE

Audit item	Recommendation	Possible locations
	Allow retail uses in the front setback area of non-conforming residential properties along arterials	Santa Clara St., 24th St/McLaughlin Ave, and King Rd. in FWBT; King Rd. in WE
	Consider form-based zoning	Commercial corridors and neighborhood villages
	Consider pedestrian overlay districts	" "
Slope (A2)	Ensure that there are no man-made slopes steeper than the ADA-mandated five percent	Freeway overpasses
Segment intersection (A3)	Consider planning a path network to connect isolated local streets and cul-de-sacs with main thoroughfares	Isolated local streets and cul-de-sacs
	Strive for new streets to be connected with as many four way intersections as possible	All locations

Table 8. Recommendations sorted by Section B of the WAI.

Audit item	Recommendation	Possible locations
Type of ped. facility (B4)	Install sidewalks on streets that are currently without them	Streets with missing sidewalks (see Appendix D)
Most prominent path material (B5)	Consider installing decorative paver blocks or brickwork in areas with high pedestrian volumes	Santa Clara St/Alum Rock Ave., 24th St/McLaughlin Ave, and William St. in FWBT; Aborn Rd., Alvin Ave., and Tully Rd. in WE
Path condition/maintenance (B6)	Set aside a small budget to fix immediate sidewalk hazards	All locations
	Educate property owners about the importance of sidewalk maintenance.	" "
Path obstructions (B7)	Designate corners as "obstruction-free" areas and consider adding sight distance triangles	All intersections
	Prohibit poles, signs, trash cans, bus stops, etc. on sidewalks' main path of travel.	All locations
	Step up code enforcement efforts to cite property owners with greenery obstructions	" "
	Install small bulb-outs around obstructions on narrower sidewalks.	Lanai and Edge communities in WE; Wooster and McKinley communities in FWBT
	Consider drafting utility placement guidelines	All locations
	Consider drafting an ordinance requiring the removal of all exterior pay phones near the sidewalk	Santa Clara St. and Julian St. in FWBT; Tully Rd. and Burdette St. in WE
Buffers between road & path (B8)	Convert monolithic sidewalks to detached sidewalks with landscaped buffers	Capitol Expy, Silver Creek Rd., Tully Rd., and Alvin Ave. north of Flanigan in WE; Julian St/McKee Rd. and McLaughlin Ave. in FWBT
	Require detached sidewalks and landscaped buffers for	All locations with existing monolithic sidewalks

Audit item	Recommendation	Possible locations
	new sidewalk installations, subdivisions, major permits, and site modification proposals	
	Encourage non-profit groups such as Our City Forest to conduct tree planting drives	Areas with underutilized buffer zones
Path distance from curb (B9)	Strive to make buffer zones as wide as possible	All locations
Sidewalk width (B10)	Seek ways to enlarge sidewalks so two couples can pass each other easily	Tully Rd. and Alvin Ave. in WE; Freeway overpasses, Julian St./McKee Rd. and McLaughlin Ave. in FWBT
ADA accessibility (B11)	Ensure new curb ramps connect to crosswalks' main path of travel	All new curb ramps that adjoin crosswalks
	Ensure that new driveway apron installation conforms to ADA standards.	All locations. Currently inadequate in Edge community in WE and Little Portugal in FWBT
	Continue ADA accessible curb ramp installation and audits of existing curb ramps	All locations, but give priority to areas near schools, bus stops, parks, commercial corridors, and areas with higher concentrations of elderly and/or disabled persons
Sidewalk completeness (B12)	Ensure that sidewalks are installed on both sides of the street, even if pedestrian traffic is expected to be low	West side of Capitol Expy and Aborn Rd. b/w Towers and Silver Creek in WE; Ann Darling Dr., Wooster Ave., and 28th St. in FWBT
	Encourage property owners into installing missing sections of sidewalks	Refer to Appendix D for locations
Sidewalk connectivity (B13)	Pursue opportunities to create pedestrian paths through current barriers	Chopin Ave., Atwood Dr., Fontaine over/under US 101, and Meadowfair Park trail to Capitol Expy in WE; Herald Ave., Berrywood Dr., and 31st St. in FWBT
	Identify direct ped. routes	Neighborhood destinations
	Encourage new streets to be laid out in a grid pattern	All locations

Table 9. Recommendations sorted by Section C of the WAI.

Audit item	Recommendation	Possible locations
Road conditions (C14)	Ensure that roads are free of potholes	Intersections, mid-block crossings, and in bicycle travel areas
	Repair buckled asphalt at curb ramps	At curb ramps
Number of lanes (C15)	Narrow individual lane widths on wider roads	Tully Rd. and Capitol Expy in WE; Julian St./McKee Rd. in FWBT
	Consider complete streets policies for arterials	" "
Posted speed limit (C16)	Consider reducing speed limits to 25 to 30 mph	As many nonresidential streets as possible
On-street parking (C17)	Allow on-street parking along commercial corridors	Tully and King Rd. and Capitol Expy in WE; McLaughlin Ave. and McKee Rd. in FWBT
	Consider angled on-street parking	Low-speed streets (25 mph) in business districts
	Consider paving on-street parking areas with colored concrete or paver blocks	Along commercial corridors
Off-street parking spaces (C18)	Support shared parking agreements and parking lot consolidation	Commercial properties along Alvin Ave., Tully Rd., and Capitol Expy in WE; Julian St./McKee Rd. in FWBT
	Consider reducing off-street parking requirements for certain land use types and by instituting parking maximums.	Existing and new shopping centers, mixed use areas, higher density residential, and uses near transit
	Use landscaped berms to shield parking lots that are up to the edge of the sidewalk	24th & Santa Clara St. and King Rd. & McKee Rd. in FWBT; Several commercial properties along Tully Rd. in WE
	Pursue the redevelopment of existing parking lots that front the sidewalk on sites with excess amounts of parking	" "

Audit item	Recommendation	Possible locations
	Encourage parking lot surfaces other than asphalt, such as paver blocks and stones	All parking lots
Walk through parking lot to get to most buildings (C19)	Prohibit parking lots in front of new buildings	Tully Rd., Alvin Ave., Aborn Rd/Silver Creek Rd. & Capitol Expy in WE; Julian St/McKee Rd. in FWBT
	Create pedestrian shortcuts through large parking lots	" "
Presence of driveways (C20)	Provide proper pedestrian treatment at medium to high volume driveways	All medium to high volume driveways, especially into shopping centers
	Require developers to close up excess medium to high volume driveways	All shopping centers
	Require placement of stop signs	Medium to high volume driveway exits
Traffic control devices (C21)	Consider installing landscaped traffic circles and medians in residential areas	Bonita community in FWBT; Meadowfair community in WE
	Install raised crosswalks on low volume streets near parks and schools	Huran & Clarice Dr., Alvin Ave. south of Flanigan, and Monrovia Dr. in WE; 24th St. south of Julian St., 33rd St. north of McKee Rd., and Bonita Ave. in FWBT
	Install landscaped medians on wider, high volume streets	McKee and King Rd. in FWBT; King and Tully Rd. and Capitol Expy in WE
	Decrease corner turning radii	Intersections with a history of pedestrian collisions.
Marked crosswalks (C22)	Utilize high visibility crosswalk marking patterns	24th/San Fernando St. and San Antonio St. in FWBT; At freeway on/off-ramps, and near schools, parks, and along commercial corridors
	Install additional crosswalks only when road and traffic conditions are deemed safe to do so	Intersections without marked crosswalks
	Consider reopening closed crosswalks and prevent any	Tully Rd. & Alvin Ave. in WE; McLaughlin Ave. &

Audit item	Recommendation	Possible locations
	future crosswalk removal	Melbourne Blvd.
Crossing aids (C23)	Install curb extensions along wide arterials	Tully Rd. and Capitol Expy in WE; McKee and McLaughlin Ave. in FWBT
	Consider removing free-flow right turn lanes or install raised crosswalks to "pork chop" refuge islands	Intersections of Quimby & Tully Rd., Quimby & Capitol Expy, Aborn & Capitol Expy, Aborn & Silver Creek Rd., Silver Creek Rd. & Capitol Expy in WE
	Install accessible pedestrian signals and leading pedestrian intervals at certain intersections	Santa Clara St/Alum Rock Ave., Julian St/McKee Rd., and McLaughlin Ave. in FWBT; Tully Rd., King/Silver Creek Rd., and Capitol Expy in WE
	Install mid-block crossings along long stretches of road without signalized intersections to shorten the distance between crosswalks	24th St. south of Santa Clara St., McLaughlin Ave., and Julian St/McKee Rd. in FWBT; Alvin Ave. north of Flanigan, King Rd., and Quimby Rd. in WE
	Decrease wait times to cross major arterials and provide median refuges or increase pedestrian signal timing	Tully Rd. and Capitol Expy in WE; McKee Rd. in FWBT
	Provide warning signage directed at motorists, pedestrians, and bicyclists	High volume intersections, such as those with free flow right turn lanes
	Prohibit vehicles from making right turns on red lights in areas with higher pedestrian volumes.	Santa Clara St/Alum Rock Ave. and 24th St/McLaughlin Ave. in FWBT; King Rd. and Tully Rd. in WE
Bicycle facilities (C24)	Provide more bicycle infrastructure along existing bicycle lanes/routes and pursue efforts for expansion/connectivity to other routes	Tully Rd. and Capitol Expy in WE; McLaughlin Ave. and 21st St. in FWBT
	Require placement of bicycle parking near building entrances for convenience and security	" "

Table 10. Recommendations sorted by Section D of the WAI.

Audit item	Recommendation	Possible locations
Roadway/path lighting (D25)	Install more pedestrian scale lighting	Preferably all streets, but at a minimum, intersections, driveway entrances, bus stops, mid-block/median refuge crossings, and along commercial thoroughfares
	Increase illumination in needed areas	High crime areas and freeway overpasses
Amenities (D26)	Identify opportunities for places to sit	Commercial corridors such as Santa Clara St/Alum Rock Ave. in FWBT and King/Silver Creek Rd. in WE
	Encourage business owners to apply for sidewalk café permits and allow vendors to set up in the buffer zone	" "
	Extend walkways and integrate public art and landscaping onto protective fences on freeway overpasses	San Antonio St., Santa Clara St., and McKee Rd. over US 101 in FWBT; Tully Rd. and Capitol Expy over US 101 in WE
	Allow artists and community members to paint utility boxes to transform them into public art pieces	Highly visible traffic signal boxes at signalized intersections
	Install decorative clocks in the buffer zone near intersections with high foot traffic	Santa Clara St., 24th St., and William St. in FWBT; Tully and King Rd. in WE
	Install restrooms, water fountains, and places to sit within the buffer zone to create pedestrian rest areas	Commercial corridors and residential collector streets
	Allow artists and community members to paint murals on blank walls. Also encourage property owners to install lattices and/or vines on blank walls	Unarticulated building walls
	Consider bollards in commercial pedestrian zones to ensure greater protection from vehicles	Santa Clara St/Alum Rock Ave in FWBT; Tully Rd. in WE

Audit item	Recommendation	Possible locations
Wayfinding aids (D27)	Encourage neighborhood and business groups to work with the city to develop gateway signs and banners	All neighborhoods and business districts
	Place wayfinding kiosks with maps near the sidewalk in commercial districts	Santa Clara St/Alum Rock Ave. and Julian St/McKee Rd. in FWBT; Tully Rd., Alvin Ave., Aborn Rd., and Silver Creek Rd. in WE
Number of trees along walking area (D28)	Pursue efforts to plant non-invasive, native, low-maintenance street trees	All locations
	Require maximum planting distances and a mix of tree species for street trees	" "
Degree of enclosure (D29)	Locate buildings close to the street and supply buffer zones with trees and street furniture	" "
Power lines along segment (D30)	Consider requiring undergrounding of existing power lines for development permits	Little Portugal and Wooster communities in FWBT
Overall cleanliness and building maintenance (D31)	Educate community members about the importance of property maintenance	All locations
	Encourage commercial property owners to form a property business improvement district (PBID)	All commercial corridors
Articulation in building design (D32)	Encourage property owners and applicants to install awnings and/or trellises	New buildings along sidewalk; existing buildings along Santa Clara St./Alum Rock in FWBT
	Require the ground floor of commercial buildings to contain a certain percentage of window area	Julian St/McKee Rd. in FWBT; Tully Rd. and Alvin Ave. in WE
	Consider incorporating design guidelines for certain neighborhoods and business districts	" "
	Discourage designs with	All locations

Audit item	Recommendation	Possible locations
	blank walls, especially those visible from the public right of way	
Building setbacks from sidewalk (D33)	Require new buildings along commercial corridors to front the sidewalk	Tully Rd. and Capitol Expy in WE; Julian St/McKee Rd. in FWBT
	Require building expansions to expand towards sidewalk	Tully Rd. & Clarice Dr./Fontaine Rd. and Lexann Ave. & Silver Creek Rd. in WE; Empire Lumber site in FWBT
Building height (D34)	Allow higher building heights for dense, varied uses	In neighborhood villages and along commercial and transit corridors
Bus stops (D35)	Equip frequently-used bus stops with small services	Select bus stops along Santa Clara St/Alum Rock Ave. in FWBT; King Rd. in WE
	Place seating and shelter at every bus stop	King Rd. and Rigoletto Dr. in WE; McLaughlin Ave. and San Antonio St. in FWBT
	Encourage community members to participate in VTA's Adopt-a-Stop Program	All bus stops
	Ensure that there are crossing facilities near bus stops	" "

Chapter 8: Conclusion

8.1. Evaluation of Hypothesis

Walkability was expected to be better in FWBT than WE on the basis that older urban neighborhoods are generally more walkable than younger suburban neighborhoods.[290] The audit confirmed that FWBT was more walkable, but by not much of a small margin over WE. FWBT's more compact street pattern allowed for more connections, smaller lots, and different land uses to be located near each other. WE's disconnected street pattern feeds an inordinate amount of traffic onto major arterials which almost force adjoining land uses to cater to automobiles. By and large, both neighborhoods are primarily programmed to give priority to automobile use, leaving behind second-rate pedestrian facilities. However, noticeable improvements have been recently implemented, such as ADA curb ramp installations in WE and traffic calming in FWBT. Walkability could get much better after transit improvements arrive and the neighborhood village concept becomes reality.

8.2. What the Walkability Audit Accomplished

This project is one of few that give detailed results of an actual walkability audit. The audit showed how different features of the built environment affect walkability. The PEDS instrument was used as a model for the WAI, which added a scoring system to assign weight to micro level data items. This was instrumental in the WAI's systematic approach towards rating a street segment's cumulative walkability.

Maps were used to depict individual segment scores, which identified locations of good and poor street segments. Clusters of "fair" and "good" street segments were found in the western part of FWBT, south of Santa Clara Street and west of 24th Street/McLaughlin Avenue. A smaller cluster of "fair" and "good" segments emanated around Whaley Elementary in WE. The analysis of the findings and recommendations for improvement inform community members, planners, and decision makers what currently exists in the neighborhoods, and what is needed to enhance walkability.

8.3 Comparison with Literature

The built environment's effect on walkability literature pointed to the 3Ds—density, diversity, and design as the most influential urban form characteristics on walking for transportation and recreation.[291] FWBT had a higher percentage of street segments with the 3Ds, which helped the neighborhood receive better cumulative walkability scores than

[290] Cervero and Radisch, "Travel Choices," 140.
[291] Cervero and Kockelman, "Travel Demand and the 3Ds," 216.

WE. It was difficult to a consistent number of street segments with the 3Ds in WE, as it is a prime example of an auto-oriented suburban neighborhood.

Density was found in the literature review to have the strongest relationship with walking while design had the weakest.[292] In contrast to the literature, the audit found that street segments with pedestrian-oriented design have higher walkability scores than those with density and diversity, although segments with density scored almost as high. This finding seems to make sense, as design elements play a critical role in the pleasurability of walking. Overall, segments with the 3Ds had the highest walkability scores, which confirm what was found in the built environment literature reviewed in this report.

Walkability audit literature concentrated on the development and testing of audit instruments, not on the results of real world audits conducted with the instruments.[293] Nevertheless, the WAI went through an informal vetting process, as did other audit instruments discussed in the literature. The literature concluded that objective items are the most reliable, and are the best types of items to include on an audit instrument. The WAI contains mostly objective items that can be observed by anyone, but it also has subjective items where responses can vary by rater. Regardless, subjective items are important to have because perceptions can have a great effect on the choice to walk.[294]

8.4. The Future of Walkability in FWBT and WE

FWBT's urban morphology and street layout helped contribute to its better walkability scores. The neighborhood may be considered compact and "mixed use" in the technical sense, but it lacks a regular array of fine-grained features to make it a safe, healthy, and livable neighborhood. Fortunately, FWBT has the "bones" of a walkable neighborhood, something that WE does not have. To make matters worse, WE has far less fine-grained features than FWBT. A major overhaul of current conditions is needed in both neighborhoods before they can be considered somewhat walkable.

Priority areas for improvement are along existing arterials, which are the most visible streets in the neighborhoods. They currently lack the pedestrian treatments needed to make them complete streets and instill a sense of place. Existing single family neighborhoods are here to stay, but small changes over time can help make them more walkable.

Improvements to walkability are primarily dependent on city decision makers' policies, planning, and funding. But the community also has a strong voice in affecting change. Both neighborhoods are part of the Strong Neighborhoods Initiative program that has neighborhood action coalitions to monitor progress. It is up to community members to

[292] Saelens et al., "Environmental Correlates," 84.
Cervero and Kockelman, "Travel Demand and the 3Ds," 218.
[293] Clifton et al., "The Development and Testing."
[294] Cluster for Physical Activity and Health, "Involving the Community."

decide whether or not walkability is a priority. The WE neighborhood has not been responsive to higher densities in the past because they have led to traffic and crime problems and have contributed little to the community.[295] Conversely, residents in FWBT welcome density and diverse land uses, because it means more housing opportunities and more jobs.[296] This project intends to make community members aware of the factors affecting the walkability of their neighborhoods so it can inform their decisions on the future of their neighborhood.

Many of the recommendations listed in Chapter 7 require the enlargement of the pedestrian right of way. Most areas have the space to do it, either into the street or into the front setback area on private property. It may sound like a good idea on paper, but it will be immensely difficult in most cases to vacate part of the roadway or require dedications of private property. To "soften the blow" of dedication and easements for public use, the city could allow property owners to place their name on the sidewalks, benches, street names, etc. that was once part of their property.[297] This is not guaranteed to work, but it is worth promoting because people like to see their name in public when it is being used for good. In the same vein, developers who contribute to bettering the pedestrian environment should be honored with plaques, awards, and signposts.

Improvements to walkability will require a great deal of internal collaboration within the City of San José's Department of Planning, Building, and Code Enforcement; Department of Transportation; Public Works; and Department of Parks, Recreation, and Neighborhood Services. Other agencies, such as the Santa Clara County Public Health Department and the VTA, will also have to be involved. The city is moving in the right direction with strong pedestrian-oriented policies proposed in its 2040 General Plan update, but there needs to be strong implementation methods to bring its vision to reality.

Community members in FWBT, WE, and in any other neighborhood should be able to have other viable travel options available than the automobile. They should also have safe places to walk for recreation and exercise. Much work is needed, but it can be done with the right amount of attention and funding for the pedestrian environment.

[295] Khanh Nguyen, interview by author, March 2, 2010.
[296] Paul Pereira, interview by author, February 26, 2010.
[297] Sucher, 216.

Appendix A: WAI Item-by-Item Summary and Comparison with PEDS Items

Excluding the addition of a scoring system and the rewording of most items, the WAI generally follows the same structure and content as PEDS. The order of many of the variables was rearranged from PEDS to have the lower scoring variables on top and the higher scoring variables on bottom. This modification was done to simplify entry in the field and post-audit data entry.

Item 0: Segment Type- 5 points possible

High volume road □ 0
Low volume road □ 5
Bike or Ped path □ 5

How it compares with PEDS:
This wording of this item exactly mirrors Item 0 in PEDS. The high and low volume road determination was made before the audit, similar to the PEDS methodology.[298] However, instead of using GIS to identify segments, segment types were identified in Google Earth. Yellow colored streets in Google Earth are typically higher volume streets, with wider streets and more traffic volume. Analogous to PEDS, each side of the street is audited separately for high volume street segments and both sides of the street are audited at once for low volume street segments. Also analogous to PEDS, the bicycle or pedestrian path selection is checked only if the path is closed off to automobile traffic.[299]

On a side note, PEDS and the WAI do not address whether streets allow one-way or two-way traffic. It may be helpful to include an additional item in a future update to the WAI that assesses traffic direction. One-way streets are typically designed to accommodate higher volumes and speeds. Two-way streets are thought to be more pedestrian friendly because divergent lanes help to slow traffic.[300]

Scoring justification:
Low volume and bicycle or pedestrian paths get five points because they are more attractive to walk on than busy arterials. High volume roads do not receive any points because they are usually intimidating and sometimes hazardous to walk along.

Item A1: Uses in Segment- 14 points possible

Check all that apply
Vacant/underdeveloped □ 0

[298] Clifton et al., "The Development and Testing," 100.
[299] Livi and Clifton, "PEDS Audit Protocol," 13.
[300] Sucher, 86.

Industrial	□ 0
Housing- Single Family Detached	□ 0
Housing- Mobile Homes	□ 0
Office/Institution	□ 2
Housing-Multi-Family	□ 4
Restaurant/Café/Commercial	□ 4
Recreation	□ 4

How it compares with PEDS:
The administration of this item follows the PEDS protocol. The rater checks off every visual land use in the segment, even if the only access point is a parking lot or driveway.[301]

Scoring justification:
Points add up for each checked variable. Multiple check marks for this item indicate a mixed use segment, which were shown to contribute to walking in the literature review. No points are allocated to vacant, industrial, single family, or mobile home housing. These land uses are generally not walkable because of large setbacks, low densities, and do not generate walking trips.

The most points are given to land uses that were shown in the literature review to be more walkable. Multifamily housing equates to higher residential densities; restaurants/commercial uses are associated with retail and personal service destinations; and recreational uses generate physical activity walking trips. Office/institution land uses include professional offices, schools, and churches. People generally drive to these uses, but there is usually a portion of people who walk to these uses as well, so this category was given two points.

Item A2: Slope- 3 points possible

Steep hill	□ 0
Slight hill	□ 1
Flat hill	□ 3

How it compares with PEDS:
The administration of this item follows the PEDS protocol.

Scoring justification:
Flat street segments are more attractive for walking due to its ease of use; additionally, they allow for short block widths and compact development. Rises in slope require more effort and may not be accessible to certain groups. Rises in slope also make it more difficult to build dense land uses.

[301] Ibid, 4.

Item A3: Segment intersection- 3 points possible

Segment has no intersections	□ 0
Segment has other intersection	□ 0
Segment dead ends	□ 0
Segment dead ends but path continues	□ 1
Segment has 3-way intersection	□ 2
Segment has 4-way intersection	□ 3

How it compares with PEDS:
This item and item B13 (sidewalk connectivity) gauge the connectivity of the street segment. While this section is mostly intuitive, the PEDS protocol does not give detailed directions on the administration of this item. There are many segments that have two types of intersections. The solution to this is to check both types of intersections only if the total score for the item does not exceed three (the maximum item score). For example, in a segment with both a three-way and four-way intersection, the rater should only check "Segment has a 4-way intersection" so the total score for the item does not exceed three.

Scoring justification:
Four-way intersections connect to the most intersections and therefore get the most points. Other intersections, such as six-way intersections, are more connected than four-way intersections, but are often large and intimidating to cross, and were initially assigned zero points. On the other hand, some four-way intersections can be just as large and intimidating. A five-way+ intersection variable worth three points will be added in a future revision to the WAI. No five-way+ intersections were encountered during the audit.

Cul-de-sacs are problematic because the segment dead ends, but they also have a three or four-way intersection connecting to a collector street. In this situation, "Segment dead ends" and "Segment has 3-way intersection" or "Segment has a 4-way intersection" are checked. There was some apprehension towards giving cul-de-sacs two or three points, but there was no variable on the WAI to address the situation. A new variable worth fewer points will be added in a future revision of the WAI to address this situation.

Item B4- Type of Pedestrian Facility- 4 points possible

Footpath (worn dirt trail)	□ 0
Paved trail	□ 2
Sidewalk	□ 4
Pedestrian street (closed to cars)	□ 4

How it compares with PEDS:
The administration of this item follows the PEDS protocol.

Scoring justification:
Sidewalks are allotted four points because they serve as the foundation for walking and were noted in the literature review as the basic element needed to entice people to walk.[302] Pedestrian streets also receive four points, but they should be allotted more points in a future WAI revision because they are more attractive for walking. Paved trails are paths separated from the roadway and are not usually audited because there is no way to assess the road features. Nevertheless, if they are being audited, they receive two points. Worn dirt footpaths do not receive any points because they give the impression that pedestrians are not welcome.

Item B5- Most prominent path material- 3 points possible

Dirt or sand	□ 0
Gravel	□ 0
Asphalt	□ 1
Concrete	□ 2
Paving brick or flat stone	□ 3

How it compares with PEDS:
This item differs from PEDS in that it only assesses the most prominent path material. The PEDS protocol directs the rater to check off all the materials that apply, as in the case with finding brickwork on a concrete sidewalk.[303] This modification made it easier to score.

Scoring justification:
Paving brick or flat stone is often decorative in nature and enhances the pedestrian experience, earning the maximum three points. Concrete surfaces are easily identifiable places to walk plus its light color is visible at night.[304] Asphalt is the least attractive paved surface, but it still accommodates pedestrians. Gravel, dirt, and sand represent informal pathways where pedestrians were not initially intended, and so are not worth any points.

Item B6- Path condition/maintenance- 2 points possible

Under repair	□ 0
Poor (many bumps/cracks/holes)	□ 0
Fair (some bumps/cracks/holes)	□ 1
Good (very few bumps/cracks/holes)	□ 2

How it compares with PEDS:
The administration of this item largely follows the PEDS protocol. This item has a level of subjectivity to it, because people can have different perceptions of how well a path is

[302] Kitamura et al., "A Micro-Analysis," 143.
[303] Livi and Clifton, "PEDS Audit Protocol," 5.
[304] Yonah Freemark, "The Sidewalks of Today and Tomorrow: Is Concrete our only Option?" The Infrastructurist Blog, posted February 22, 2010, http://www.infrastructurist.com/2010/02/22/the-sidewalks-of-today-and-tomorrow-is-concrete-our-only-option (accessed March 13, 2010).

maintained. The PEDS protocol uses the standard of measure of how easily a pedestrian can push a stroller along without it rocking about.[305] "Poor" pedestrian paths disrupt smooth stroller movement and are so damaged that they needs complete replacement.

Scoring justification:
The scoring system naturally goes up in points as the condition improves.

Item B7- Path obstructions- 1 point possible or negative point deductions

Yes	□ -1
No	□ 1

If yes, check all that apply

Poles or signs	□ -1
Parked cars	□ -1
Greenery	□ -1
Garbage cans	□ -1
Pay phones	□ -1
Other	□ -1

How it compares with PEDS:
The phrasing of the item changed from PEDS to ask if there are obstructions or not. If there are no obstructions, the rater checks "no" and moves on to the next item. If there are obstructions, one point is deducted then additional points are subtracted for each type of obstruction. Pay phones were added to the variables list because there are often instances when a pay phone is located near the edge of the sidewalk. If persons were to use the phone, they would block the sidewalk for other pedestrians.

The PEDS protocol directs the rater to only count an obstruction when someone in a wheelchair cannot pass.[306] A stricter standard is employed for the WAI, where anything significantly blocking the sidewalk portion of the path could be counted as an obstruction. For instance, if a bus shelter blocks the main sidewalk, even if there is room to walk around it in the buffer zone, it will still count as an obstruction. Unless the road curves or there is a meandering sidewalk, a person should be able to travel in an unobstructed straight line.[307] Obstructions can be permanent (poles, utility boxes) or temporary (greenery, parked cars).

Scoring justification:
This is the only item that deducts points because obstructions are a negative feature of the pedestrian environment. Obstructions are generally a nuisance for able-bodied persons, creating a situation where they have to walk out into the street or the buffer area to get

[305] Livi and Clifton, "PEDS Audit Protocol," 5.
[306] Ibid, 6.
[307] Mid-America Regional Council, "Creating Walkable Communities."

around them. Obstructions become more of a problem for disabled persons who cannot easily maneuver around the obstruction.

Item B8- Buffers between road and path- 1 point possible with opportunity for bonus points

Are there buffers between the road and path?
No □ 0
Yes □ 1

If yes, check all that apply
Trees □ 2
Fence □ 1
Hedges □ 1
Landscape □ 1
Grass □ 1
Other □ 1

Buffers are the space in the pedestrian right of way between the curb and sidewalk. Sidewalks with buffers are considered detached, since the buffer zone detaches the sidewalk from the street. Sidewalks without buffers are known as monolithic sidewalks, since there is nothing separating the street from the sidewalk. Detached sidewalks are more desirable not only because they provide a space for trees and landscaping, but also because they provide further protection from the roadway.

How it compares with PEDS:
This item follows the administration of PEDS in regard to how it counts trees, where they are only counted if they are consistently present on the street.[308] This is the first item of the audit to include an opportunity to gain bonus points. If there are no buffers, the rater checks "no" and moves on to the next item. If there are buffers, the rater will check "yes" and check all of the bonus variables that apply. Sometimes a sidewalk will have an extra concrete panel in between the main path and curb. This is considered a buffer, even though if there is nothing in it. The reason behind this judgment was that these spaces have the room to be converted into landscaped buffers. In this case or in a case when the landscaped buffer is underutilized with no landscaping or trees, the rater will check "yes", but will not check any of the bonus variables.

Scoring justification:
All buffer variables receive one point, because they help beautify and/or insulate the pedestrian path from the street. Trees are given two bonus points because of its importance to good walking environments. Trees help improve the air quality, aesthetics, and safety of streetscapes, and provide valuable shade and shelter for pedestrians. Trees

[308] Livi and Clifton, "PEDS Audit Protocol," 5.

can also help to slow down vehicular traffic.[309] The simple addition of trees can produce spectacular results, as witnessed by Figure 70 comparing First Street in San José in 1975 to 2006.

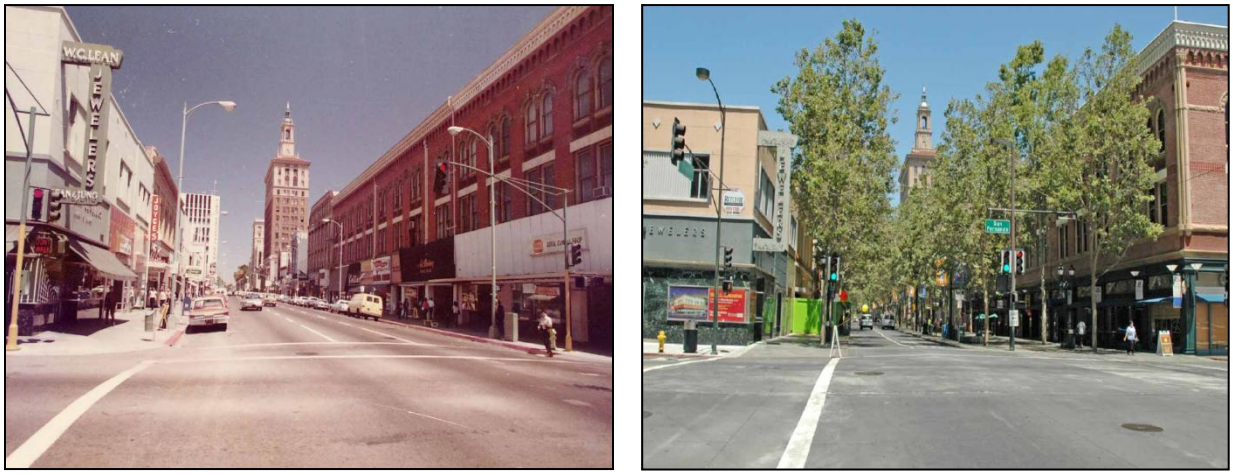

Figure 70. Streetscape comparison before and after trees.
Source: San José Redevelopment Agency, "San Jose '75,"
http://www.sjredevelopment.org/PublicationsPlans/SanJose1975.pdf (accessed March 13, 2010).

Item B9- Path distance from the curb- 2 points possible

At edge	□ 0
1-4 feet	□ 1
More than 5 feet	□ 2

How it compares with PEDS:
This item goes in hand with item B8, buffers. If there are buffers, the response will be either "1-4 feet" or "more than 5 feet." If there are not any buffers, the response for this item will be "at edge." The phrasing of this item differs from PEDS by changing "< 5 feet" to "between 1 and 4 feet" and ">5 feet" to "more than 5 feet." This change was made to speed up the item's administration to avoid confusion in the field that may come from misinterpreting the greater than/less than symbols.

Scoring justification:
Buffers greater five feet get the maximum amount of points because there is more space available for larger shade trees and other landscaping to provide a sense of enclosure and protection from the street. "At edge" distances have no enclosure or protection, and do not receive any points.

[309] Sucher, 85.

Item B10- Sidewalk width- 3 points possible

Less than 4 feet □ 0
Between 4 and 8 feet □ 1
More than 8 feet □ 3

How it compares with PEDS:
The phrasing of this item differs from PEDS by changing "< 4 feet" to "less than 4 feet" and "> 4 feet" to "more than 8 feet" The PEDS protocol states that the rater should use a tape measure to measure the width of the whole right of way, excluding the curb. The rater should use the most common width if the sidewalk width varies.[310] To further clarify, the rater should only measure the width of the path element in the right of way, excluding the buffer zone. Also, the rater is not required to measure every sidewalk. The variables' sidewalk width ranges make it possible for the user to estimate the width and still be able check the accurate response.

Scoring justification:
Most three-variable items in the WAI score according to the "0, 1, 2" scoring pattern—no score for the least desirable variable, one point for an average variable, and two points for the most desirable variable. The most desirable variable for this item is having a sidewalk more than eight feet wide. Three points were given to the variable because sidewalks this wide can accommodate a higher volume of pedestrians and more room for amenities. Sidewalks this wide generally signify the importance of foot traffic along a segment.

Item B11- Is the facility fully or partially ADA accessible? 1 point possible with opportunity for bonus points

No □ 0
Yes □ 1

If yes, check all that apply
Safe curb slope □ 1
Truncated domes □ 1
Perpendicular curbs □ 1
Other □ 1

How it compares with PEDS/Scoring justification:
The PEDS instrument does not specifically address Americans with Disabilities Act (ADA) accessibility. However, it does direct the user to count curb cuts, though it does not specify in the protocol if the rater is supposed to count driveway curb cuts in addition to curb ramps for disabled pedestrians.[311] One would assume not, since PEDS item C20 has the rater count the number of medium to high volume driveways in a segment.

[310] Ibid, 6.
[311] Ibid, 7.

This item was completely reworded to focus exclusively on ADA curb ramps. In the WAI, instead of counting the number of curb ramps, the rater checks whether or not there are curb ramps. If there are, the rater will check any bonus variables that apply. Sometimes the rater will not be able to check any of the variables because the curb ramp does not contain the items that make it fully ADA compliant.

ADA requirements state that accessible curb ramps should have running slopes no greater than 8.33 percent.[312] This is because pedestrians in wheelchairs or pedestrians pushing strollers or carts should be able to travel over the slope without difficulty. Raters are not expected to measure the curb slope, but they should be able to estimate the severity of the slope gradient. Usually, newly installed curb ramps with truncated domes will have "safe" curb slopes. Truncated domes are the detectable warning material installed on curb ramps that let visually impaired persons know when they are at an intersection. Truncated domes are required by federal law to be installed on new curb ramps.[313]

Perpendicular curb ramps are curb ramps on either side of a street corner that align with the crosswalk going in both directions (see Figure 71 below). Perpendicular curb ramps are preferred over diagonal ramps because diagonal ramps often require persons to enter the intersection before they can turn left or right into the crosswalk.[314] Diagonal ramps also do not often align with crosswalks.

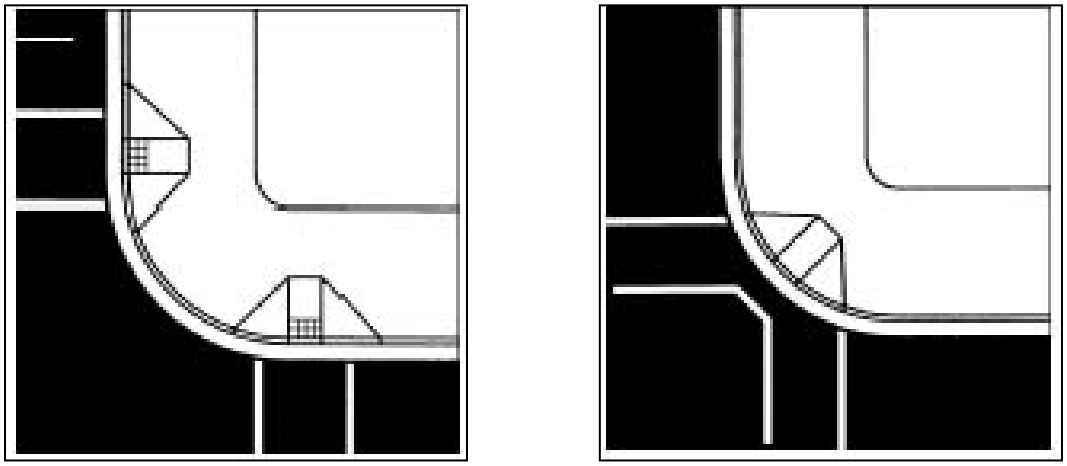

Figure 71. Perpendicular and diagonal curb cut diagrams.
Source: U.S. Department of Transportation, Federal Highway Administration, "Chapter 7. Curb Ramps," http://www.fhwa.dot.gov/environment/sidewalk2/sidewalks207.htm (accessed March 14, 2010).

[312] ADA Home Page, "Curb Ramps and Pedestrian Crossings under Title II of the ADA," U.S. Department of Justice http://www.ada.gov/pcatoolkit/chap6toolkit.htm (accessed November 17, 2009).
[313] U.S. Department of Transportation, Federal Highway Administration, "Detectable Warning Memorandum," http://fhwa.dot.gov/environment/bikeped/dwm.htm (accessed January 27, 2010).
[314] FHWA, "Chapter 7. Curb Ramps," http://www.fhwa.dot.gov/environment/sidewalk2/sidewalks207.htm (accessed March 14, 2010).

Item B12- Sidewalk completeness- 1 point possible

Sidewalk is incomplete □ 0
Sidewalk is complete □ 1

How it compares with PEDS:
The administration of this item follows the PEDS protocol. A sidewalk is considered complete if it is continuous throughout the entire segment. Conversely, if the sidewalk comes to an end within the segment or there are sections missing, then it is considered incomplete.[315] The PEDS protocol does not provide direction in instances when there was a sidewalk on one side but none on the other. In this situation, if the segment is a low volume segment (auditing both sides at once), the rater should check "incomplete." If it is a high volume segment, the rater would only mark "incomplete" on the side where there are gaps in sidewalk continuity.

Scoring justification:
Only one point is assigned to complete sidewalks because there should not be any gaps in sidewalk continuity anyway.

Item B13- How many other sidewalks does the sidewalk connect to? 2 points possible

0-3 □ 0
4 or 5 □ 1
6+ □ 2

How it compares with PEDS:
The wording of this item is completely different than PEDS, but its purpose is still the same: to count how many other sidewalks the street segment connects to. PEDS directs the rater to write in the number of sidewalk connections there are to the street segment, while the WAI directs raters to make one of three selections based on the number of connections there are.

Per the PEDS protocol, the rater is supposed to look in all directions at the beginning and end of the segment and count the number of sidewalks the segment physically connects to.[316] The protocol states that the rater should count sidewalks that are connected by a crosswalk or a stop sign. The rater can count a connection to a sidewalk on a low volume road, even if it does not have a stop sign, as long as they do not count the other side of the same street segment (since raters audit both sides of low volume streets at a time).

[315] Livi and Clifton, "PEDS Audit Protocol," 7.
[316] Ibid, 7.

Crosswalks connecting both sides of the street will only count as a connection for high volume street segments (since the rater has to audit both sides of the street separately).

Usually, a low volume street segment that is bisected by another street will count as a connection for each side of the street segment that is bisected. The rater can count a connection to the street perpendicular to the bisecting street if there is a marked crosswalk (on high volume roads) or if the segment is a low volume road. Any mid-block crossings will count as a connection, even if it is on a low volume street segment.

Since this item is probably the most complicated to assess objectively, examples on the next few pages show how connections are counted.

Figure 72 below shows an instance where a low volume segment is bisected on both sides by another low volume segment and a high volume segment.

Figure 72. Instance in where a low volume segment is bisected by a high volume segment.
Source: Google Inc., Google Earth, version 5.1.3533.1731 (accessed March 14, 2010).

Connection #1 is counted for the sidewalk that begins mid block of the subject segment. Connection #2 is counted for the sidewalks on the north and south sides of the bisecting low volume street. Low volume-low volume intersections only count as one connection because both sides of the two street segments are included. In other words, a pedestrian on the subject street segment can access the sidewalks on the north and south sides of the bisecting street relatively easily without having to cross heavy traffic. Connection #'s 3 and 6 are counted for the sidewalks perpendicular to the bisecting streets. Connection #'s 4 and 5 are similar to connection #2 in that the north and south sides of the bisecting street are counted once. Since this is a high volume road, both sides (east and west) of the bisecting

road are also counted, earning a total of two connections for this high volume bisecting road.

Figure 73 below shows an example of a low volume street segment with three sidewalk connections.

Figure 73. Street segment with 3 sidewalk connections.
Source: Google Inc., Google Earth, version 5.1.3533.1731 (accessed March 14, 2010).

Connection #1 represents the mid-block crosswalk connecting the subject street segment across the bisecting high volume street to the sidewalk on the other side of the same road. Even if this bisecting street was a low volume road, the subject street segment would get credit for the mid-block crossing. Connection #'s 2 and 3 are counted for the sidewalks of the bisecting roads on either side of the street segment.

Figure 74 below shows a low volume street with four sidewalk connections.

Figure 74. Street segment with 4 sidewalk connections.
Source: Google Inc., Google Earth, version 5.1.3533.1731 (accessed March 14, 2010).

Connection #'s 1 and 3 represent the two bisecting low volume streets' sidewalk connections. Connection #'s 2 and 4 are the sidewalk connections across the bisecting low volume streets.

Figure 75 on the next page shows an example of a high volume-high volume street segment intersection with six or more sidewalk connections. Since this high volume street segment is bisected on both sides by high volume street segments, there will be more opportunities for sidewalk connections.

Figure 75. High volume street segment with 9 sidewalk connections.
Source: Google Inc., Google Earth, version 5.1.3533.1731 (accessed March 14, 2010).

Connection #1 shows the connection to the east side of the bisecting street's south side. Connection #'s 2 and 3 are made possible by the crosswalk across the bisecting street. Connection #4 is made from the crosswalk across the subject high volume street segment. Connection #5 is shown twice, since there are two crosswalks across the subject high volume road. This connection would not count if the subject street segment were low volume. Connection #'s 6, 7, 8, and 9 all mirror the connections made on the other side.

Scoring justification:
The WAI scoring system primarily forced the item's verbiage change. It is simpler to pre-assign scores to the number of connections rather than try and figure out how many points a specific number of connections would get. Accordingly, three variable groups were created where the most desirable number of connections receives the maximum number of points. No points are given to segments with zero to three sidewalk connections; one point is given to segments with four or five sidewalk connections; and two points are given to streets with six or more sidewalk connections.

Item C14- Conditions of road- 2 points possible

Under repair	□ 0
Poor (many bumps/cracks/holes)	□ 0
Fair (some bumps/cracks/holes)	□ 1
Good (very few bumps/cracks/holes)	□ 2

How it compares with PEDS:
This item is similar to item B6 (sidewalk condition/maintenance), except that it assesses the state of the roadway. The item also follows the administration of the PEDS protocol. This item may concern drivers and bicyclists more than it does pedestrians. However, a well-maintained road enhances the appearance of a streetscape and gives some impression of a safe street. Per the PEDS protocol, "poor" roads have many potholes, broken asphalt, and the like that could cause damage to vehicles.[317] "Good" roads do not have to have newer asphalt, but they do have to be free of potholes and major cracks that would otherwise cause bumpy driving or bicycling conditions.

Scoring justification:
The best road condition gets the maximum amount of points while the worst does not receive any.

Item C15- Number of lanes (# of lanes for whole street)- 2 points possible

3 or more □ 0
2 or less □ 2

How it compares with PEDS:
As stated in the PEDS protocol, this item counts the number of lanes at the widest point in the street.[318] The phrasing of this item is different from PEDS in that instead of writing in the minimum or maximum number of lanes, the rater counts the number of lanes at the widest point in the road, including the median turning lane, that a pedestrian would have to cross and checks one of the two variables. On-street parking areas and bicycle lanes are not included in this tally.

Scoring justification:
Streets with two or less lanes represent narrow, pedestrian-friendly streets and receive the full two points. Streets with three or more lanes are usually found among wider arterials or streets with higher traffic volume, which are not inviting to pedestrians.

Item C16- Speed limit (posted or estimated)- 2 points possible

More than 25 mph □ 0
25 mph or less □ 2

How it compares with PEDS:
This item differs from PEDS in that the rater checks one of the two above options instead of writing in the posted speed limit. Contrary to the PEDS protocol, the rater fills out this item regardless of whether or not there is a speed limit sign on the segment. The PEDS protocol guides raters to check "none posted" if there is not a speed limit sign within the segment.[319]

[317] Ibid, 8.
[318] Ibid.
[319] Ibid.

While there are not speed limit signs posted on each street, drivers should be able to tell what the speed limit is based on the area. Business, residential districts, and school zones are almost always 25 mph or less,[320] and multi-lane roads are usually more than 25 mph.

Scoring justification:
25 mph or less speed limits are worth two points because they make it safer to walk and cross the street by slowing vehicles to allow adequate reaction time to pedestrians in the street.[321] Speeds above 25 mph indicate higher volume roads or roads where traffic circulation was considered more important than a pleasant walking environment.

Item C17- On-street parking- 2 points possible

None □ 0
Parallel or diagonal □ 2

How it compares with PEDS:
The administration of this item follows the PEDS protocol. Parallel or diagonal parking counts when it is marked on the street, there are cars parked, if there are signs that allow parking, and/or if there are not any signs restricting parking.[322]

Scoring justification:
Parallel or diagonal parking earns two points because on-street parking can serve as a traffic calming device and an additional buffer between the street and sidewalk. Furthermore, parallel parking narrows the crossing width for pedestrians and encourages businesses/property owners to locate their building entrances near the sidewalk.[323] Like trees, diagonal parking provides the visual enclosure that naturally induces drivers to slow down.

Item C18- Off-street parking lot spaces- 2 points possible

6+ □ 0
0-5 □ 2

How it compares with PEDS:
This item was modified from PEDS by reducing the number of variables from three to two. This change was made to simplify the administration and reduce the amount of time counting parking spaces. The 6+ threshold came from the "6-25 spaces" variable in PEDS. It was thought that once there are more than six spaces, the better the likelihood that there will be many more.

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[320] California Department of Motor Vehicles, "California Driver Handbook: Speed Limits," http://www.dmv.ca.gov/pubs/hdbk/speed_limits.htm (accessed March 14, 2010).
[321] LaPlante, "Retrofitting Urban Arterials."
[322] Livi and Clifton, "PEDS Audit Protocol," 8.
[323] Walkinginfo.org, "On-Street Parking Enhancements," http://www.walkinginfo.org/engineering/parking.cfm (accessed March 14, 2010).

According to the PEDS protocol, off-street parking spaces are only counted for surface lots visible from the right of way. Parking spaces behind buildings do not count, not only because they are invisible from the sidewalk, but also because it is ideal to have parking lots behind buildings.[324] Although it was not specified in the protocol, parking spaces in garages or structures are not counted. Neither are uncovered driveways or covered garages on single-family homes.

Scoring justification:
Street segments with zero to five spaces get two points because they suggest a more pedestrian-oriented street with minimal emphasis on off-street parking.

Item C19- Walk through a parking lot to get to most buildings? 3 points possible

Yes □ 0
No □ 3

How it compares with PEDS:
This item follows the same administration as its counterpart in the PEDS protocol. If there is a surface lot separating the sidewalk from most building entrances, the rater would check "yes."

Scoring justification:
Checking "no" will earn the street segment three points because it suggests an environment where buildings are near the edge of the sidewalk or connected with walkways to the front entrance. This also suggests building enclosure and an emphasis on easy pedestrian access.

Item C20- Presence of medium to high volume driveways- 2 points possible

3 or more □ 0
0-2 □ 2

How it compares with PEDS:
This item was modified from PEDS by changing the variable value and reducing the number of variables from three to two. But it follows the administration as stated in the PEDS protocol where, "high-medium volume driveways are driveways that often have cars pulling in and out, like commercial driveways or driveways of apartment buildings. Single-family residential driveways are low volume and should not be counted here."[325]

Scoring justification:
Three or more medium to high volume driveways within a segment increase the likelihood of auto-pedestrian conflicts. These types of driveways interrupt pedestrian flow and often create situations where motorists are not looking for pedestrians when entering or exiting

[324] Livi and Clifton, "PEDS Audit Protocol," 9.
[325] Ibid.

a driveway. The optimal number is zero, but this item allows for up to two driveways in order to get the maximum amount of points.

Item C21- Traffic control devices- 1 point possible with opportunity for bonus points

No □ 0
Yes □ 1

If yes, check all that apply

Traffic circle	□ 2
Speed bumps	□ 2
Chicanes or chokers	□ 2
Raised crosswalk	□ 2
Traffic light	□ 1
Stop sign	□ 1
Median	□ 1
Other	□ 1

How it compares with PEDS:
The wording of this item is similar to the verbiage modifications made in items B7 and B8 (obstructions and buffers, respectively) in that it asks if there are traffic control devices or not. If there are, the rater checks "yes" and checks all the bonus variables that apply.

The PEDS protocol directs raters to disregard traffic control devices that are not within the segment.[326] However, traffic lights are often physically located on the next street segment over, but they still control traffic on the segment. In the WAI, "off-segment" traffic lights count if they directed towards controlling traffic on the segment. Two bonus variables were added to this item—medians and raised crosswalks. Pedestrian refuge spaces (with pedestrian signals) on medians are included as a bonus variable on item C23.

Scoring justification:
Traffic circles, speed bumps, chicanes or chokers, and raised crosswalks receive two bonus points because they are significant infrastructure investments for the pedestrian environment. They are also effective in their purpose to calm vehicular traffic.[327] Traffic lights and stop signs are more common and expected at intersections, thus they receive one bonus point.

[326] Ibid.
[327] Reid Ewing, "Impacts of Traffic Calming," *Transportation Quarterly* 55, no. 1 (Winter 2001).

Item C22- Marked crosswalks- 2 points possible

None □ 0
1-3 □ 1
4 or more □ 2

How it compares with PEDS:
This item was modified from PEDS by changing the variable value and reducing the number of variables from four to three. Per the PEDS protocol, crosswalks are only counted if they are marked parallel on the street.[328] Any crosswalk that touches the segment is counted.

Scoring justification:
Four or more crosswalks signify an intersection where pedestrians can cross safely on all sides, and receive the maximum points because it enhances crossing safety.

Item C23- Crossing Aids- 1 point possible with opportunity for bonus points

Are there crossing aids?
No □ 0
Yes □ 1

If yes, check all that apply
Curb extension □ 2
Pedestrian signal □ 1
Audible/visual countdown □ 1
Yield to pedestrian paddles □ 1
Overpass/underpass □ 1
Pedestrian xing warning sign □ 1
Flashing warning sign □ 1
Share the road sign □ 1
Refuge/traffic islands □ 1
Other □ 1

How it compares with PEDS:
The layout of this item is similar to item C21 (traffic control devices). If there are crossing aids, the rater will check "yes" and all the bonus variables that apply to the street segment. Regular intersection crosswalks are not counted in this item because item C22 already addresses them. However, mid block crossings should be counted as "other." A future revision to the WAI will add the mid-block crossing variable.

The bonus variables capture all of the crossing aids listed in PEDS, with the exception of "median/traffic islands," which was moved to item C21. The reason for this was that medians do not always have space for pedestrian crossing refuges, but they can help to

[328] Livi and Clifton, "PEDS Audit Protocol," 10.

slow down traffic. "Refuge/traffic islands" was added to the bonus variables to account for the curbed spaces in the roadway for pedestrians to wait to cross. These can either take the form of median islands or "pork chop" islands, which are the raised concrete areas in front of channelized right turn lanes.[329]

"Audible/visual countdowns" were another bonus variable added, representing the beeping noise and numeric countdown that can be installed on pedestrian signals. In hindsight, these two should have been separated into two bonus variables, perhaps worth 0.5 points each, because there were many instances when the two were not present at the same time.

Scoring justification:
All of the variables are worth one point each, with the exception of "curb extension." Curb extensions are worth two points because they demonstrate a significant infrastructure investment to calm traffic turning around corners, regain the pedestrian right of way, and shorten the crossing distance. PEDS' pedestrian markings variable was inadvertently removed from the WAI, however, during the audit, different colored or opaquely striped crosswalks were counted under "other."

Item C24- Bicycle facilities- 1 point possible with opportunity for bonus points

Are there bicycle facilities?
No □ 0
Yes □ 1

Check all that apply

Segregated bike lane	□ 2
Striped bike lane	□ 1
Bike parking	□ 1
Bike crossing warning	□ 1
Bike route sign	□ 1
Other	□ 1

An element of the segment's bikeability is accounted for in this item. This item relates to the pedestrian environment because streets with bicycle infrastructure are often more accommodating for non-motorists, including pedestrians.

How it compares with PEDS:
The wording of this item was modified to ask if there are bicycle facilities or not. If there are, the rater checks "yes" and all the bonus variables that apply.

[329] Metropolitan Transportation Commission, "Safety Toolbox: Engineering- Pedestrian Refuge Island," http://www.mtc.ca.gov/planning/bicyclespedestrians/tools/pedrefugeisland/index.htm (accessed February 12, 2010).

Scoring justification:
Almost all of the bonus variables are worth one point. Segregated bike lanes are worth two points because they represent a considerable infrastructure investment to further protect bicyclists through physical barriers between the road and bike lane.

Item D25- Roadway/pathway lighting- 3 points possible

Check all that apply

No lighting	□ 0
Other lighting from buildings etc.	□ 0.5
Road-oriented lighting	□ 0.5
Pedestrian-scale lighting	□ 2

Of course, an accurate assessment of the segment's lighting would take place at night; however this item only asks for the type of lighting on the street, not its condition.

How it compares with PEDS:
The phrasing of this item mirrors its PEDS counterpart, and the variable's definitions are the same as in the PEDS protocol.[330] Lighting types were checked even if there were only one or two light poles on the segment, which may not illuminate it well at night.

Scoring justification:
Pedestrian scale lighting fixtures are worth the most points because they illuminate the pedestrian path in an aesthetically pleasing manner. Road-oriented lighting and lighting from nearby buildings can incidentally illuminate the pedestrian path, but their main purpose is to illuminate the road or building features. A segment with a mix of all lighting types will obtain the maximum amount of points possible.

Item D26- Amenities- 1 point possible with opportunity for bonus points

Are there any amenities/street furniture?

No	□ 0
Yes	□ 1

If yes, check all that apply

Public art	□ 2
Benches (non-transit)	□ 1
Places to sit (non-restaurant)	□ 1
Outdoor restaurant seating	□ 1
Public restrooms	□ 1
Pedestrian-oriented signage	□ 1
Public garbage cans	□ 0.5
Water fountain	□ 0.5

[330] Livi and Clifton, "PEDS Audit Protocol," 11.

Vendors/vending machines	□ 0.5
Bollards	□ 0.5
Other	□ 1

How it compares with PEDS:
This item was modified from PEDS to ask if there are amenities or not. Additional amenity variables were also added. The PEDS protocol stipulates that all countable amenities must be for public use, and visible and accessible from the pedestrian path.[331]

The similar bonus variables "benches (non-transit)," "places to sit (non-restaurant)," and "outdoor restaurant seating" may cause some confusion. To clarify, the rater should count any bench along the path (not transit benches, which are included in item C35). Non-restaurant places to sit are raised planters or other hardscape features that allow enough room for pedestrians to sit on them. Outdoor restaurant seating is seating placed by the restaurant adjacent to the business. Outdoor seating could also be an obstruction if poorly placed in the pedestrian path area.

In retrospect, the pedestrian-oriented signage bonus variable addition should be removed. Pedestrian-oriented signage includes temporary a-frame signs and perpendicular blade signs, but it could be unclear to the rater as to what signs would count. Along the same line, some pedestrian-oriented signage, such as temporary a-frame signs, can be unattractive and possibly obstruct the sidewalk.

Street vendors/vending machines are defined in PEDS as inclusive of food dispensary machines, newspaper racks, pay phones, and mailboxes.[332] Pay phones and mailboxes were removed from the WAI definition because they do little to enhance the pedestrian environment. Mailboxes are found just about everywhere and in the age of cellular phones, pay phones are mainly problematic due to their association with narcotics-related crime and loitering. Plus, as referred to in item B7 (path obstructions), if the pay phone is located up to the edge of the sidewalk, it can create a situation where the sidewalk is obstructed by persons using the phone.

Scoring justification:
More weight is given to variables that usually generate more foot traffic. Streets with public art and places to sit or rest are more attractive to walk down than streets with just vending machines and public garbage cans.

Item D27- Are there wayfinding aids (street signs, maps)? 2 points possible

No	□ 0
Yes	□ 2

[331] Ibid.
[332] Ibid.

How it compares with PEDS:
The administration of this item follows the PEDS protocol. Wayfinding aids are defined in the PEDS protocol as street signs that are visible from the right-of-way, regardless if they are on the segment or not.[333]

Scoring justification:
It is better to have wayfinding aids that tell you what street you are on than none at all. However it might be hard to tell where you are geographically just by looking at the street signs, especially if you are on a lesser-known street. With that being said, "wayfinding aids" should be redefined in a future WAI revision to only include maps or directional signs (such as "business district ahead") or at least reduce the number of points possible to 0.5 points for segments that have street signs. Street signs are present on virtually every street, and do little to enhance walkability.

Item D28- Number of trees along walking area- 2 points possible

None of very few	□ 0
Some	□ 1
Many/dense	□ 2

How it compares with PEDS:
The variables in this item are the same as in PEDS. The PEDS protocol defines "some" as trees shading 25 to 75 percent of the path and "many/dense" as trees shading more than 75 percent of the path.[334] However, during fall and winter, it could be difficult to gauge whether or not a tree actually shades the path. For maximum clarity, the word "shading" was changed to "along" in the item's title. This will inform the rater to count trees along the path regardless if they are shading it or not. This modification will allow densely planted young trees to count towards "Many/dense", even though they are not mature enough yet to provide shade.

Scoring justification:
Segments that are densely planted with trees are more beneficial and attractive than those with none or very few.

Item D29- Degree of enclosure- 2 points possible

Little or no enclosure	□ 0
Some enclosure	□ 1
Highly enclosed	□ 2

Of the "objective" items, this item, along with item D32 (articulation in building design) are probably the most subjective items of the audit. Due to its subjectivity, the results of this

[333] Ibid.
[334] Ibid.

item may not be consistent if there are multiple raters. Clifton et al. observed that objective items like this consistently garnered unreliable Kappa scores among groups of raters.[335] Notwithstanding the subjectivity, the PEDS protocol gives good directions as to how to administer this item.

How it compares to PEDS:
The administration of this item follows the PEDS protocol. Essentially, the buffer landscaping and building orientation define the segment's enclosure.[336] If there is mostly empty space within the pedestrian's peripheral vision, there is "Little or no enclosure." If there is a dense canopy of trees, but the building is somewhat setback from the sidewalk or vice versa, then the rater may check "Some enclosure." To qualify as highly enclosed, the PEDS protocol states that, "the buildings lining the street are within 10 feet of the sidewalk and there is a cross-sectional design ratio of approximately one (height) to two (width) or less.[337] However, it may be easier to use the rule if the buildings are close to the sidewalk and there is dense tree cover, then it could qualify as "Highly enclosed."

Scoring justification:
Highly enclosed street segments cater more closely pedestrians by having convenient building access and shade/security from the street. Streets with little to no enclosure are not pleasurable to walk through, thereby not worth any points.

Item D30- Power lines along segment- 1 points possible

High/low distribution line □ 0
None □ 1

How it compares to PEDS:
This item was modified from PEDS by reducing the number of variables from three to two. PEDS separated low voltage/distribution lines from high voltage/transmission lines, but they are grouped together in the WAI because raters might not know the difference. Moreover, power lines are power lines, and one type does not usually look better than the other.

Scoring justification:
As in item D27 (wayfinding aids), it is uncertain how much this variable impacts walkability. Only one point is allocated to a "none" response. Power lines can be aesthetically unpleasing, but they also are common in older, established neighborhoods that may be more walkable than newer neighborhoods with underground utilities. But based solely on aesthetics, it is fair to say that a street without power lines looks more attractive.

[335] Clifton et al., "The Development and Testing," 104.
[336] Livi and Clifton, "PEDS Audit Protocol," 11.
[337] Ibid.

Item D31- Overall cleanliness and building maintenance- 2 points possible

Poor (much litter/graffiti/broken facilities) □ 0
Fair (some litter/graffiti/broken facilities) □ 1
Good (no litter/graffiti/broken facilities) □ 2

How it compares to PEDS/scoring justification:
While item B6 (path condition) assesses the physical maintenance of the sidewalk, this item acts as a catch-all for the overall cleanliness and appearance of the segment. This can also be a subjective question, but most of the time it is easy to judge the overall cleanliness. For instance, a segment covered with litter and other incivilities, containing dirty buildings and weeds would qualify as "poor." Alternatively, if the buildings are clean, the landscaping is maintained, and the outside environment is not a mess, it would be sensible to mark "good."

Item D32- Articulation in building designs- 2 points possible

Little or no articulation □ 0
Some articulation □ 1
Highly articulated □ 2

How it compares with PEDS:
Building articulation roughly refers to the amount of architectural detail on the façade of a building. If the façade is a blank wall, it is considered "unarticulated." On the other hand, if a building façade is embellished with architectural features and fenestrated with well-defined window openings, it can be considered articulated. There is no change to the variables in this item from PEDS. The PEDS protocol defines "little or no articulation" as simple (Figure 76); "some articulation" as "not very ornate" (Figure 77); and "highly articulated" as "complex" (Figure 78).[338] More often than not, only a few buildings within a street segment will be highly articulated, while the rest are not. The WAI proposes that the rater would only check the variable that represents at least 50 percent of the buildings on the segment.

Scoring justification:
Highly articulated buildings spark visual interest and are meant to be admired by pedestrians, thereby being worth the most points.

[338] Ibid, 12.

Figure 76. Building with "little to no articulation."

Figure 77. Building with "some articulation."

Figure 78. "Highly articulated" building.

Item D33- Building setbacks from sidewalk- 2 points possible

More than 10 feet from sidewalk □ 0
Within 10 feet of sidewalk □ 1
At edge of sidewalk □ 2

How it compares with PEDS:
The variables were modified from PEDS to set a more stringent setback requirement. PEDS' variables are "within 20 feet of sidewalk" and "more than 20 feet from sidewalk." The WAI reduces them to 10 feet and adds a middle variable. In hindsight, this number should have been changed to 15 feet, as more segments would get a point for being within 15 feet of the sidewalk. Not many properties are within 10 feet except for the ones that are located at the edge of the sidewalk.

Scoring justification:
It is desirable to have buildings at the edge of the sidewalk since they are the most accessible to pedestrians, thereby being worth the most points. Buildings far away from the sidewalk more often than not have a parking lot in front of it. Buildings more than 10 feet away can indicate the standard 20 foot setback suburban-style single family home.

Item D34- Building height- 1 point possible

1 story	□ 0
2-4 stories	□ 1
5+ stories	□ 1

How it compares with PEDS:
The variables in this item were modified from PEDS to quantify building heights. PEDS' variables are "short", "medium", and "tall." In the protocol, "short" buildings are one to two stories; "medium" buildings have three to five stories; and "tall" buildings have more than five stories.[339] Usually, stories can be estimated by counting each row of windows on the building. If the segment has more than one type of building height, the most prominent type is selected.

It is not known whether taller buildings make a street segment more walkable. Taller buildings do indicate density, but on the other hand, they can also include monolithic high-rise office buildings. One-story buildings can be good and bad for walkability. They are good in that retail buildings are usually one story. Conversely, they are bad in that single family housing, big box, and auto-serving commercial uses are one story.

Scoring justification:
The one story variable is not worth any points since they include the most unwalkable uses.

Item D35- Bus stops- 2 points possible with opportunity for bonus points if multiple bus stops

Check all that apply

No bus stop	□ 0
Bus stop with signage only	□ 0.5
Bus stop with bench	□ 0.5
Bus stop with shelter	□ 2

How it compares with PEDS:
The variables in this item are the same as in PEDS. Bus stops with signage only are just that, no bench or any shelter area, just a sign. Bus stops with shelters feature an overhang above the waiting benches.

[339] Ibid, 12.

Scoring justification:
Bus stops with shelters are worth the most points because they provide protection from the elements and often feature route maps for wayfinding. They are also usually located in areas where several bus lines converge. In hindsight, more points should have been allocated to bus stops with benches; however, a provision was made to count bus stop variables twice if there are more than one within a street segment. For instance, if there are two bus stops with benches on the segment, the rater would assign one point for the item (0.5+0.5), plus points if there are any other types of bus stops within the segment.

Subjective assessment of the segment- 15 points possible

Enter 0-3; 0= Strongly disagree, 3= Strongly agree

…is attractive for walking	□ 0-3
…is attractive for cycling	□ 0-3
…feels safe for walking	□ 0-3
...feels safe for cycling	□ 0-3
…is accessible for pedestrians/cyclists	□ 0-3

How it compares with PEDS:
The last section of the audit allows the rater to rate the segment in a Likert scale-format based on their perceptions. This item adds the variable "…is accessible for pedestrians/cyclists" to assess how well a pedestrian/cyclist can pass along the street. The rater should question whether there appears to be room and/or dedicated space for a bicyclist to ride on the street. They should also consider whether disabled pedestrians can traverse the sidewalk without difficulty. Obstructions and poor or nonexistent ADA access will likely lower this rating. On the other hand, ADA compliant curb ramps, wider sidewalks, and room to ride a bicycle free of the "door zone" will likely increase the rating.

The other assessments follow the PEDS protocol. If the segment is considered by the rater to be "attractive", he/she should want to walk/bike this segment. If the rater thinks it is "safe," he/she should feel safe from auto traffic, road and sidewalk hazards, and crime. If the rater thinks it is "safe" for bicyclists, they should take into consideration adequate bicycling space and slower traffic.[340] Scores of three should only occur when the speed is 25 mph or less and there are bike lanes present.

Scoring justification:
The section is worth 15 points, five less than the 20 points allotted to sections A-D, because of its subjectivity; however each question carries considerable weight. The purpose of this section is to help even out any discrepancies in the previous sections. In other words, if the rater feels that a street is walkable even though it scored low on the objective sections, this is the area where they can give it high marks. Alternatively, if a segment scores high on the objective sections, but the rater feels that the walkability is poor, then they can rate the subjective questions lower.

[340] Ibid, 13.

Appendix B: Complete Segment Scores

Table 11. FWBT Audit Results by Segment

Segment Number	Street Segment	Total Score	Rating
1	N/S Julian w/o 24th St	44.5	Poor
2	Peruka Pl	49.5	Poor
3	N/S Julian b/w Peruka & 26th	39.5	Poor
4	26th n/o Julian St	58.5	Poor
5	26th n/o Tripp	60.5	Fair
6	Tripp	52.5	Poor
7	Wooster n/o Tripp	42.5	Poor
8	Wooster s/o Tripp	28.5	Poor
9	N/S Julian b/w 26th & Wooster	29.5	Poor
10	N/S Julian b/w Wooster & West	37.5	Poor
11	N/S Julian b/w East & West Ct	42	Poor
12	East Ct	43.5	Poor
13	West Ct	57.5	Poor
14	N/S Julian w/o 101	30.5	Poor
15	28th s/o Julian	35.5	Poor
16	S/S Julian b/w 27th & 28th	34.5	Poor
17	27th s/o Julian	48.5	Poor
18	S/S Julian b/w 26th & 27th	23	Poor
19	26th s/o Julian	57.5	Poor
20	S/S Julian b/w 25th & 26th	27.5	Poor
21	25th s/o Julian	61.5	Fair
22	S/S Julian b/w 24th & 25th	39.5	Poor
23	24th s/o Julian	60	Fair
24	S/S Julian b/w Coyote Creek & 24th	41.5	Poor
25	St James b/w 24th & 26th	65.5	Fair
26	St James b/w 26th & 27th	52.5	Poor
27	28th b/w St James & St John	24.5	Poor
28	St John b/w 26th & 27th	53.5	Poor
29	St John b/w 24th & 26th	60.5	Fair
30	24th b/w St James & St John	57.5	Poor
31	25th b/w St John & St James	55.5	Poor
32	26th b/w St James & St John	64.5	Fair
33	27th b/w St James & St John	54.5	Poor
34	27th b/w Santa Clara & St John	52.5	Poor
35	N/S Santa Clara b/w 27th & 28th	56.5	Poor
36	28th b/w Five Wounds Ln & Santa Clara	48.5	Poor
37	N/S Santa Clara b/w 28th & 101	62	Fair
38	N/S Santa Clara b/w 26th & 27th	67	Fair
39	26th b/w St John & Santa Clara	61.5	Fair
40	25th b/w St John & Santa Clara	62.5	Fair
41	N/S Santa Clara b/w 26th & 25th	74	Good

Segment Number	Street Segment	Total Score	Rating
42	N/S Santa Clara b/w 24th & 25th	69	Fair
43	24th b/w St John & Santa Clara	60.5	Fair
44	N/S Santa Clara b/w 19th & 21st	66.5	Fair
45	N 21st St N/O Santa Clara St	70	Fair
46	N/S Santa Clara b/w Coyote Creek & 21st St	67.5	Fair
47	S/S Santa Clara b/w 19th & Coyote Creek	69	Fair
48	Calhoun St	58.5	Poor
49	S 19th s/o Santa Clara	76	Good
50	S/S Santa Clara b/w 19th & 20th	60.5	Fair
51	20th s/o Santa Clara St	72.5	Fair
52	S/S Santa Clara b/w 20th & 21st	67	Fair
53	S. 21st s/o Santa Clara	75.5	Good
54	S/S Santa Clara b/w 21st & 22nd	67	Fair
55	S 22nd s/o Santa Clara	71.5	Fair
56	S/S Santa Clara b/w 22nd & 23rd	62.5	Fair
57	23rd s/o Santa Clara	75	Good
58	S/S Santa Clara b/w 23rd & 24th	76	Good
59	W/S 24th b/w Santa Clara & S. Fernando	62.5	Fair
60	E/S 24th b/w Shortridge & Santa Clara	53.5	Poor
61	S/S Santa Clara b/w 24th & 26th	76.5	Good
62	S/S Santa Clara b/w 26th & 28th	57.5	Poor
63	S/S Santa Clara b/w 28th & 101	64.5	Fair
64	30th b/w Santa Clara & San Fernando	58.5	Poor
65	Shortridge b/w 28th & 30th	64.5	Fair
66	Shortridge b/w 26th & 27th	50.5	Poor
67	Shortridge b/w 24th & 26th	55.5	Poor
68	E/S 24th b/w Shortridge and S. Fernando	49.5	Poor
69	San Fernando b/w 24th & 26th	56.5	Poor
70	26th b/w Santa Clara & San Fernando	59.5	Poor
71	28th b/w San Fernando b/w Santa Clara	63.5	Fair
72	San Fernando b/w 28th & 30th	56.5	Poor
73	San Fernando b/w 28th & 26th	62.5	Fair
74	E/S 24th b/w Whitton & San Fernando	44	Poor
75	Whitton b/w 24th & 26th	55.5	Poor
76	Whitton b/w 26th & 28th	50.5	Poor
77	Whitton b/w 28th & 30th	63.5	Fair
78	30th b/w San Fernando & San Antonio	58.5	Poor
79	San Antonio b/w 28th & 30th	61.5	Fair
80	28th b/w San Fernando & San Antonio	63.5	Fair
81	N/S San Antonio b/w 26th & 28th	48	Poor

Segment Number	Street Segment	Total Score	Rating
82	26th b/w San Fernando & San Antonio	50.5	Poor
83	N/S San Antonio b/w 24th & 26th	55	Poor
84	E/S 24th b/w San Antonio & Whitton	50	Poor
85	S/S San Antonio b/w 24th & Bonita	43.5	Poor
86	San Antonio Overpass @ 101	29.5	Poor
87	Bonita b/w San Antonio b/w Peach	53.5	Poor
88	Peach Ct	49.5	Poor
89	E/S 24th b/w Peach & San Antonio	45	Poor
90	E/S 24th b/w William & Peach	34.5	Poor
91	William b/w Bonita & 24th	61.5	Fair
92	Bonita b/w Peach & William	54.5	Poor
93	Bonita b/w William & Sunny	68.5	Fair
94	Sunny Ct	67.5	Fair
95	E/S McLaughlin b/w Sunny & William	56.5	Poor
96	E/S McLaughlin b/w Sunny & Appian	51.5	Poor
97	Spiro/Siler	54.5	Poor
98	Bonita b/w Sunny & Danube	51.5	Poor
99	Bonita b/w Danube & Herald	48.5	Poor
100	Herald b/w Banff & Bonita	40.5	Poor
101	Remo St	33.5	Poor
102	Banff	42.5	Poor
103	Jasper Ln	39.5	Poor
104	Lotus	37.5	Poor
105	Herald b/w Lotus & Banff	46.5	Poor
106	E/S McLaughlin b/w Appian & 280	50.5	Poor
107	W/S McLaughlin b/w Melbourne & 280	50.5	Poor
108	Melbourne b/w McLaughlin & Mercedes	55.5	Poor
109	Melanie Ct	50.5	Poor
110	Mercedes Ave	53.5	Poor
111	Melbourne b/w Mercedes & Forestdale	53.5	Poor
112	Kaufman Ct	48.5	Poor
113	Dorrie Ave	49.5	Poor
114	Jeanne s/o Melbourne	51.5	Poor
115	Jeanne e/o Forestdale	51.5	Poor
116	Forestdale	59.5	Poor
117	Appian b/w McLaughlin & Mercedes	64.5	Fair
118	W/S McLaughlin b/w Appian & Melbourn	62.5	Fair
119	W/S McLaughlin b/w Sunny & Appian	49	Poor
120	W/S McLaughlin b/w William & Sunny	39.5	Poor
121	William b/w 21st & 24th	73.5	Fair
122	22nd s/o William	70.5	Fair
123	Woodborough Pl s/o Woodborough Ct	71.5	Fair
124	Woodborough b/w 21st & Woodborough	66.5	Fair
125	21st b/w 19th & William	72.5	Fair
126	William b/w 19th & 21st	78	Good
127	William b/w 19th & Coyote Creek	83.5	Good

Segment Number	Street Segment	Total Score	Rating
128	Brookwood n/o William	60.5	Fair
129	18th b/w William & Brookwood	72	Fair
130	19th b/w Brookwood & William	60.5	Fair
131	20th b/w William & Brookwood	60.5	Fair
132	21st b/w William & Brookwood	62.5	Fair
133	22nd b/w Brookwood & William	62.5	Fair
134	23rd b/w San Antonio & William	55.5	Poor
135	W/S 24th b/w San Antonio & William	52	Poor
136	San Antonio b/w 22nd & 24th	77.5	Good
137	San Antonio b/w 20th & 22nd	67.5	Fair
138	San Antonio b/w Coyote Creek & 20th	69.5	Fair
139	18th b/w Brookwood & San Antonio	69.5	Fair
140	19th b/w Brookwood & San Antonio	64.5	Fair
141	20th b/w Brookwood & San Antonio	68.5	Fair
142	21st b/w San Antonio & Brookwood	66.5	Fair
143	22nd b/w San Antonio & Brookwood	70.5	Fair
144	W/S 24th b/w San Antonio & San Fernando	55.5	Poor
145	San Fernando b/w 21st & 24th	67.5	Fair
146	San Fernando b/w 19th & 21st	70.5	Fair
147	19th b/w San Antonio & San Fernando	66.5	Fair
148	20th b/w San Fernando & San Antonio	67.5	Fair
149	21st b/w San Antonio & San Fernando	63.5	Fair
150	22nd b/w San Fernando & San Antonio	66.5	Fair
151	23rd b/w San Fernando & San Antonio	67.5	Fair
152	N/S McKee b/w 101 & 33rd	38.5	Poor
153	33rd b/w Julian & Berrywood	51.5	Poor
154	33rd b/w Berrywood & Melody	60.5	Fair
155	Marburg Wy	49.5	Poor
156	Melody Ln	50.5	Poor
157	Berrywood	55.5	Poor
158	Royce Dr	52.5	Poor
159	Ann Darling n/o Berrywood	53.5	Poor
160	Ann Darling b/w Berrywood & McKee	39.5	Poor
161	W/S McKee b/w Ann Darling & 33rd	40	Poor
162	N/S McKee b/w Ann Darling & King	37	Poor
163	S/S McKee b/w King & McDonald	31.5	Poor
164	S/S McKee b/w McDonald & 34th	28.5	Poor
165	S/S McKee b/w 34th & 33rd	42	Poor
166	33rd b/w McKee & St. James	55.5	Poor

Segment Number	Street Segment	Total Score	Rating
167	34th b/w McKee & St. James	61.5	Fair
168	McDonald b/w McKee & St. James	58.5	Poor
169	W/S King b/w McKee & St. James	46	Poor
170	St James b/w King & 34th	55.5	Poor
171	St James b/w 34th & 31st	46.5	Poor
172	31st St n/o St. James	45.5	Poor
173	31st St s/o St James	60.5	Fair
174	Mt. Hamilton View Dr	56.5	Poor
175	31st St s/o Mt Hamilton View Dr	60.5	Fair
176	32nd St	52.5	Poor
177	St John b/w 31st & 33rd	52.5	Poor
178	33rd b/w St James & Alum Rock	61.5	Fair
179	Eastwood Ct	42.5	Poor
180	34th b/w Alum Rock & St James	56	Poor
181	W/S King b/w Wilshire & St. James	49.5	Poor
182	W/S King b/w Alum Rock & Wilshire	39.5	Poor
183	N/S Alum Rock b/w 34th & King	53	Poor
184	N/S Alum Rock b/w 33rd & 34th	76.5	Good
185	N/S Alum Rock b/w 33rd & 101	53	Poor
186	S/S McKee b/w 33rd & 101	32.5	Poor
187	McKee Overpass @ 101	28.5	Poor
188	Perry Ct	55.5	Poor
189	S/S Julian w/o 101	33.5	Poor
190	Santa Clara on 101 overpass	31.5	Poor
191	Five Wounds Ln	37.5	Poor
192	Kelly Ct	57.5	Poor
193	Woodfalls Ct	60.5	Fair
194	Woodvale Ct	58.5	Poor
195	Brookwood b/w 19th & 22nd	42.5	Poor
196	19th s/o William	69.5	Fair

Table 12. WE Audit Results by Segment

Segment Number	Street Segment	Total Score	Rating
1	W/S Lanai b/w Waverly & Tolbert	49.5	Poor
2	Tolbert b/w Denali & Lanai	48.5	Poor
3	Tolbert Court	42.5	Poor
4	Denali b/w Tolbert & Lanai	40.5	Poor
5	Lanai b/w Denali & Tully	49	Poor
6	Tully b/w US 101 & Lanai	40.5	Poor
7	Lanai b/w Denali & Tolbert	45.5	Poor
8	Honeysuckle b/w Lanai & Tampa	57.5	Poor
9	Tampa b/w Seminole and Waverly	51.5	Poor
10	Tampa Ct	47.5	Poor
11	Bluebell b/w Honeysuckle and Dixie	56.5	Poor
12	Dixie b/w Lanai & Seacliff	58.5	Poor
13	N/S Tully b/w Seacliff & Lanai	42.5	Poor
14	N/S Tully b/w King & Seacliff	38	Poor
15	Seacliff b/w Tully and Seminole	38	Poor
16	Seminole b/w Seacliff & King	55.5	Poor
17	W/S King b/w Waverly & Seminole	52	Poor
18	E/S King b/w Tully & Waverly	55	Poor
19	Tully b/w King & Huran	37.5	Poor
20	Huran b/w Clarice & Waverly	61.5	Fair
21	Clarice b/w Orlando & Huran	59	Poor
22	Palmira b/w Clarice and Orlando	60.5	Fair
23	Orlando b/w Waverly & Clarice	57.5	Poor
24	Tully b/w Huran & Kenesta	37.5	Poor
25	Clarice b/w Quimby & Huran	47.5	Poor
26	Tully b/w Quimby and Kenesta	37.5	Poor
27	S/S Tully b/w Quimby and Brahams	47.5	Poor
28	Brahms b/w Tully & Edgebank	55.5	Poor
29	Tully b/w Huran & Brahms	40	Poor
30	S/S Tully b/w Huran & King	47.5	Poor
31	E/S King b/w Tully & Burdette	46.5	Poor
32	W/S King b/w Tully & Burdette	34.5	Poor
33	S/S Tully b/w Seacliff & King	40.5	Poor
34	S/S Tully b/w Alvin & Seacliff	45.5	Poor
35	S/S Tully b/w 101 & Alvin	32.5	Poor
36	W/S Alvin b/w Fontaine & Tully	36.5	Poor
37	Fontaine b/w Flanigan & Alvin	51	Poor
38	Flanigan b/w Melissa Ct & Fontaine	56.5	Poor
39	Flanigan b/w Alvin & Melissa	60.5	Fair
40	W/S Alvin b/w Burdette & Flanigan	51.5	Poor
41	W/S Alvin b/w Fontaine & Burdette	39.5	Poor
42	E/S Alvin b/w Burdette & Tully	40	Poor
43	N/S Burdette b/w King & Alvin	41.5	Poor
44	S/S Burdette b/w Alvin & King	39.5	Poor
45	E/S Alvin b/w Burdette & Flanigan	33.5	Poor
46	N/S Flanigan b/w King & Alvin	53.5	Poor
47	Flanigan w/o King	55.5	Poor
48	W/S King b/w Burdette & Flanigan	43.5	Poor
49	W/S King b/w Bowling Green & Flanigan	53.5	Poor
50	Bowling Green	60.5	Fair
51	Alvin b/w Flanigan & Tierra Buena	76.5	Good
52	Center Ridge	64.5	Fair

Segment Number	Street Segment	Total Score	Rating
53	W/S King b/w Bowling Green & Tierra Buena	42.5	Poor
54	Tierra Buena b/w Alvin & King	62.5	Fair
55	Tierra Buena b/w Alvin & Fontaine	69.5	Fair
56	Fontaine b/w Tierra Buena & Flanigan	57.5	Poor
57	Fontaine b/w Tierra Buena & Aldrich	60.5	Fair
58	Aldrich Wy	52.5	Poor
59	Camino Ecco	60.5	Fair
60	Alvin b/w Tierra Buena & Aldrich	69.5	Fair
61	W/S King b/w Saralynn & Tierra Buena	45.5	Poor
62	Enesco b/w Alvin & King	69.5	Fair
63	Saralynn	62.5	Fair
64	W/S King b/w Saralynn & Aldrich	43	Poor
65	Nickel	57.5	Poor
66	Aldrich e/o Alvin	60.5	Fair
67	W/S King b/w Jessica & Barberry	49.5	Poor
68	Jessica	57.5	Poor
69	Galena Dr b/w Aldrich & Barberry	53.5	Poor
70	Dina Ln	44.5	Poor
71	Dina Ct	43.5	Poor
72	Barberry Ct	44.5	Poor
73	Barberry Lane w/o King	75	Good
74	Staghorn	45.5	Poor
75	Orangewood Dr	46.5	Poor
76	Stanhope Dr	46.5	Poor
77	Citrus Grove Ct	45.5	Poor
78	Redfield Ct	45.5	Poor
79	Aborn w/o Towers	56.5	Poor
80	Stallion	60.5	Fair
81	Camarena Pl	57.5	Poor
82	Amberly Ln	60.5	Fair
83	Abigail Ln	60.5	Fair
84	Towers n/o Aborn	51.5	Poor
85	Aborn b/w Towers & Silver Creek	55.5	Poor
86	W/S King b/w Barberry & Aborn	43	Poor
87	W/S Silver Creek b/w Aborn & Lexann	55.5	Poor
88	Lexann b/w Towers & Silver Creek	58.5	Poor
89	Towers b/w Aborn & Lexann	57.5	Poor
90	Towers b/w Cap Expy & Lexann	54.5	Poor
91	N/S Cap Expy b/w Towers & 101	25	Poor
92	W/S Cap Expy b/w Towers & Silver Ck	35.5	Poor
93	W/S Silver Creek b/w Lexann & Cap Ex	40	Poor
94	E/S Silver Creek b/w Aborn & Cap Expy	35	Poor
95	S/S Aborn Rd b/w King & Aborn Sq	42.5	Poor
96	N/S Aborn b/w Cap Expy & Aborn Sq	39.5	Poor
97	N/S Aborn Rd b/w King & Aborn Sq	53.5	Poor
98	N/S Cap Expy b/w Aborn Sq & Aborn Dr	39	Poor
99	Cap Expy n/o Aborn	31.5	Poor
100	Cap Expy along Arcadia property	12	Poor
101	Cap Expy b/w Quimby & Whispering Hills Mobile homes	23	Poor
102	Quimby b/w Cap Expy & Rigoletto	30.5	Poor

Segment Number	Street Segment	Total Score	Rating
103	W/S Quimby b/w Edgebank & Rigoletto	36.5	Poor
104	Quimby b/w Tully & Edgebank	43.5	Poor
105	Huran Dr/Ct	54.5	Poor
106	Edgecrest Dr	42.5	Poor
107	Edgestone Cir	43.5	Poor
108	Edgebank b/w Quimby & Brahams	47.5	Poor
109	Edgeview b/w Brahams & Quimby	45.5	Poor
110	Edgegate	45.5	Poor
111	Brahams b/w Rigoletto & Edgebank	50.5	Poor
112	Edgefort Ct	41.5	Poor
113	Rigoletto b/w Brahms & Quimby	66.5	Fair
114	Rigoletto b/w Brahms & King	63.5	Fair
115	E/S King b/w Rigoletto & Enesco	51	Poor
116	Enesco b/w Puccini & King	68.5	Fair
117	Aida	56.5	Poor
118	Othello b/w Rigoletto & Enesco	60.5	Fair
119	Ophelia b/w Enesco & Rigoletto	60.5	Fair
120	Puccini b/w Rigoletto & Enesco	60.5	Fair
121	Brahams b/w Rigoletto & Chopin	55.5	Poor
122	Mozart b/w Chopin & Rigoletto	55.5	Poor
123	Paganini b/w Rigoletto & Chopin	58.5	Poor
124	Sibelius b/w Rigoletto & Chopin	60.5	Fair
125	Chopin b/w Sibelius & Puccinini	58.5	Poor
126	Chopin b/w Puccinini & Othello	55.5	Poor
127	Ophelia b/w Chopin & Enesco	55.5	Poor
128	Othello b/w Enesco & Chopin	61.5	Fair
129	Aida s/o Enesco	55.5	Poor
130	E/S King b/w Enesco & Aldrich	53	Poor
131	E/S King b/w Alridch & Barberry	35.5	Poor
132	Barberry e/o King	62.5	Fair
133	Kyra Cir	46	Poor
134	Corda Dr	56.5	Poor
135	Monrovia Dr	54.5	Poor
136	Aborn Sq.	44.5	Poor
137	Aborn Sq n/o Aborn Rd	40.5	Poor
138	Atwood Dr	50.5	Poor
139	Irwindale	53.5	Poor
140	Bradbury	54.5	Poor
141	Tustin Dr	55.5	Poor
142	Vanport Dr	56.5	Poor
143	E/S King b/w Tustin & Aborn	49.5	Poor
144	King Ct	53.5	Poor
145	E/S King b/w Kyra & Tustin	45	Poor
146	E/S Lanai b/w Waverly & Tolbert	51	Poor
147	W/S King b/w Seminole & Tully	36	Poor
148	Quimby, north of Tully	49	Poor
149	E/S King b/w Burdette &	52.5	Poor
150	Edgedale Ct	46.5	Poor
151	N/S Cap Expy b/w Silver Creek & Aborn	40.5	Poor
152	S/S Waverly b/w Alvin & King	60.5	Fair
153	S/S Waverly b/w King & Huran	55.5	Poor

Appendix C: Detailed Result Tables

Table 13. Segment type statistics (item 0)

	FWBT			WE			Combined total		
0.	# of segments	% total	Median score	# of segments	% total	Median score	# of segments	% total	Median score
High volume	62	32	50	59	39%	42.5	121	35%	44.5
Low volume	134	68	58.5	94	61%	56	228	65%	56.5
Totals	196	100%	8.5*	153	100%	13.5*	349	100%	12*

*Median score difference between high volume and low volume roads

Table 14. Uses in segment statistics (item A1)

	FWBT			WE			Combined total		
A1.	# of segments	% total	Median score	# of segments	% total	Median score	# of segments	% total	Median score
Single family only	32	16	52	81	53	54.5	113	32	52.5
Multifamily only	9	5	52.5	2	1	53	11	3	52.5
Com/Ofc/ Inst.	21	11	48.5	32	21	40	53	15	40.5
SFD/Multi-family	38	19	58.5	4	3	60.5	42	12	60.5
Multi/Com/ Ofc/Inst.	35	18	62.5	7	5	52.5	42	12	61.5
SFD/Com/Ofc /Inst.	12	6	52.5	14	9	52	26	7	52
Res/Rec.	10	5	69	8	5	59	18	5	67
Res/Ind'l	13	7	50.5	n/a	n/a	n/a	13	4	50.5
Res/Com/ Ofc/Ind.	10	5	59	n/a	n/a	n/a	10	3	59
Industrial only	6	3	34.5	n/a	n/a	n/a	6	2	34.5
No land use	4	2	30	3	2	23	7	2	29.5
Com/Ofc/ Inst/Ind.	4	2	43	n/a	n/a	n/a	4	1	43
Com/Ofc/ Inst/Rec.	2	1	72	2	1	40.5	4	1	57.5
Totals	196	100%		153	100%		349	100%	

Table 15. Slope statistics (item A2).

	FWBT			WE			Combined total		
A2.	# of segments	% total	Median score	# of segments	% total	Median score	# of segments	% total	Median score
Slight hill	6	3	31	n/a	n/a	n/a	6	2	31
Flat	190	97	56	153	100	51	343	98	54.5
Totals	196	100%	25*	153	100%		349	100%	23.5*

*Median score difference between slight hill and flat slope

Table 16. Segment intersection statistics (item A3).

	FWBT			WE			Combined total		
A3.	# of segments	% total	Median score	# of segments	% total	Median score	# of segments	% total	Median score
No inter-section	5	2.5	31.5	1	0.5	12	6	1.5	31
Dead ends but has a 3 or 4-way inter-section	16	8	57	15	10	47.5	31	9	52.5
Dead ends but path continues	5	2.5	60.5	n/a	n/a	n/a	5	1.5	60.5
3-way	50	26	50.5	67	44	53.5	117	34	52.5
4-way	120	61	58.5	70	45.5	49.5	190	54	55.5
Totals	196	100%		153	100%		349	100%	

Table 17. Type of pedestrian facility statistics (item B4).

	FWBT			WE			Combined total		
B4.	# of segments	% total	Median score	# of segments	% total	Median score	# of segments	% total	Median score
Footpath	1	1	24.5	2	1	17.5	3	1	23
Sidewalk	191	97	56	151	99	51.5	342	98	54.5
None	4	2	34	n/a	n/a	n/a	4	1	34.5
Totals	196	100%		153	100%		349	100%	

Table 18. Most prominent path material statistics (item B5).

	FWBT			WE			Combined total		
B5.	# of segments	% total	Median score	# of segments	% total	Median score	# of segments	% total	Median score
Dirt or sand	1	1	24.5	2	1	17.5	3	1	23
Asphalt	n/a	n/a	n/a	1	1	25	1	0	25
Concrete	191	97	56	150	98	51.5	341	98	54.5
n/a	4	2	34.5	n/a	n/a	n/a	4	1	34.5
Totals	196	100%		153	100%		349	100%	

Table 19. Path condition/maintenance statistics (item B6).

	FWBT			WE			Combined total		
B6.	# of segments	% total	Median score	# of segments	% total	Median score	# of segments	% total	Median score
Poor	31	16	51.5	6	4	28	37	10.5	50.5
Fair	118	60	55.5	94	61	51	212	61	53.5
Good	43	22	61.5	53	35	52.5	96	27.5	56.5
n/a	4	2	34.5	n/a	n/a	n/a	4	1	34.5
Totals	196	100%		153	100%		349	100%	

Table 20. Path obstructions statistics (item B7).

	FWBT			WE			Combined total		
B7.	# of segments	% total	Median score	# of segments	% total	Median score	# of segments	% total	Median score
Yes	81	41	50.5	51	33	44.5	132	38	47.5
No	111	57	60.5	101	66	55.5	212	61	57.5
n/a	4	2	34.5	n/a	n/a	n/a	4	1	34.5
Totals	196	100%		153	100%		349	100%	
*Poles or signs	37	37	49.5	14	23.5	37	51	32	44.5
*Parked cars	15	15	52.5	4	7	53.5	19	12	52.5
*Greenry	18	18	55	11	19	40.5	29	18	48.5
*Fire hydrant	4	4	49	12	20	45.5	16	10	46
*Pay phones	6	6	59.5	4	7	41	10	6.5	52.5
*Other	20	20	45.5	14	23.5	39	34	21.5	43.5

*8 WE and 15 FWBT segments had two or three types of obstructions.

Table 21. Buffers between road and path statistics (item B8).

	FWBT			WE			Combined total		
B8.	# of segments	% total	Median score	# of segments	% total	Median score	# of segments	% total	Median score
No	43	22	42.5	59	39	41.5	102	29	42.5
Yes	149	76	60.5	94	61	55.5	243	70	57.5
n/a	4	2	34.5	n/a	n/a	n/a	4	1	34.5
Totals	196	100%		153	100%		349	100%	

Table 22. Path distance from curb statistics (item B9).

	FWBT			WE			Combined total		
B9.	# of segments	% total	Median score	# of segments	% total	Median score	# of segments	% total	Median score
At edge	44	22	42.5	59	38.5	41.5	103	29.5	42.5
1-4 feet	135	69	60.5	35	23	55.5	170	49	58.5
More than 5 feet	13	7	59.5	59	38.5	56.5	72	20.5	57
n/a	4	2	34.5	n/a	n/a	n/a	4	1	34.5
Totals	196	100%		153	100%		349	100%	

Table 23. Sidewalk width (item B10).

	FWBT			WE			Combined total		
B10.	# of segments	% total	Median score	# of segments	% total	Median score	# of segments	% total	Median score
Less than 4’	18	9	44	2	1	24	20	6	42.5
Between 4 and 8 feet	163	83	56.5	151	99	51.5	314	90	54.5
More than 8 feet	11	6	62.5	n/a	n/a	n/a	11	3	62.5
n/a	4	2	34.5	n/a	n/a	n/a	4	1	34.5
Totals	196	100%		153	100%		349	100%	

Table 24. ADA accessibility statistics (item B11).

	FWBT			WE			Combined total		
B11.	# of segments	% total	Median score	# of segments	% total	Median score	# of segments	% total	Median score
No	35	18	45.5	2	1	18	37	11	44.5
Yes	157	80	58.5	151	99	51.5	308	88	55.5
n/a	4	2	34.5	n/a	n/a	n/a	4	1	34.5
Totals	196	100%		153	100%		349	100%	

Table 25. Sidewalk completeness statistics (item B12).

	FWBT			WE			Combined total		
B12.	# of segments	% total	Median score	# of segments	% total	Median score	# of segments	% total	Median score
Incomplete	20	10	43	12	8	47	32	9	43.5
Complete	172	88	57.5	141	92	51.5	313	90	55.5
n/a	4	2	34.5	n/a	n/a	n/a	4	1	34.5
Totals	196	100 %		153	100 %		349	100 %	

Table 26. Sidewalk connectivity statistics (item B13).

	FWBT			WE			Combined total		
B13.	# of segments	% total	Median score	# of segments	% total	Median score	# of segments	% total	Median score
0-3	90	46	53	96	63	51.5	186	53	52.5
4 or 5	89	45	58.5	52	34	50	141	41	55.5
6+	13	7	67.5	5	3	69.5	18	5	68.5
n/a	4	2	34.5	n/a	n/a	n/a	4	1	34.5
Totals	196	100%		153	100%		349	100%	

Table 27. Road conditions statistics (item C14).

	FWBT			WE			Combined total		
C14.	# of segments	% total	Median score	# of segments	% total	Median score	# of segments	% total	Median score
Poor	5	3	53	n/a	n/a	n/a	5	1	53
Fair	91	46	53.5	38	25	49	129	37	53
Good	100	51	57.5	115	75	51.5	215	62	54.5
Totals	196	100%		153	100%		349	100%	

Table 28. Number of lanes statistics (item C15).

	FWBT			WE			Combined total		
C15.	# of segments	% total	Median score	# of segments	% total	Median score	# of segments	% total	Median score
3 or more	44	22	47	51	33	42.5	95	27	42.5
2 or less	152	78	56.5	102	67	55.5	254	73	55.5
Totals	196	100%	9.5*	153	100%	13*	349	100%	13*

*Median score difference between 3 or more and 2 or less travel lanes

Table 29. Speed limit statistics (item C16).

	FWBT			WE			Combined total		
C16.	# of segments	% total	Median score	# of segments	% total	Median score	# of segments	% total	Median score
More than 25 mph	48	24	45	51	33	40.5	99	28	42
Less than 25 mph	148	76	57.5	102	67	55.5	250	72	56.5
Totals	196	100%	12.5*	153	100%	15*	349	100%	14.5*

*Median score difference between more than 25 mph and less than 25 mph

Table 30. On-street parking statistics (item C17).

	FWBT			WE			Combined total		
C17.	# of segments	% total	Median score	# of segments	% total	Median score	# of segments	% total	Median score
None	34	17	39.5	49	32	40.5	83	24	40
Parallel or diagonal	162	83	58.5	104	68	55.5	266	76	56.5
Totals	196	100%	19*	153	100%	15*	349	100%	16.5*

*Median score difference between none and parallel or diagonal on-street parking spaces

Table 31. Off-street parking lot spaces statistics (item C18).

	FWBT			WE			Combined total		
C18.	# of segments	% total	Median score	# of segments	% total	Median score	# of segments	% total	Median score
6+	67	34	53	61	40	45.5	128	37	50
0-5	129	66	56.5	92	60	54	221	63	55.5
Totals	196	100%	3.5*	153	100%	8.5*	349	100%	5.5*

*Median score difference between 6+ and 0-5 off-street parking spaces

Table 32. Have to walk through a parking lot to get to most buildings statistics (item C19).

	FWBT			WE			Combined total		
C19.	# of segments	% total	Median score	# of segments	% total	Median score	# of segments	% total	Median score
Yes	16	8	39.5	44	29	41.5	60	17	40.5
No	180	92	57	109	71	55.5	289	83	55.5
Totals	196	100%	17.5*	153	100%	14.5*	349	100%	15.5*

*Median score difference between having to and not having to walk through a parking lot

Table 33. Presence of high to medium volume driveways statistics (item C20).

	FWBT			WE			Combined total		
C20.	# of segments	% total	Median score	# of segments	% total	Median score	# of segments	% total	Median score
3 or more	33	17	49.5	32	21	44	65	19	47.5
0-2	163	83	57.5	121	79	53.5	284	81	55.5
Totals	196	100%	8*	153	100%	9.5*	349	100%	8*

*Median score difference between 3 or more and 0-2 high to medium volume driveways

Table 34. Traffic control devices statistics (item C21).

	FWBT			WE			Combined total		
C21.	# of segments	% total	Median score	# of segments	% total	Median score	# of segments	% total	Median score
No	31	16	48.5	32	21	46.5	63	18	47.5
Yes	165	84	56.5	121	81	52.5	286	82	55.5
Totals	196	100%	8*	153	100%	6*	349	100%	8*

*Median score difference for segments with and without traffic control devices

Table 35. Marked crosswalks statistics (item C22).

	FWBT			WE			Combined total		
C22.	# of segments	% total	Median score	# of segments	% total	Median score	# of segments	% total	Median score
None	94	48	55.5	68	44	55.5	162	46.5	55
1-3	89	45	55.5	79	52	47.5	168	48	51.5
4 or more	13	7	66.5	6	4	60	19	5.5	66.5
Totals	196	100%		153	100%		349	100%	

Table 36. Crossing aids statistics (item C23).

	FWBT			WE			Combined total		
C23.	# of segments	% total	Median score	# of segments	% total	Median score	# of segments	% total	Median score
No	108	55	55.5	78	51	55.5	186	53	55.5
Yes	88	45	56.5	75	49	47.5	163	47	52.5
Totals	196	100%	1*	153	100%	-8*	349	100%	3*

*Median score difference for segments with and without crossing aids

Table 37. Bicycle facilities statistics (item C24).

	FWBT			WE			Combined total		
C24.	# of segments	% total	Median score	# of segments	% total	Median score	# of segments	% total	Median score
No	165	84	55	131	86	53.5	296	85	54.5
Yes	31	16	64.5	22	14	40	53	15	53
Totals	196	100%	9*	153	100%	-13.5*	349	100%	

*Median score difference for segments with and without bicycle facilities

Table 38. Roadway/path lighting statistics (item D25).

	FWBT			WE			Combined total		
D25.	# of segments	% total	Median score	# of segments	% total	Median score	# of segments	% total	Median score
No lighting	6	3	46.5	5	3	25	11	3	44
Other lighting/road-oriented	5	2.5	67	4	3	47	9	2.5	53
Road-oriented	174	89	55.5	142	93	52	316	90.5	54.5
Road-oriented/ped. scale	11	5.5	62.5	2	1	69	13	4	62.5
Totals	196	100 %		153	100 %		349	100 %	

Table 39. Amenity statistics (item D26).

	FWBT			WE			Combined total		
D26.	# of segments	% total	Median score	# of segments	% total	Median score	# of segments	% total	Median score
No	159	81	55.5	136	89	52	295	85	53.5
Yes	37	19	64.5	17	11	47.5	54	15	56
Totals	196	100%	9*	153	100%	4.5*	349	100%	

*Median score difference between segments with and without amenities

Table 40. Wayfinding aids statistics (item D27).

	FWBT			WE			Combined total		
D27.	# of segments	% total	Median score	# of segments	% total	Median score	# of segments	% total	Median score
No	10	5	52.5	6	4	45.5	16	5	49
Yes	186	95	56	147	96	51.5	333	95	54.5
Totals	196	100%	3.5*	153	100%	6*	349	100%	5.5*

*****Median score difference between segments with and without wayfinding aids

Table 41. Number of trees along walking area statistics (item D28).

	FWBT			WE			Combined total		
D28.	# of segments	% total	Median score	# of segments	% total	Median score	# of segments	% total	Median score
None or very few	78	40	49	81	53	43.5	159	45.5	45.5
Some	92	47	60.5	71	46	56.5	163	47	58.5
Many/ dense	26	13	68	1	1	69.5	27	7.5	68.5
Totals	196	100%		153	100%		349	100%	

Table 42. Degree of enclosure statistics (item D29).

	FWBT			WE			Combined total		
D29.	# of segments	% total	Median score	# of segments	% total	Median score	# of segments	% total	Median score
Little or no	139	71	52.5	143	93	50.5	282	81	51.5
Some	57	29	67	10	7	60.5	67	19	66.5
Highly	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Totals	196	100%		153	100%		349	100%	

Table 43. Power lines along segment statistics (item D30).

	FWBT			WE			Combined total		
D30.	# of segments	% total	Median score	# of segments	% total	Median score	# of segments	% total	Median score
High/low dist. Lines	140	71	55.5	31	20	52	171	49	55
None	56	29	58.5	122	80	51	178	51	53.5
Totals	196	100%	3*	153	100%	-1*	349	100%	-1.5*

***Median score difference between segments with and without power lines

Table 44. Overall cleanliness and building maintenance statistics (item D31)

	FWBT			WE			Combined total		
D31.	# of segments	% total	Median score	# of segments	% total	Median score	# of segments	% total	Median score
Poor	46	23	49	24	16	40	70	20	42.5
Fair	102	52	55.5	101	66	50.5	203	58	53.5
Good	48	24	61	28	18	58.5	76	22	60.5
Totals	196	100%		153	100%		349	100%	

Table 45. Articulation in building designs statistics (item D32).

	FWBT			WE			Combined total		
D32.	# of segments	% total	Median score	# of segments	% total	Median score	# of segments	% total	Median score
Little or none	103	58.5	50.5	124	81	48	227	65	49.5
Some	87	44	61.5	29	19	58.5	116	33	60.5
Highly	6	3	67.5	n/a	n/a	n/a	6	2	67.5
Totals	196	100%		153	100%		349	100%	

Table 46. Building setbacks from sidewalk (item D33).

	FWBT			WE			Combined total		
D33.	# of segments	% total	Median score	# of segments	% total	Median score	# of segments	% total	Median score
More than 10‘	153	78	55	153	100	51	306	88	53
Within 10’	26	13	62	n/a	n/a	n/a	26	7	62
At edge of sidewalk	17	9	67	n/a	n/a	n/a	17	5	67
Totals	196	100%		153	100%		349	100%	

Table 47. Building height statistics (item D34).

	FWBT			WE			Combined total		
D34.	# of segments	% total	Median score	# of segments	% total	Median score	# of segments	% total	Median score
1 story	159	81	55	126	82	49	285	82	53
2-4 stories	37	19	62.5	27	18	56.5	64	18	60.5
Totals	196	100%	7.5*	153	100%	7.5*	349	100%	7.5*

***** Median score difference between 1 story and 2-4 story segments

Table 48. Bus stop statistics (item D35).

	FWBT			WE			Combined total		
D35.	# of segments	% total	Median score	# of segments	% total	Median score	# of segments	% total	Median score
No bus stop	172	88	55.5	126	82	53.5	298	85	55.5
Bus stop w/ signage	2	1	60.5	3	2	43	5	1	43
Bus stop w/ bench	14	7	47.5	21	14	45	35	10	45
Bus stop w/ shelter	5	2.5	67.5	2	1	46.5	7	2	66.5
Bus stop w/ shelter & bench	2	1	65	n/a	n/a	n/a	2	1	64.5
Bus stop w/ signage & bench	1	0.5	77.5	1	1	66.5	2	1	72
Totals	196	100 %		153	100 %		349	100 %	

Appendix D: Non-ADA Compliant Streets and Intersections

A number of streets and intersections were found to be missing ADA facilities. The street segments and intersections fit into one of the following criteria:

- No sidewalks at all
- Missing sections of sidewalks or sidewalks on only one side of the street
- No ADA curb ramps

Street segments with missing sidewalks obviously do not have ADA curb ramps and are not listed again in Table 51.

Table 49. Street segments without sidewalks

Five Wounds/Brookwood Terrace	West Evergreen
28th b/w Julian and St. James	Capitol Expy along Arcadia property
Wooster b/w Tripp and Julian	Capitol Expy along Arcadia property b/w Quimby & Whispering Hills Mobile homes
Remo St.	
Lotus St.	

Table 50. Street segments with missing sections of sidewalks or sidewalks on only one side of the street

Five Wounds/Brookwood Terrace	West Evergreen
Wooster n/o Tripp	Fontaine b/w Flanigan & Alvin
N/S Julian b/w 26th & Wooster	Fontaine b/w Tierra Buena & Flanigan
N/S Julian b/w West and East Ct.	Fontaine b/w Tierra Buena & Aldrich
East Ct.	W/S King b/w Bowling Green & Tierra Buena
Five Wounds Ln.	Aborn Sq. b/w Aborn Rd. & Monrovia
28th b/w St. James and Five Wounds Ln.	Aborn Sq. b/w Monrovia & Capitol Expy
28th b/w Five Wounds Ln. and Santa Clara	Aborn Rd. b/w Towers & Silver Creek
S/S San Antonio b/w 24th & Bonita	Atwood Dr.
Kelly Ct.	
Herald b/w Banff and Bonita	
Herald b/w Lotus & Banff	
Banff St.	
Jasper St.	
W/S McLaughlin b/w Sunny & Appian	
22nd s/o William	
W/S 24th b/w San Antonio & William	
Brookwood b/w 18th & 22nd	
Marburg Way	
Ann Darling Dr.	

Table 51. Intersections without ADA curb ramps

Five Wounds/Brookwood Terrace	West Evergreen
All of Melody Ln. All of Royce Dr. All of Ann Darling Dr. All of Berrywood Dr., except at 33rd McKee & McDonald Julian & East Ct. S/S Julian & 25th S/S Julian & 26th S/S Julian & 27th St. John & 24th St. John & 25th St. John & 26th St. John & 27th St. James & 25th St. James & 26th W/S St. James & 27th St. James & 31st NE Corner Santa Clara & 21st Shortridge & 26th San Fernando & 26th Peach & 24th Whitton & 26th Brookwood & 19th Brookwood & 20th Brookwood & 21st Brookwood & 22nd	None that are not already specified in previous tables

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