

Effects of Neighborhood Design on Residential Habits and Sense of Community:

Testing the Claims of New Urbanism

by

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ABSTRACT

This is a study that tests the New Urbanist claims that neighborhood design impacts sense of community and residential habits. Through the framework provided by New Urbanist theories, a social survey is used to examine residential perception and behavior among three fringe neighborhoods in southeast Tucson, each representing a different approach to neighborhood design: New Urbanist, traditional suburban, and a hybrid variety. The primary relationships studied are between neighborhood design and use of public space, neighborhood design and travel habits, and neighborhood design and sense of community. The findings show that the New Urbanist community does support the highest levels of sense of community and use of public space, but conclusions cannot be drawn concerning the relationship between sense of community and travel behavior, especially non-vehicular travel to public space. While these results are inconclusive concerning the direct impact of the neighborhood type on certain behaviors and perceptions, the findings support the notion that a New Urbanist design does indeed enhance social interactions and use of public space. It also offers insight into the importance of residential preferences, not as much towards walkability but towards general environmental concern.

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CHAPTER 1: INTRODUCTION

In response to the growing concerns over the negative social and environmental impacts that suburban sprawl inflicts on communities and society, reformed approaches to neighborhood development have become an integral conversation for planners and designers. A prominent antidote found in the New Urbanism movement asserts that neighborhood design, as based on certain principles, enhances residential life in the community. This solution is dependent on controversial assumptions concerning how people react with and are affected by the built environment. The prescribed principles from New Urbanism encourage specific neighborhood attributes such as connected, walkable, and compact blocks, a defined town center with a mix of diverse uses, accessible public space, and a mix of housing options.

This study examines the specific claim within New Urbanism that neighborhood design influences sense of community at the neighborhood level. The specific relationships that play a part of this claim go beyond just measuring sense of community. Supporters of New Urbanism contend that the public realm is the medium where interaction between residents is essential to sense of community and that walking (in lieu of driving) encourages chance encounters with neighbors; therefore, the travel habits of residents and their use of public space serve to determine whether sense of community is impacted by such patterns. Further, this study also considers and tests the various demographic,

perception, and residential preferences that may influence sense of community and transportation to public space.

The relationships examined in this study are compared between three neighborhoods of varying neighborhood environments. These include a New Urbanist development, a typical suburban development, and a hybrid development, all located in a contiguous area on the fringe of Tucson, Arizona. This is what distinguishes this study from others done on New Urbanist developments. Most studies have a dichotomous approach with only the traditional suburb and the New Urbanist community. In the context of the desert southwest, one of the regions most marked by sprawl, this study provides insight into a particular culture where fringe developments and low-density living can be a preference of many residents.

Context and Background

Arguably, no other region is as marked by the image of sprawling neighborhoods than the Sunbelt. This development is characterized by such growth as that found in the Phoenix Metropolitan Area which increased in land area by 43.5% from 2000 to 2010 (U.S. Census Bureau, 2011). Located 118 miles southeast of Phoenix, Tucson, with a metro area population of just over 1 million, has similarly seen suburban growth on the fringes (U.S. Census Bureau, 2010), and when compared to eighty six other major U.S. cities, Tucson scored the lowest on urban density in 2002 (Ewing, Pendall, & Chen, n.d.). This exurban expansion is not new. It is historically associated with the post-World War II

migration to suburbia and was intensified by legislation such as the Federal Highway Act of 1956, which heavily subsidized state-funded highway projects. The resulting development pattern characterized by low-density, exurban growth, necessitates the use of the automobile as the primary mode of transportation for most suburban residents. More time spent commuting to-and-from work and driving children to sports and school, means less time in the community. Today, these drive-until-you-qualify suburbs and fringe communities have created neighborhoods where cul-de-sacs and curvilinear streets dominate, private space is preferred, and shared spaces are limited (Duany, Plater-Zyberk, & Speck, 2010 pp. 41-42); the public realm exists mostly as streets and highways along with meaningless and often inaccessible pieces of land between private properties (Kunstler, 1996 p. 36). It is this type of urban form that is accused of creating disparities in societal cohesion and declining sense of community. Now validated by researchers in various disciplines, sprawl, the communities it has engineered, along with longer commutes, are blamed for deteriorating social ties (Putnam, 2000, Beatley, 2005); social interaction is reported to be lower in car-dependent communities than in those deemed to be more walkable (Leyden, 2003; Podobnik, 2002). Concurrently, such development practices often result in negative environmental consequences such as increase of carbon emissions from vehicles and land conversion from native habitat to developed property (Burchell et al., 2002 pp. 9-14) ultimately leading to meaningless places without ecological, social, or historical meaning (Beatley, 2005).

New Urbanism calls for a return to traditionally livable towns and cities; developments must embody design elements that foster walkable, diverse, and human-scaled places; the urban form resulting from such goals creates an atmosphere that enhances social interaction and sense of community among residents. Specifically, activation of the public realm (especially street life) is targeted.

For the purpose of this study, which is at the scale of the neighborhood, *sense of community* is used to indicate a comprehensive measurement or the general idea that relates to terms such as *neighboring*, *social capital*, and *social interaction*. This body of work defines *sense of community* as the experience of an individual and their experiences with feeling tied to place (neighborhood) and people (neighbors). *Sense of community*, it could be argued, falls between social interaction and social capital; included in *sense of community* is social interaction; on the other hand, sense of community is one part of *social capital*.

Activating public space and increasing social interaction is important for neighborhoods: social networks allow dissemination of resources and knowledge that enhance both the individual's experience and the neighborhood as a whole (Unger & Wandersman, 1985); more specifically, such ties enhance communication, facilitate collective action, and make life easier for those in the community because, for example, residents can rely on those around them for support (Putnam, 1993). If certain neighborhoods have the capacity to encourage such a social environment where members of the community benefit in this way, certainly planners and designers should be facilitating such development.

However, the answer is not that simple. First, research has returned in support of suburbia, purporting that compact cities are not the golden ticket (Gordon and Richardson 1997) and go so far to suggest that social ties may actually be higher in such communities. Also, it is clear that there are people in society that clearly favor single-detached households although a mismatch of housing availability has been determined (Lewis & Baldassare, 2010). In a region that has grown accustomed to sprawl, these are important factors for consideration.

Unlike developers that approached fringe growth with little planning and even less intention for building a community of residents, Civano, a solar community in the southeast periphery of Tucson, Arizona has been applauded as a place that honors community, environment, and the planning process (Killebrew, n.d.; Nichols & Laros, 2009). Listed as one of Planetizen's "unsprawl" cases, it has embodied not only environmental best-practices for buildings, design, and development, but the designers also employed New Urbanist principles in the planning process. It is the neighborhood of interest in this study.

Summary of Research

The resulting research examines the contested relationship between neighborhood design and the perceptions, habits, and social environment of residents. Chapter 2 states the research questions and outlines the primary hypotheses of the study developed from the New Urbanist approach to affecting sense of community with neighborhood design. In Chapter 3, a review of the literature is conducted. First, current definitions of social interaction and an

overview of ways to measure such social goals in survey form are explored; second, the New Urbanist framework is discussed and applied to this work via social goals; finally, other findings concerning the attainment of social goals in New Urbanist communities are summarized.

The observational data from site visits provide an explanation of the different neighborhood designs represented, and the survey methodology is reviewed alongside it in Chapter 4. This includes discussion of the sample of residents, survey tool, and data gathered from the survey. Chapter 5 is devoted to exploring and stating the findings from the social survey. Chapter 6 provides conclusions and implications of the outcomes of the study and, finally, Chapter 7 gives conclusions of this study.

CHAPTER 2: RESEARCH QUESTIONS

Research evaluating New Urbanist communities is not new; but it also is fairly limited. Past studies examine travel habits and sense of community, among other measures, comparing fringe neighborhoods with more inner-city New Urbanist developments (Kim, 2007; Lund, 2003; Podobnik, 2002, 2011; Trudeau & Malloy, 2011). Sometimes studies direct their focus only at a New Urbanist development such as Seaside, Florida (Plas & Lewis, 1996) failing to complete a comparison to other types of developments.

This study falls within this literature to evaluate the social environment and the lifestyle choices of the residents in a New Urbanist development compared to developments with other forms. Beyond being novel in its evaluation of a fringe New Urbanist community, this study finds strength in the proximity of the three neighborhoods, providing distinct neighborhood delineations while still being comparable in geographic location in regards to the rest of the city of Tucson. Also, the similarity of the neighborhood demographics allow for more in depth comparisons among a particular group of people. This research is also beneficial to the smaller community of Civano. It provides evaluation of the state of the community from a social viewpoint and aims to complement data and information already gathered on the environmental efficiency of the neighborhood. Past research in Civano has principally focused on measuring environmental (ecological and energy efficiency) goals. In order to fully complete the picture of how Civano is performing as a community, all aspects of the

guiding principles must be addressed. So far, the social aspect has not been researched or evaluated. This provides a set of data that examines results both within the community and in comparison to Sierra Morado and Mesquite Ranch, and it will be communicated to stakeholders in the community upon the completion of this project. To this end, there are three primary research questions that frame this research. The first one is concerned with neighborhood public space, the second with travel habits, and the third with sense of community.

Research Question One

The first research question helps to determine use of public space as part of the New Urbanist framework leading to sense of community. Each neighborhood provides some type of public space; however, this is done to varying degrees, does that impact varying successes of the neighborhoods in regards to use of the public space? The research question is as follows: Does the design of the community encourage greater use of public space? In using the neighborhoods as proxies for different neighborhood design, it is hypothesized that Civano residents will frequent public space more often than the other two communities. This question establishes the platform for the impacts of neighborhood design within the communities.

Research Question Two

Beyond frequenting public space is the likelihood that residents will walk or bike to local amenities such as businesses and public space. This depends on

the assumption within the framework of New Urbanism that certain neighborhood environments encourage more walking and biking and less automobile use. The second research question asks: Does neighborhood design influence travel habits among residents? There are two sub questions that address two parts to the question:

- Do residents in Civano walk or bike more often than drive when traveling to public space or the town center?
- Is it true that after moving to Civano, residents walk more often than they did in their previous neighborhood?

It is hypothesized that Civano residents are more likely to utilize non-vehicular travel when visiting public space than their counterparts in the other neighborhoods. Other tests will examine travel habits only in Civano as there are certain amenities such as the town center that are nonexistent in the other two communities.

Research Question Three

New Urbanist principles rely on the idea that neighborhood design, because it increases use of public space and travel habits, contributes to sense of community. The third question relates to this relationship: Do community design and residential use of public space impact neighborhood sense of community? For this question, evidence supporting these relationships will also be examined between the communities. It is hypothesized that Civano residents will exhibit higher levels of sense of community and walking/biking to public space will

positively correlate with this measure. Other possible demographic, residential preferences, or habitual variables will be carefully examined as correlates of Sense of Community as well.

The neighborhoods in this study provide a context in which to examine three different types of urban form. The hypotheses are reflective of the framework within which the New Urbanism's social goals operate: certain urban form elements impact the habits of residents that foster an increased use of the public realm; this leads to more social interaction and therefore a heightened sense of community. To explore the differences between the three neighborhoods, statistical tests are used to determine significance as reported through the survey data collected.

CHAPTER 3: REVIEW OF LITERATURE

Drawing from the discourse developed over the past fifteen to twenty years concerning sense of community within the New Urbanism's approach and framework of design and planning, the Review of Literature explores the relationship between the built environment and the expected outcomes for social interactions and transportation habits among residents. This discussion also is concerned with whether or not these aspects of residential lifestyle can be impacted by physical form. Along with examination of the purported social goals of the New Urbanism, which include consideration of the way that sense of community and social interaction are defined and measured, the use of a social survey is discussed. Further, a review of the challenges met by other researchers studying New Urbanist developments and resulting social climates is conducted.

Defining and Measuring Sense of Community

Due to the interdisciplinary nature of urban planning, it is necessary to survey the various approaches to defining and measuring a place's sense of community used across the social sciences. In the dense and growing literature on social interaction and sense of community there are a number of seminal articles and approaches relevant to this study that will be discussed in depth. Social interaction is a well-defined concept: also referred to as '*neighboring*,' it includes any number of activities experienced between individuals and the resulting social networks and ties within a community (Unger & Wandersman, 1985). It is

suggested that social interaction, is one of two important aspects of sense of community measurement, the other being the affective (Plas & Lewis, 1996; Talen, 2002). Beyond the social component (also referred to as *social interaction* or *neighboring*), the affective component deals directly with feelings and attitudes towards and about neighbors and the community including a “sense of mutual aid” and “an attachment to place” (Unger & Wandersman, 1985). The affective and social components will be necessary to include in a measure of sense of community, however, it is important to examine other approaches to defining the aspects of community.

McMillan and Chavis define *sense of community* as encompassing four elements: membership, influence, integration and fulfillment of needs, and a shared emotional connection (1986). These stated elements move beyond the *social* component and embody aspects of the *affective* component of sense of community such as sense of belonging, sense of mattering, and similarity to the group. The authors also distinguish between communities of *place* and communities of *interest*. In a society where virtual communities abound, this characterization is important. Within the framework of this study and literature, communities of place are the primary interest and represent the sense of attachment to a neighborhood – a place – instead of the an aspatial community of interest (Nasar & Julian, 1995).

Sense of community, resulting from both the affective and social components, is also measured and valued under the concept of social capital, although social capital extends measurement of community beyond the

neighborhood or a single community. Made popular by the book *Bowling Alone*, Robert Putnam describes *social capital* in terms of its value on a communal scale: it is defined by aspects of “social organization, such as networks, norms, and trust that facilitate coordination and cooperation for mutual benefit” further it “enhances the benefits of investment in physical and human capital” (1993). Social capital can be broken down into two parts, bonding and bridging. Bonding must precede bridging as it involves ties (dependent on trust via interactions) within and between community members. Bridging, on the other hand, is experienced when ties are extended to groups outside the community. Collective action is the result of social capital and has been presented as especially important for low-income communities as collective efficacy is often diminished in these neighborhoods (Larsen et al., 2004; Sampson, Morenoff, & Earls, 1999).

Paxton (1999) depicts two different dimensions of social capital: objective associations between individuals (a network “linking individuals [within] social space”) and subjective ties between individuals (ties in which trust and positive feelings are reciprocated). In a complex model, Paxton identifies trust between individuals and institutions and measures of association with neighborhoods, groups, and place, as the two variables for measuring social capital. This is completed for both the scale of individuals or groups and also for broader constituencies like nations. Ultimately, the study found trust between individuals to be the greatest influencer of changes in social capital. Other measures focus on trust and *social cohesion* as the two most important variables with evaluating sense of community leading to social efficacy (Sampson, 1997).

Social measurements of community have covered large and small extents; however, for the purpose of the neighborhood planner, the development of a composite measure appropriate for the neighborhood unit is necessary. Relating directly to the planning profession and addressing specific measures for the neighborhood scale, Nasar and Julian (1995) evaluate the psychological sense of community based on Glynn's 1981 evaluation of community. Both their 15-item and 11-item composite measures are crafted to examine "supportive relationships in the community, similarity and relationship patterns of community residents, individual involvement in the community, and community security" (Nasar, 2003). The measures are effective of going beyond a simple calculation of social cohesion or trust, simultaneously use similar components of bonding social capital, and effectively include aspects of both social affect and social interaction.

Ultimately, in a unit such as the neighborhood, social interaction affects the cohesion of the community and these elements of sense of community impact the ability of the members to come together and participate in local action (Mason, 2010). Anecdotally, a community organizer, a neighborhood leader, or a city planner can harness the sense of community among a group of people in order to affect change (McMillan & Chavis, 1986).

The New Urbanism

The New Urbanism is a movement that has been developing for over two decades in response to the poorly planned urban environments that are pervasive from the core of the city to the fringe developments. The Congress of the New

Urbanism is celebrating twenty-one years this year and has been responsible for conceptualizing, promoting, and organizing the people and places that are associated with the movement. Clearly stated in the Charter for the New Urbanism is the direct link between community and the physical environment. The places we have created over the past half of a century are inadequate to support healthy communities and people. This has been covered extensively by New Urbanists and others with the majority of the critique focusing on problems caused by sprawling development and bedroom communities (Burchell et al., 2002; Calthorpe & Fulton, 2001; Duany et al., 2010; Freeman, 2001). At the root of the New Urbanism is the idea that the form of a place will precede other societal goals. This is in direct contrast to traditional planning which works towards regulating the functions or uses of places. Other than form versus function, this approach also takes on the idea that planning and design can affect social change (this is beyond the more simplistic idea that providing social services is the role of planning) (Talen, 2002).

A framework for livable communities. Although not ‘new,’ The New Urbanism has distilled methods for creating livable environments from traditional forms, historical urban movements, and past urban theorists (Ellin, 1996, chapter 3). Declining sense of community has been a point of focus for researchers over the past decades, and the New Urbanism employs a fairly straightforward framework in order to counter that backslide. The New Urbanism is focused on form. It is a movement within the planning and design disciplines and approaches its social goals in this way. While the New Urbanism is criticized for the steadfast

belief that certain physical forms can create community, the Charter directly examines its limitation while still defending their stance: “physical solutions by themselves will not solve social and economic problems, but neither can economic vitality, community stability, and environmental health be sustained without a coherent and supportive physical framework.”

With twenty-seven principles in the Charter, the movement depicts its approach to building better cities and towns across scales: from the building to the region. The Charter elucidates the goals of The New Urbanism with a fierce focus on “real neighborhoods and diverse districts, the conservation of natural environments, and the preservation of...built legacy.” Among other goals, the principles emphasize the importance of: places that encourage walking and reduce vehicle miles traveled; diversity in design encouraging diversity in people; embracing culturally vernacular practices; and design that facilitates social interaction. Physical form then must incorporate strong city centers and pedestrian friendly neighborhoods, access to multiple modes of travel and development along transit corridors, mix-use development and the combining of housing types valued at different levels in the housing market, distinct design for civic buildings and spaces, historical preservation of buildings and landforms, and the implementation of building for a human-scale.

Ultimately, the New Urbanist approach to enhancing sense of community employs physical design as the medium and possibly the catalyst for social interaction. The intermediary step is the activity of individuals in a community so that, for example, a street with shade trees, a sidewalk, and a lower speed limit

that is comfortable for a pedestrian will be more likely used by someone traveling to a corner store than a street with no sidewalk along a busy road. If multiple pedestrians are using the same pathway to visit a neighbor, walk a dog, or complete any other daily activity, social interaction increases. Jane Jacobs presented the idyllic situation in her depiction of the street ballet where at any given moment there are multiple pedestrians coming and going to and from the diverse and varied activities, participating in the events of the day (and night) (Jacobs, 1961, pp. 51-54). While this may seem possible only for a place like New York City as described by Jacobs, predominately residential neighborhoods can still foster a similar soiree of interactions (interactions that are necessary for formation of trust).

Moving Beyond ‘Sense of Community’. Community is just one of three social goals found within the Charter for the New Urbanism (Talen, 2002). Strengthened relationships and interactions within a community, ultimately an important goal in a society where it is argued that those ties are weak, is also criticized for having negative affects on the broader community. This happens when communities become homogeneous and close-minded and is the reason for Putnam to move beyond bonding social capital to include bridging social capital. This addresses issues of equity, again another criticism of New Urbanism and its developments (Ellis, 2002).

David Brain suggests that it is not community that should be the ultimate goal of New Urbanism, but it is civility (2005). Civility, he claims, is place-based while community need not be. Civility requires a level of equity that community

does not. This concept is highly important when studying communities that are integrated better within the urban core. Social capital (bonding and bridging) as defined by Putnam has been measured in the New Urbanist development at Orenco Station; while higher levels of bonding were found among residents of Orenco Station than those living in typical suburban neighborhoods, bridging was low for both neighborhood-types showing that this civility was lacking while trust among residents was high (Podobnik, 2002). Is this as impactful of a measure for a New Urbanist fringe development?

For a location such as Civano, measures of trust, social interaction, and relationships between residents is more important to understand to address how physical form may impact sense of community. This includes the affective and social components of community but only at the bonding level, not the bridging level. Further, trust between individuals, out of all the measures falling within the framework of social capital as a measurement, was determined to be the main influencer of decline in community. This all must be considered when examining empirical work tying the built environment to sense of community.

Built Environment, Sense of Community, and Resident Lifestyles

Studies directly relating the built environment to sense of community and articles evaluating the goals of New Urbanist communities or Traditional Neighborhood Developments are reviewed in this section. It is important to note that many studies examining neighborhoods and sense of community focus on disparities of income and other sociodemographic elements, specifically the

research of Robert Sampson and JD Sallis (for a Southwest case study see Larsen et al., 2004). This section will not focus as much on that relationship as it will on the relationship of the built environment with sense of community and the habits and practices of residents in New Urbanist neighborhoods.

How the physical environment affects the behaviors of individuals is numerated and explored by both the literature within environmental psychology and the design and planning disciplines. The New Urbanist framework depends on the strength of this relationship. Historically, urbanists have claimed the importance of this relationship, mainly through observational methods such as the importance of street activity defended by Jane Jacobs' (1961). Appleyard and Lintell (1972) examined through observation and interviews the "livability and quality of the street environment," demonstrating that the street environment does impact the resident, but environmental variables were not defined. House design elements such as front porches also impact the amount of interaction between neighbors (Brown, Burton, & Sweaney, 1998). Studies of other interactional spaces also reveal that the built and natural environment affect neighboring (Skjaeveland & Garling, 1997). Similarly, the role of the built environment influencing travel habits has been extensively examined. While studies do not all agree on the specific role of the various environmental attributes, researchers have specified the importance of variables such as distance and access to amenities (Frank & Pivo, 1994; Handy, Cao, & Mokhtarian, 2005; Mokhtarian & Handy, 2008). There is certainly support to warrant the study of the built environment

found in New Urbanist communities and how it may influence sense of community.

More studies have arisen in the past decade that empirically examine the goals of New Urbanism. All of these studies employ a social survey or interviews along with other measures to collect data on sense of community and the neighborhood. Some of these articles use very specific measurement of urban form via GIS technologies or walking audits; others simply formulate their study around a New Urbanist designated development. Additional aspects to consider are the methods of measuring sense of community and the variables collected in conjunction with sense of community and the built environment.

The current research examines two important relationships that are interrelated: that of urban form and sense of community and that of urban form and travel habits. Many incorporate measures of walking (Barbara B. Brown & Cropper, 2001; Dill, 2006; Lund, 2003; Podobnik, 2011). Dill (2006) and Podobnik (2011) both included some aspect of travel choice in their study as well. In those studies that examine both relationships, travel habits may be used as the primary determinate for heightened community. Those without measures of walking often simply determine the walkability of a neighborhood empirically and use this as a proxy for travel mode. Brown and Cropper (2001) identified that neighborhood walkability had a modest association with sense of community, as did Podobnik (2002) and Kim (2007). Lund (2003b) determined that those residents within the New Urbanist neighborhood who walked more did, indeed, have more social interactions. On the other hand, Nasar (2003) found that

traditional neighborhood developments have significantly lower auto use but not necessarily heightened sense of community.

Not all studies agree with the positive impacts of New Urbanist physical form on sense of community (Forsyth, Hearst, Oakes, & Schmitz, 2008; Mason, 2010; Yang, 2008). One study, specifically concerning neighborhoods with cul-de-sac designed streets, sidewalks, and open space, found that these design elements have increased trust among residents (Mason, 2010); this shows that traditional suburban neighborhoods certainly are not devoid of sense of community, but it requires examination of how studies determine and value walking types. According to Forsyth et al. (2008) certain environments may increase walking for leisure but will not increase walking for transit, and vice versa. New Urbanism is concerned with all walking as a medium for social interaction; much of the other walkability research focuses on health outcomes of walking. Similarly complex, Yang (2008) argues that the built environment may affect neighborhood satisfaction differently depending on the location of the neighborhood within the context of a city: when examining the impacts of compact development and mix-use, quality of life increased in an area of Portland but decreased in Charlotte. For a more successful study this context must be considered (expressed both in measuring other correlates and in careful examination of the built environment being studied).

Other challenges for researchers plague the New Urbanist approach to development. Sander (2002) illustrates four challenges that must be considered: the context of the project or “influence of the outside world”, the newness of so

many New Urbanist developments, selection bias within residents living in the neighborhood, and the Hawthorne effect, or respondents who answer positively in order to confirm that their community is a good place to live.

The Use of a Mailed Social Survey

While data on personal preferences, habits, and perceptions may be obtained through a variety of methods, a mailed questionnaire offers a low-cost approach for obtaining quantitative data on a larger group of people (Groves et al., 2009, Ch. 1). Further, the data generated provides empirical measurement of the social aspects of the neighborhoods.

The frequency of using mailed, in-person, telephone, and online surveys has greatly increased leaving the general public bombarded with surveyors asking to be respondents (Dillman, 1991). In order to obtain the most accurate data in this survey, the design, length, and distribution of the survey must be carefully considered and executed. It was determined that certain properties of Don Dillman's Total Research Method (TRM) were to be utilized in order to help maximize survey respondents; however, TRM's extensive approach to the best practices of the process behind survey methodology demands more funding and time than this research allowed. Therefore, not all aspects of TRM were included in this study. Those steps from TRM practiced in this survey process include the following: asking engaging questions at the beginning of the survey, attractive survey design with contrasting elements, word choice easily interpreted and understood by the target population, question order that flows, follow-up post

cards to residents serving as reminders of the survey, explanation of the importance of the survey, and how confidentiality is secured. Those infeasible aspects of the methodology that were not carried out, for example, are follow-up phone calls and additional follow-up postcards mainly due to lack of funding. TRM fails to examine the benefit of offering multiple options for respondents to complete the survey, nor does it discuss the added benefit of rewarding respondents. Respondents could complete the survey by calling ISSR to answer over the telephone, complete a paper survey and mail it using a return envelope, and an online form making available as many avenues for response as possible. In this way, no one could have except for any survey receiver that may not be able to read in English. Respondents were also invited to enter a drawing for a gift card upon completion to encourage participation. The survey was disseminated among colleagues to test for clarity in word choice, content, and organization.

Summary

As demonstrated in the literature, there is still a need to understand New Urbanist communities in the context of fringe development and the impact that such development ultimately has on its residents. The framework of New Urbanism is dependent on the validation of the relationship between the built environment and residential lifestyles, and research is moderately conclusive that there is an effect on community. Within the realm of research done specifically on New Urbanist communities, this study is timely in that the development used as a case study has had time to mature, and it also can be compared to contiguous

neighborhoods with similar demographics providing an important window into the effects of New Urbanism in this contained fringe environment.

CHAPTER 4: DATA AND METHODS

This chapter outlines the observational data and the survey methodology. The first section describes the geographical context of the study area along with site observations from the three neighborhoods. The second section then details the survey methodology, the survey instrument, and the data collection process. These observations and explanation of data serve to validate the use of the site selected and the implementation of the survey and resulting sample.

Although this study primarily utilized a social survey for data collection, the site selection process relied heavily on observation of the built environment to determine the major differences between the surveyed neighborhoods. The survey was based on the residential experience within the neighborhood and its context; therefore evaluation of the physicality of each is a necessary starting point. Observational data was collected during site visits and documented photographically to determine neighborhood type of the built environment and confirm other attributes of the neighborhoods such as parks, trails, and open space. Site visits were conducted in late September of 2011 and again in early January of 2012 (before and during the release of the survey) to examine the types of amenities available to residents, photograph and observe the differences in urban form between the neighborhoods, to check for vacancies, and ensure the residents being surveyed were living on streets built to completion.

This chapter will continue with a description of the study site (Civano) and its context (the City of Tucson), an overview of the intentions of the planners

and designers to integrate New Urbanism, and Civano's relationship to the Sierra Morado Development. Quantitative data are reported from the U.S. Census and American Community Survey (ACS) to provide a demographic context for the study along with descriptions of the urban form which provide the context of neighborhood design. Lastly, an analysis of how Civano fulfills its classification as a New Urbanist development within the context of the built environment is outlined before the survey methodology is completed.

Study Site: Context and Description

Historically framed as a Spanish colonial town, Tucson boasts plenty of southwest architecture, and its proximity to the Mexican/United States border creates strong ties to the Latino heritage that is prevalent among borderland communities. Driving through the city, it is easy to see that many housing developments have embraced the southwest adobe-style vernacular that is not always present in similar Phoenix developments. Environmentally, Tucson's unique absence of storm water drainage infrastructure gives the city a different approach to landscaping in the public and private realm as well as valuing rainwater catchment systems; permaculturalists know Tucson to be home to one of the premier water-harvesting specialists. Despite these and other social and environmental advances in the policy realm, the seemingly unmonitored expansion in the desert southwest still has endangered both the fragile desert environment as well as the sense of community among residents. Ultimately,

reform of the built environment is still needed, with issues such as pervasive large urban blocks limiting street access and walkability (Ewing et al., n.d.).

Civano. Located approximately 15 network miles from downtown Tucson and the University of Arizona and just four miles from the eastern grounds of Saguaro National Park is the study site for this research project (Figure 1). Civano



Figure 1. Study area in relation to the rest of Tucson, Arizona

is the northern most neighborhood with Sierra Morado and Mesquite Ranch both to the south (Figure 2). Originally slated to be Tucson's first 'solar village,' the neighborhood intended to reach energy self-sufficiency, but this eventually was abandoned. Still, goals to be environmentally sustainable through best building practices and technologies as well as integrating community design along the way were present throughout the many iterations of design and site plans (Nichols & Laros, 2009); the plans insured use of the abundant Arizona sun through passive and technological solar practices and simultaneously prioritized a built

environment applying New Urbanist principles including a village core with mix-use development (Ellin, 1996; UnSprawl).

From the time that Civano was first conceived to its ground breaking in 1999, fifteen years had passed (Nichols & Laros, 2009, p. 149). The neighborhood's lengthy planning process included extensive negotiation with the city and state as it was built on appropriated state trust land. In the land acquisition for the development site on the southeastern edge of Tucson, the

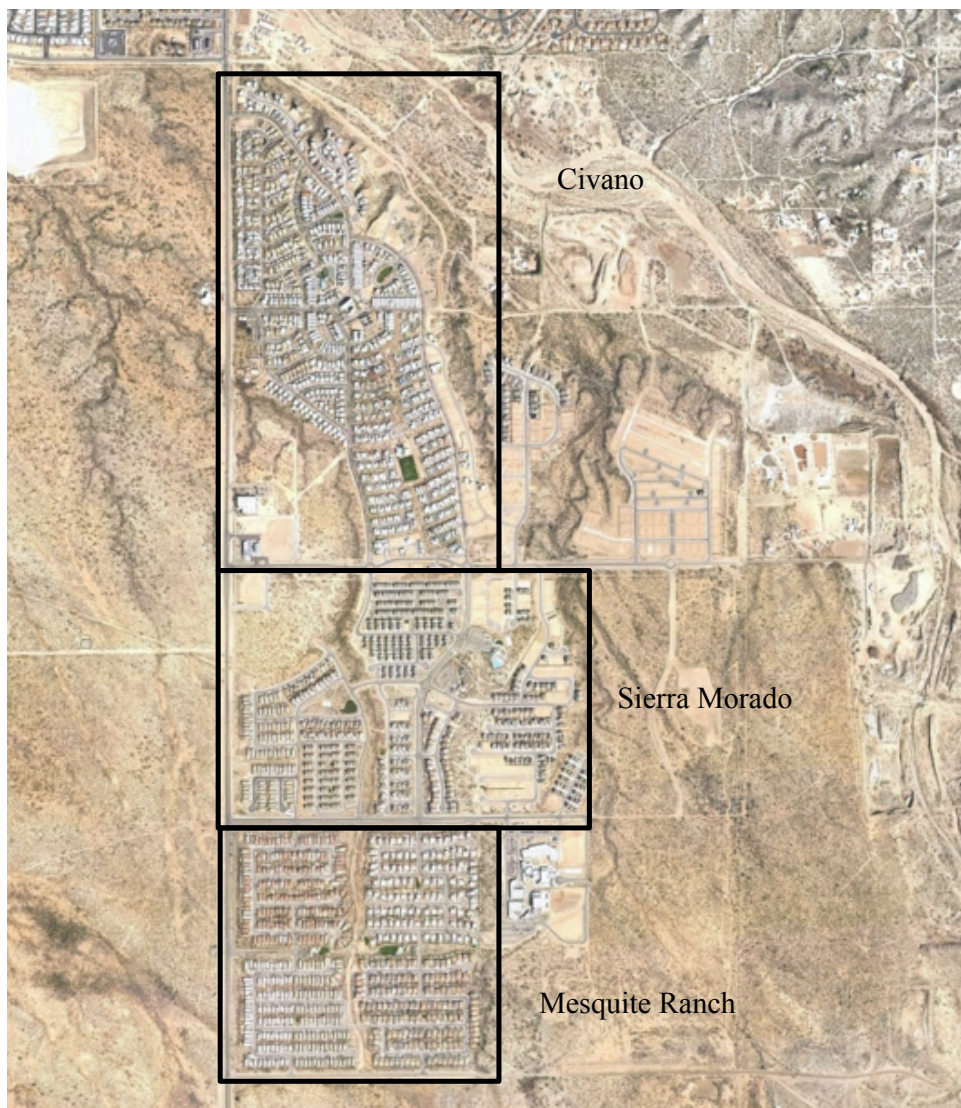


Figure 2. Study area neighborhoods

Arizona Solar Village Corporation (the first organizational entity of the neighborhood development project) worked closely with the State Land Department for the physical property and the City of Tucson for the rezoning into a master planned community. As a result of this relationship, Civano was required to measure the ecological/environmental success of the community with the Integrated Method of Performance and Cost Tracking (IMPACT) System for Sustainable Development (Nichols & Laros, 2009); however, no benchmarks or evaluations concerning the social goals were ever set.

Sierra Morado and Mesquite Ranch. Such extensive plans were not generated for Sierra Morado, the neighborhood directly south of the current Civano community. Although, originally intended to contain the second and third phases of the Civano development, the land was eventually relinquished to Pulte Homes Developers (Nichols & Laros, 2009). Nearly 700 units have been completed to date with more planned and many under construction. The first houses were completed and occupied in 2007. While Civano encouraged Sierra Morado to incorporate similar goals when building developer motives were fundamentally different from those of Civano (Nichols & Laros, 2009). Sierra Morado, for example, does focus on technological and infrastructure approaches to environmentally friendly design, similar to that of Civano. It boasts exemplary energy efficiency in building materials and many households have solar panels. Public space, pocket parks, and trails are included promoting an emphasis on access to natural environments and “extending living space to the outdoors” (“Amenities at Sierra Morado,” n.d.). In promotional materials, the community

amenities are focused firstly on outdoor adventure activities and secondarily on proximity to public space such as a community center, swimming pools, and parks. Sierra Morado is still being built, especially on the northeast and eastern sides of the neighborhood.

South of Sierra Morado is Mesquite Ranch, a suburban master-planned community by Diamond Ventures with 619 homes (“Diamond Ventures,” n.d.). Development commenced in 2001 with the majority of houses being completed in 2002 and 2003. The community advertises amenities such as two neighborhood pools, a community park, volleyball and basketball courts, and walking and biking paths that exist among the four sections that are delineated by ease of automobile access. This neighborhood is built to completion with no vacant lots.

The three neighborhoods represent three varying approaches to neighborhood design. These differences are described in the following section of observations. With the direct intention to utilize New Urbanism in Civano, it represents the New Urbanist neighborhood design type in this study; Sierra Morado, employing only some aspects of New Urbanist design will be discussed as the hybrid community; Mesquite Ranch, intended to be a typical fringe development, is referenced as the suburban neighborhood.

Neighborhood Design Observations. It is clear from the intentions stated in the 1998 Planned Area Development (PAD) that Civano’s design and development goals include social aspects of community. The four core elements that guided the first phase of development are: “Building Community,” “Connection with the Land,” “Respect for Climate,” and “Regeneration”

(Community Design Associates). In the PAD, community-centered efforts are approached, specifically, with effort put into creating a supportive built environment and are drawn from New Urbanist principles: diversity in social and cultural spaces, both private and public; shorter street segments; pedestrian oriented streets; and human scale. It was the goal of Civano that this particular neighborhood design facilitate human interaction, which is expected to increase the quality of social life and reduce the time spent in the automobile (Community Design Associates, 1998). Beyond the goals in the PAD are design elements specific to New Urbanism and the Principles of New Urbanism found in the Charter for the New Urbanism. In order to discuss Civano in the context of New Urbanism, each aspect of neighborhood design will be discussed in terms of these principles in the following sections on the neighborhood design. A full list of the principles as discussed in the Charter for the New Urbanism is in Appendix A. The elements of the neighborhood built and natural environments examined are *streetscape, public and civic spaces, available housing types, and the street/foot path connectivity* efforts made in each community.

Streetscape and Connectivity. Each neighborhood provides a very different street environment. Good street design and connectivity is essential in the New Urbanist approach to a successful neighborhood. Streets should be “safe, comfortable, and interesting to the pedestrian” (Congress for the New Urbanism, 2001). In Figure 3, the street morphology can be seen from an aerial vantage point. In the traditional suburb, Mesquite Ranch, it is easy to see the presence of dead ends and a disconnected street pattern. The hybrid community, Sierra

Morado, appears to be more connected than Mesquite Ranch but with larger block sizes than Civano. Civano exhibits predominately small blocks in the northern part of the development (higher density area) and has a natural flow of major streets toward the town center as the focal point in the neighborhood. As seen in Figure 4, photographs also depict the differences in the streetscape. Civano has plenty of shade trees. Many of these were saved from the land before

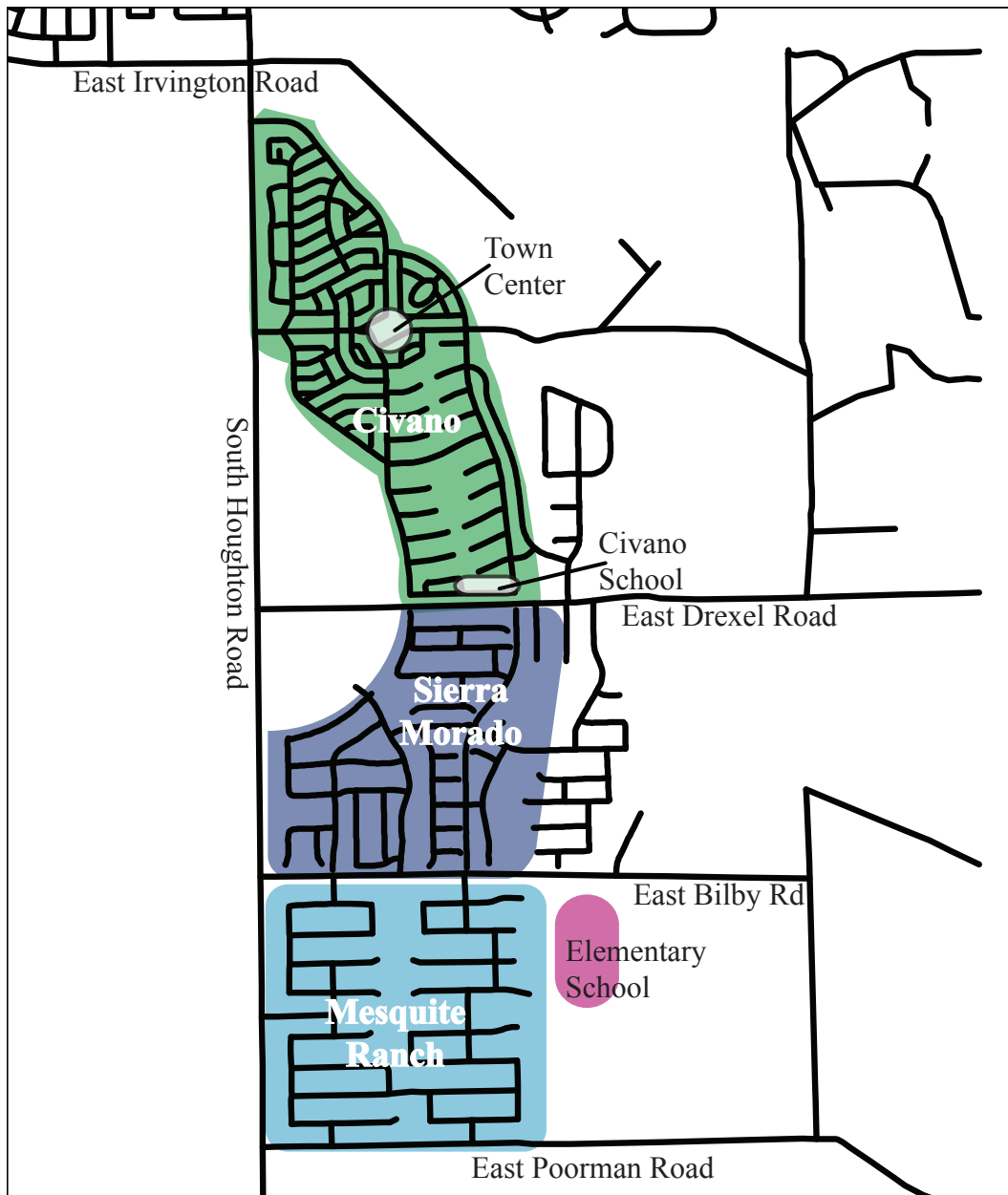


Figure 3. Street Morphology of Neighborhoods



Civano: Sidewalk on a local street (left) and neighborhood collector street (right)



Sierra Morado: Sidewalk on a local street (left) and neighborhood collector street (right)



Mesquite Ranch: Sidewalk on a semi-private cul-de-sac (left) and neighborhood collector street (right)

Figure 4. Neighborhood Street Types in Civano, Sierra Morado, and Mesquite Ranch

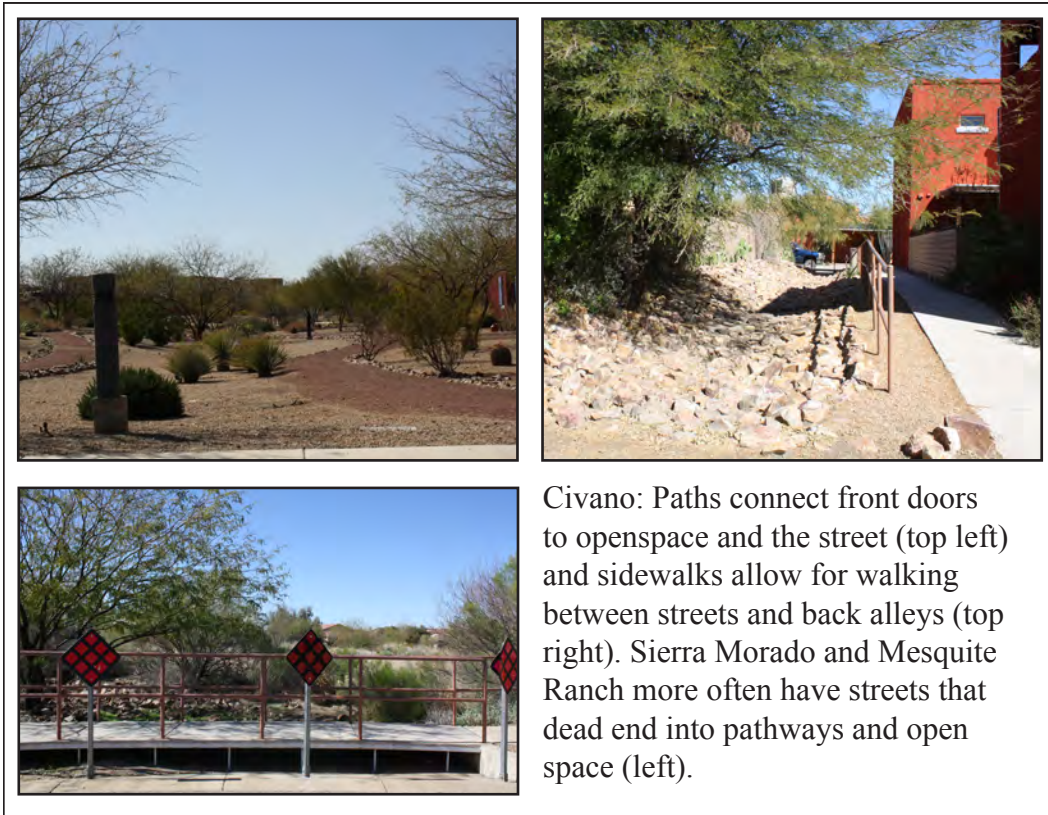


Figure 5. Pathway Connectivity

development and replanted. Local streets have on-street parking and sidewalks passing directly in front of houses close to the town center. Collector streets provide wide walking paths. The Charter calls for these measures in defining streets as places for public use (Principle 21) and the importance of ensuring pedestrian street safety through design (Principle 23). Sierra Morado provides nearly the same situation but with less shade on the collector street and sidewalks that do not connect the pedestrian to the house façades. Mesquite Ranch design, with even larger front yards, separates the house from the road more. Sidewalks are provided but shade is not. Collector streets abut walled properties, leaving no connection to nearby properties.

As seen in Figure 5, other connectivity measures were taken in Civano such as outdoor pathways that link housing and public space (in the lower density part of the neighborhood) and sidewalks safely taking residents parking in alleyways to the street (and house and business frontages). Most of these paths in the other communities are for exercise only (such as the pathway that runs between the east and west side of the Mesquite Ranch neighborhood).

Housing Types. Housing is important in this context for how dwellings interact with the street and also the availability of diverse housing types (which can encourage a diversity in neighborhood demographics). In Civano, most houses front either the street or a walking path. Those closer to the Town Center have porches fronting the street and sidewalk while others are a bit more secluded (as seen in Figure 6). The majority of garages are in the back of the house fronting alleyways. In Sierra Morado, while some houses front streets and walkways, many have snout nose garages that put the automobile and driveway in the front of the house. All of the houses in Mesquite Ranch sport the snout-nose house with the garage, consuming the majority of the façade. These aspects of housing impact the street environment, as mentioned in the previous section, by prioritizing the automobile. Both Sierra Morado and Civano ultimately have environments that fulfill two different New Urbanist Principles: the housing types and how they integrate with the streetscape, accommodating the automobile, but also respect the needs of the pedestrian (Principle 22); there is also a variety and variability of housing types of different pricing and sizes (Principle 13). In Civano and in Sierra Morado, there are a number of housing options in size, price, and



Civano: Most houses front the street or a walking path with car access in back alleyways (seen on right)



Sierra Morado: Some houses front walkways with car access in the back (left two photos); other houses have the snout nose, with a garage dominating the façade (above).

Mesquite Ranch: All homes have garage-dominating façade (right).



Figure 6. Housing types as seen in all three neighborhoods

density. This is not evident in Sierra Morado. In addition, Civano has started to embrace housing types such as Granny Flats that allow residents to age in place.

Public and Civic Space. The public spaces available in all communities include swimming pools and parks (Figure 7), but only Civano and Mesquite Ranch have a distinct neighborhood/community center (Figure 8). Such diversity and availability of parks is certainly important in the New Urbanist framework (Principle 18); however, it is revealed that only Civano truly provides the breadth and depth of the range of pocket parks, larger green space, community gardens, and civic space. Civano's Town Center is integrated with the neighborhood, surrounded by homes and businesses with one of the neighborhood pools just a block away. This Town Center is an important attribute of New Urbanist neighborhoods (Principles 16 and 25). In contrast to the on-street parking and central location of Civano's Town Center is the Community Center of Sierra Morado. Sierra Morado's community center, on the other hand, is dominated by the extensive parking lot that separates the center from the collector street, requiring walkers to traverse this area upon arrival (see figure 7). It also lacks centrality in the current developed land of the community. It is possible that upon build out, it will be better connected and centralized; however, there is little indication of this connectivity to date.

The two main parks in Mesquite Ranch are shown in Figure 8. Connectivity is only extended to the nearest lots, but this common space is central to the neighborhood. The pocket parks in Mesquite Ranch are fairly stripped of much character and resemble vacant lots. There is very little shade with the main

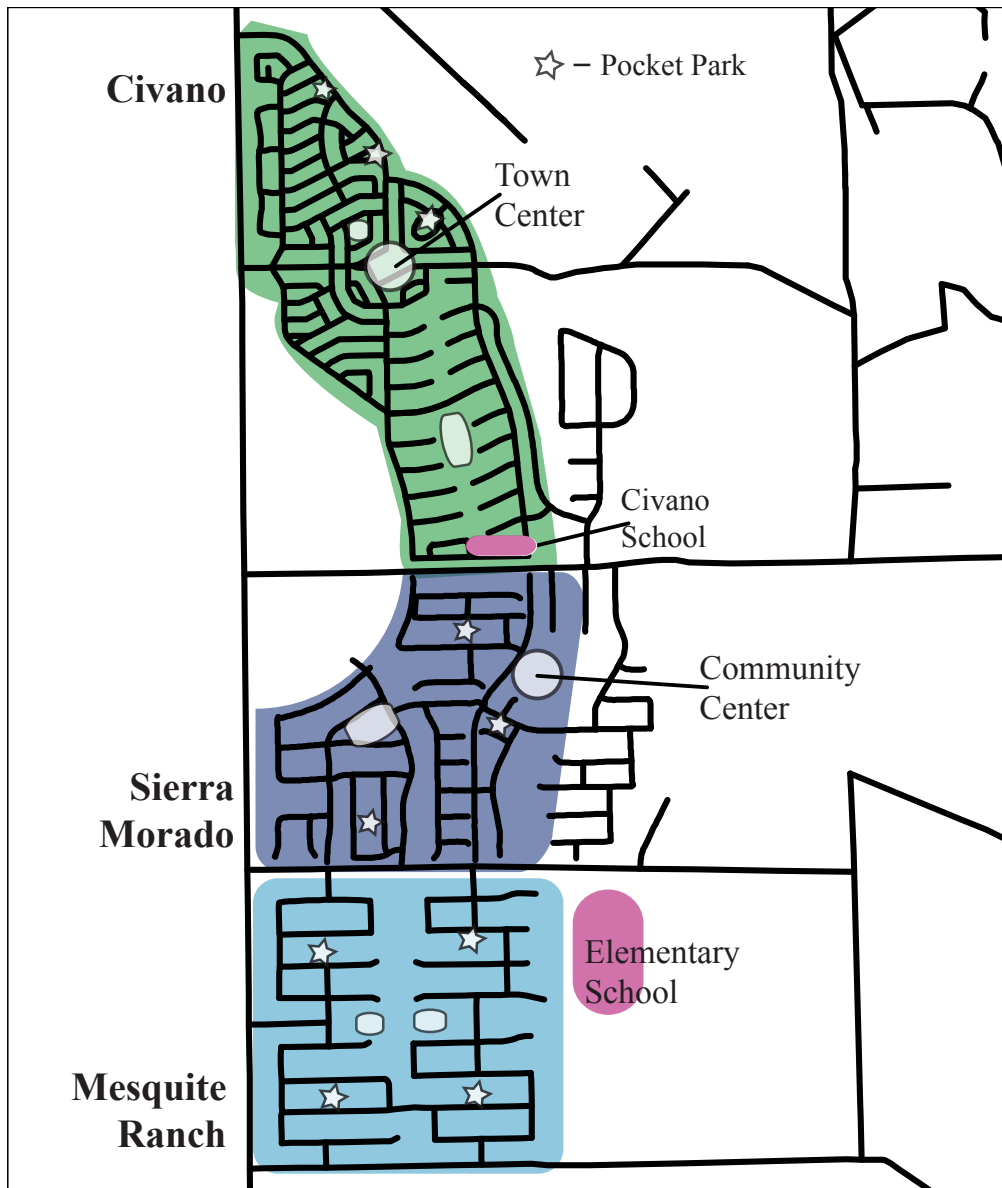


Figure 5. Public Space in the Three Neighborhoods

feature being a picnic table. The pocket parks in Sierra Morado are characterized by grills and picnic tables. Some even have amenities such as volleyball courts. Pocket parks in Civano provide green space and benches. Most major amenities in Civano are located at the larger public spaces (such as a tennis court and swimming pool).

Also of importance in Civic and Public space is the need of these sites “to reinforce community identity and the culture of democracy” (Principle 25). The

Civano: The aerial image to the right shows the town center in the middle with houses facing this space and pathways connecting to another swimming pool, a community garden and more open space. (Image from Google Earth, March 2011)



On-street parking surrounds the center. The image on the left depicts the entrance to the meeting room.



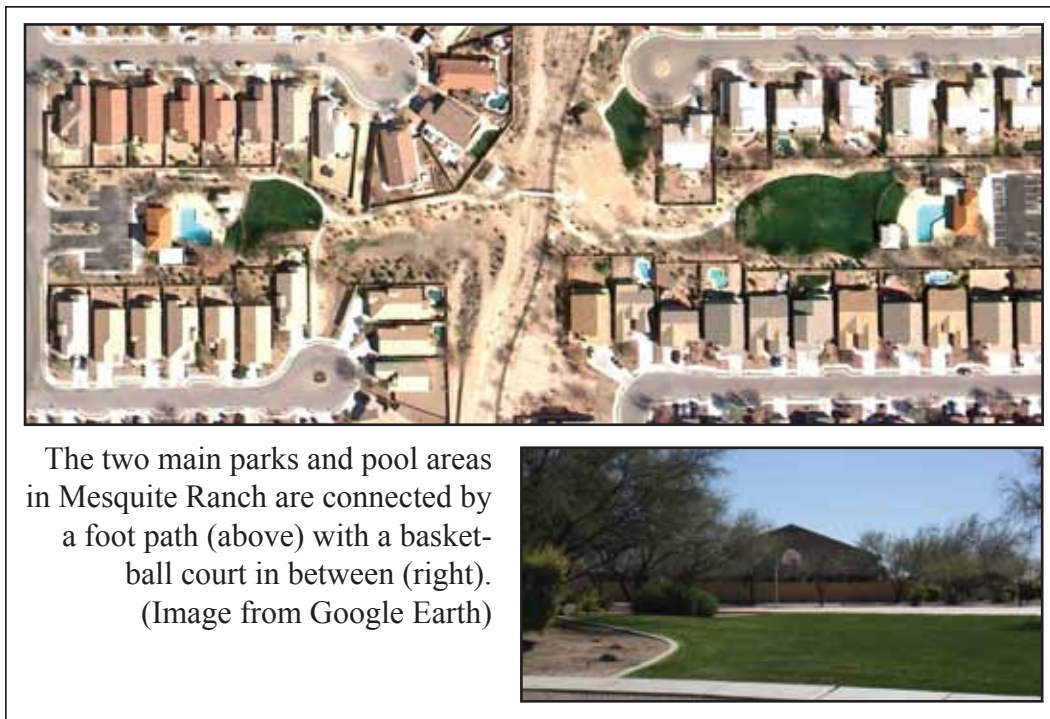
Sierra Morado: The 'Community Center' is seen to the left with pedestrians approaching through the parking lot.

On the right an aerial image shows the isolation of the shared space with the large parking lot separating the center from the street. (Image from Google Earth)



Figure 6. Town center and community center in Civano and Sierra Morado

Town Center in Civano, does have distinct design with the building culminating in a memorable and identifiable water tower cooler (Nichols & Laros, 2009). This is not the case in Sierra Morado where the Community Center is non-descript both in name and in design.



The two main parks and pool areas in Mesquite Ranch are connected by a foot path (above) with a basketball court in between (right). (Image from Google Earth)

Figure 7. Mesquite Ranch's Public Space

Quantitative Data. The quantitative data were collected from the 2010 U.S. Census and the American Community Survey (ACS) using the online download feature from American FactFinder. Data from the Census were taken at the block level and aggregated to the neighborhood boundaries shown in Figure 3. Data from the ACS were at the Census Tract level.

Demographics. The demographics of the three neighborhoods are quite comparable with the exception of Sierra Morado being developed at a later time as indicated by a lower tenure. Also, Sierra Morado has a lower median age. As seen in Table 1, only some demographic data could be secured for each

neighborhood. This came from the 2010 Census. The other data, provided by the ACS, had to be represented at the Census Tract level and therefore are not available at the neighborhood aggregated area but only for the entire study site area. For those variables that can be compared between neighborhoods, you can see that there are fewer children present in the households but that home ownership and gender are similar.

Table 1
Demographics of Study Area from Census and American Community Survey

	Civano ACS	Sierra Morado ACS	Mesquite Ranch ACS	Census Tract Level
Median Household Income	-	-	-	\$74,311
Median Age (over 18)	-	-	-	35.8
Own Home (Percent HH)	85.2	84.4	83.9	84.7%
Percent Female	53.6	51.6	51.6	52.1%
Percent Completing Bachelors Degree	-	-	-	52.4
Presence of Children Under 18 (% HH)	27.1	51.7	54.3	34.1

Density. Density was determined by averaging the households by block area. Civano actually had the lowest density of 5.1 households per acre. Sierra Morado had the highest density of 6.4 households per acre and Mesquite Ranch had 5.3 households per acre. Sierra Morado, however, at build out, will have a lower average density because the newest houses that are still under construction will be on larger lots than some of the condo-type domiciles.

Social Survey Methods

A social survey was employed to collect quantitative information on the residents and households of each community. These data may then be statistically

analyzed to determine significant relationships among the respondents of the survey and between the three neighborhoods in the study site. This survey is designed to examine sense of community, travel habits, neighborhood attitudes, and other demographic information. Prior research on Civano's social environment has been only anecdotal in nature. This social survey also complements the empirical data collected on the energy performance of both Civano and Sierra Morado. All eligible households were sent a survey instrument; therefore, this study represents respondents from a census of the communities rather than a sample.

The Survey. At the beginning of the study, the Institute of Social Science Research (ISSR) at Arizona State University was enlisted to help in the mailing of surveys, online formatting of the survey, and in the receiving of returned surveys. The survey methods protocol was carried out between September 2011 and February 2012. A list of mailing addresses was obtained from the Pima County tax assessor for the three neighborhoods. Those households located in the Sierra Morado and Civano neighborhoods on streets not yet built to completion were removed from the list.¹ It was decided that incomplete streets could potentially influence responses to include perception of a different built environment than the rest of the community. Further, households owned by banks, not individuals, trusts, or other forms of LLCs, were removed from the survey list. Examining a sample of these residents during the September site visit verified that those residencies appeared to be unoccupied and likely represented foreclosures. All

¹ This was defined as streets that had any vacant lots or more than one lot under new construction with the exception of the neighborhood center of Civano.

remaining residents on the mailing list were mailed a letter between the last week of November 2011 and the first two weeks of December. This was done with the help of ISSR's services. It was determined that the survey would initially be delivered in batches to each neighborhood, with another batch sent out every half week. Four batches were deployed. Surveys that were returned to sender were considered ineligible and were most likely foreclosures. The mailed survey and letter instructs recipients to reply in one of four ways: Opting out of the survey, completing the paper survey and returning it by mail, going online with an assigned ID number to complete the survey electronically, or calling a number to complete the survey by phone. Completed surveys were accepted through mid-February of 2012, and a reminder postcard was delivered in the first two weeks of January to boost responses. ASU's Institutional Review Board oversight and approval form can be found in Appendix B, and a copy of the survey can be found in Appendix C.

Survey Respondents and Response Rate. Because this survey was sent to all residents on the final mailing list of eligible respondents, discussion of sampling error is not necessary; however, the response rate remains an important aspect of determining whether or not the respondents accurately represent the three neighborhoods. In the table below the response numbers and rates are provided. For all three neighborhoods, the response rate is 19.68%. For Civano the response rate is 27.40%, for Sierra Morado, 15.34%, and for Mesquite Ranch, 16.53% (see Table 2). While these numbers are low, especially for Sierra Morado and Mesquite Ranch, the respondents can be compared to total study area and

neighborhood area data collected from the 2010 U.S. Census and ACS; additionally, the data sport an adequate confidence level and margin of error (at the 95% confidence level the margin of error is 5.9). This, along with comparison to actual data, helps to determine the statistical confidence of how representative

Table 2
Response Rate from Survey By Neighborhood

Neighborhood	Letters Sent (Eligible)	Surveys Completed	Response Rate
Civano	365	100	27.40%
Sierra Morado	378	58	15.34%
Mesquite Ranch	375	62	16.53%
Total	1118	220	19.68%

the respondents are of the entire population. Due to the large margins of error in the ACS, appropriate *block-level* data could only be gathered from the 2010 U.S. Census. *Tract-level* data was the smallest extent available to be extracted from ACS; therefore, differences between the neighborhoods can be teased out only for variables collected from the U.S. Census. Data unavailable at the block and therefore the neighborhood level is represented by ‘ND’ in Table 3 outlined the comparison below.

Fortunately, the Census Tract (40.61) includes all of the households in the three communities and provides a good point of comparison for the survey data. The area covered in the tract but outside of Civano, Sierra Morado, and Mesquite Ranch is not developed and does not have households that could potentially skew the comparison. The comparative data of the entire study area show that some populations are inadequately represented in the respondent pool and others are overrepresented (see Table 3). On the Census Tract level (comparing the entire respondent population), actual median age is much younger than those responding

Table 3

Comparison Between Respondent Data and Census Data in Neighborhoods

	Civano	Civano ACS	Sierra Morado	Sierra Morado ACS	Mesquite Ranch	Mesquite Ranch ACS	Total Survey	Census Tract Level
Median Age (over 18)	57	ND	38	ND	47	ND	50	35.8
Own Home	89	85.2	93.1	84.4	95.2	83.9	91.8	84.7
Percent Female	59	53.6	72.4	51.6	50	51.6	60	52.1
Percent Completing Bachelor's Degree	79	ND	71.6	ND	67.8	ND	72.3	52.4
Presence of Children Under 18	24.5	27.1	53.2	51.7	45.9	54.3	38.7	34.1

to the survey (35.8 versus 50). Females are over-represented among respondents (52.1% actual versus 60% of respondents), as are homeowners (84.7% actual versus 91.8% of respondents). These are both issues found in most survey-based research studies. The level of educational attainment is lower for the real population than the response sample, and households with children under 18 are slightly over-represented. These differences are consistent with the idea that older and more highly educated individuals are more likely to take the time to answer a survey.

Civano has a population similarly skewed, and the higher response rate from their community may be a reason for such discrepancies between the total respondent demographics and that of the actual population at the tract level. This is validated by examining the data sets available at the block-level and aggregating them to the three neighborhoods in the study area. The data available that are also provided by survey responses are tenure, gender, and presence of children. These data demonstrate that, indeed, when reviewed at the neighborhood-level, the respondents are a much better representation of the total population by neighborhood (see Table 3). While it is impossible to fully account for the differences between the variables only available at the tract-level, this analysis shows that some of the discrepancies stem from the simple difference in demographics between the neighborhoods and do not indicate that the sample is misrepresentative of the study site.

Survey Tool. The primary instrument for data collection in this study was a mailed social survey. Identical forms were sent to all three communities with

questions covering the following topics: sense of community, travel habits, environmental attitudes, and neighborhood preferences. These measurements, together, allow for a comprehensive approach evaluating the differences on an individual level and, more importantly, between the three neighborhoods in the study representing different neighborhood design elements.

Sense of Community. This study utilized a validated composite measure for determining sense of community within the context of the neighborhoods in the study site. The survey also included other measures of social interaction that did not fall into this measure, but proved to be important to examine in the overall scheme of understanding the various components that play a part in defining and measuring sense of community.

Nasar/Julian Composite Measure. The composite measure is adapted from Nasar and Julian's psychological 'sense of neighborhood community' measure (1995). This measure was used because it is specific to the neighborhood unit and evaluates sense of community, not just social interaction. The respondents rated the following items on a Likert Scale from 1 to 7, 1 being that they "strongly disagreed" 7 being that they "strongly agreed" to the statements.

- If I had an emergency, even people I do not know in this neighborhood would be willing to help.
- If someone does something good for this neighborhood, that makes me feel good.
- My friends in this neighborhood are part of my everyday activities.
- If I feel like talking, I can generally find someone in this neighborhood to talk to right away.
- People here know they can get help from others in the neighborhood if they are in trouble.
- I am similar to most people who live in my neighborhood.
- I DON'T care whether this neighborhood does well. (Reverse coded)

The measure is very similar to other scales such as Sampson, Raudenbush and Earl's 5-item scale measuring trust and social cohesion (1997). It includes aspects of neighboring as discussed by Paxton (1999) and is similar to elements of social bonding as discussed by Putnam (1995). The adapted version of the scale used for this study was determined to be valid through a series of tests. A test of validity was first conducted with all of the statements listed above; the last statement "I don't care whether this neighborhood does well" had a corrected item total-correlation of below 3 (1.41). Although Cronbach's Alpha Coefficient was acceptable (.806), it was removed from the scale. The final six-item scale showed good internal consistency with a Cronbach's Alpha of .831 for the six-item scale. Corrected item total-correlation was fair with values between 4.8 and 7.51 indicating that each item does a good job of representing varying aspects of the composite measure. Because the scale was slightly altered, the reliability of the scale cannot be discussed, as it is not the same scale that Nasar and Julian originally used. The final variable used in the analysis was a mean of the items measured for each respondent. Using a mean of the total number of items answered allowed respondents that skipped up to two items on the scale to still be included in the analysis.

Other Measures of Sense of Community. Other statements measuring aspects of community interaction, trust, and neighborhood satisfaction were also included in the survey. While not a part of the original scale from Nasar and Julian (1995), these statements reinforce the elements of community and expand upon them. Recognizing the importance of trust that was determined by Paxton to

be one of the most influential aspects of social capital, the following statement was included to measure trust on an individual basis and determine its impact on sense of community: “I have made trusting relationships with my neighbors.” Similarly, a measure of trust with lending or borrowing physical items was included: “I feel comfortable lending and/or borrowing items from my neighbors.”

A measure of organized group participation on a formal or informal level was also included (“Members of my household participate in formal or informal neighborhood associations or groups”) as well as a simple statement indicating knowing individuals in proximity to the respondent’s home (“I know the majority of my neighbors on my street”). An element of neighborhood satisfaction was also included (“I would recommend this neighborhood to a friend or family member”) as was a statement addressing influence within community as described by McMillan and Chavis (1986) (“I feel like I can influence decisions that affect my neighborhood”).

Lastly, two questions asked about relationships that do not necessarily rely on the presence of a used public realm were asked:

- “In a typical month, how many times do you invite a neighbor over to your house to socialize?”
- “In a typical month, how many times are you invited to a neighbor’s house to socialize?”

By asking specifically about interaction within the home, not in the public space of the community, evaluating sense of community in relation to a high level of private interactions can be examined. Ultimately, these statements also allow for

further evaluation of measuring components of sense of community specific to these neighborhoods.

Travel Behavior. There are a number of questions in the survey that pertain to travel habits of residents. In the survey response options public transportation (e.g. city bus) was not provided throughout the survey because there were no services available for the three neighborhoods at the time of the study. Also, although it is typical for studies to distinguished between walking for *leisure* and walking for *transport* this was not necessary in the study at hand because the principle outcome desired was to specifically measure walking to the public space and the few amenities that are in the area. The first questions ask for an estimation of time spent driving with travel purposes of “errands,” “work,” and “other activities” asked separately. The respondent was instructed to approximate average minutes in the day spent in the car. While automobile use is likely high in all three neighborhoods due to location on the fringe of the city, an important measure concerning walking habits is travel to public spaces within the neighborhood. After asking about the frequency with which the respondent visited public spaces, the respondent was asked the following: “If you visit the neighborhood public spaces, how often do you get there by a mode of transportation other than a car?”

In order to evaluate the use of Civano’s town center businesses, the respondents were similarly asked how often they used certain modes of transportation if/when they visited. The respondent was also asked the following question to examine any change in transportation habits: “Compared to where you

used to live, how often do you and the rest of your household do each of the following now?” with regards to driving, biking, and walking.

Behavior linked to environmental attitudes. With Civano’s environmental goals at the time of development in mind, it is important to examine the environmental attitudes of residents. A series of statements were enlisted and respondents were instructed to rate on a scale of 1 to 7 how much they agreed or disagreed. Two statements examine beliefs: “Climate change is something humans do not influence” addresses whether or not the respondent believes that climate change is human caused; “I believe that climate change is affecting the environment” deals with measuring impact of climate change directly on the environment. One question directly deals with habits connected to climate change: “I have made considerable efforts to change my habits in the past five years because of environmental issues.” The last three questions address habits of resource usage but can not be solely attributed to attitudes to environmental attitudes:

- I make a considerable effort to recycle things that I use.
- I don’t really pay attention to the amount of energy used in my household.
- If available, I would be willing to use a public transit system from my home to work.
- Our household makes an effort to purchase energy efficient appliances.

There are plenty of surveys trying to understand the values and detailed attitudes linked to climate change and environmentalism. That is not the goal of this study; rather, it is to reveal habits practiced by respondents across the three neighborhoods that may possibly indicate self-selection to Civano or provide an opportunity to suggest neighborhood policy changes.

Self-selection. Self-selection is an important aspect of survey research. Sander (2002) detailed the explicit importance of identifying presence of self-selection in New Urbanist communities because it is a common issue in New Urbanist research such as this study. In the survey self-selection was measured by asking the level of importance when residents chose their current neighborhood with the following attributes listed:

- Safety
- Peace and quiet
- Affordability of housing
- Quality of schools
- High sense of community
- Easy to walk to places
- Energy efficiency of household
- Public amenities (i.e. basketball courts, pool, community space)

Rated on a 1 to 7 Likert Scale, data generated from this will provide information to compare against neighborhood type. High ratings from respondents to those aspects that represent Civano's goals (high sense of community, easy to walk to places, energy efficiency of household, and public amenities) would infer that perhaps residents self-select for this neighborhood, already being apt to favor these neighborhood qualities and participate in them, prior to moving to the neighborhood.

CHAPTER 5: RESULTS

In this chapter the outcomes of the statistical tests that were performed on the survey data are reported to provide insight into the role that the neighborhood design plays in the lives of residents, specifically, how it might impact sense of community, attitudes, and habits. The resulting discussion and conclusions are further discussed in Chapter 6.

To understand some of the trends in each of the neighborhoods, demographic data reported by the respondents are summarized in Table 4. Recall that Civano is the New Urbanist neighborhood, Sierra Morado is the hybrid neighborhood, and Mesquite Ranch is a traditional suburban neighborhood. As mentioned before, respondents in Civano tend to be older, and those in Sierra Morado younger, than those in Mesquite Ranch. Most respondents are considered to be in the middle to high-income range. Civano respondents have the highest percentage of residents reporting income levels in the highest income bracket. Another important factor is that Sierra Morado has a much higher percentage of respondents living in the neighborhood for less than three years (60.3%). This is reversed in both Civano and in Sierra Morado with 69% and 83.9% of respondents living in the community for more than three years (respectively). Another important difference is the number of households with children under 18. Civano reports a much lower percentage (24.5%) than that of Sierra Morado (53.2%) and Mesquite Ranch (45.9%). Related is the high retirement rate in Civano (36%) when compared to the other neighborhoods. Educational attainment

beyond the completion of a Bachelor's degree is similar. Lastly, many more females completed the survey in Sierra Morado than did those in the other neighborhoods.

Table 4
Study Variables by Neighborhood

		Civano	Sierra Morado	Mesquite Ranch
<i>Demographics</i>				
Median Age (over 18)		57	38	47
Percent Female		59	72.4	50
Percent Completing Bachelor's Degree		79	71.6	67.8
Percent Retired		36	13.7	25.8
Percent Own Home		89	93.1	95.2
Income (percentage)	Under \$35,000	9.7	2	9.6
	\$35,000 to \$65,000	21.5	35.3	23.1
	\$65,000 to \$95,000	26.9	27.5	28.8
	Above \$95,000	41.9	35.3	38.5
Tenure (percentage)	Less than 3 years	31	60.3	16.1
	More than 3 years	69	39.7	83.9
Percent Households w/ Children Under 18		24.5	53.2	45.9
<i>Other Measures</i>				
Average Sense of Community (out of 7)		5.21	4.31	4.51
Use of Public Space	More than 1 x a week	40%	29.3%	24.2%
	At least 1 x a month	43%	53.5%	46.8%
	Never	17%	17.2%	29%
Walking in Current Neighborhood	Much More	68.4%	47.1%	40%
	Same	21.4%	41.2%	50%
	Much less	10.2%	11.8%	10%
Household Group Participation	Nearly All Involved	20%	5.1%	3.2%
	Some Involvement	54%	43.2%	42%
	No Involvement	26%	51.7%	54.8%

The other measures in Table 4 detail the main variables for comparison in this study. In the rest of this chapter, these relationships will be tested for statistical significance between the neighborhoods and when controlling for the various other variables.

Use of Public Space and Local Amenities

The first research question (*Does neighborhood design increase use of public space?*) is explored by comparing the use of public space in the three communities. It is hypothesized that Civano's residents will utilize public space more frequently*. As seen in Figure 7, a majority of residents in each community do visit public space with only 17%, and 17.2% never utilizing public space in Civano and Sierra Morado, respectively; however, nearly 30% of respondents in Mesquite Ranch never utilize public. A Kruskal-Wallis (non-parametric) test is used to determine significance among the three neighborhoods. The test revealed that Civano (n=100), Sierra Morado (n=58), and Mesquite Ranch (n=62) differed significantly ($\chi^2 = 6.628$, df=2, sig. 0.036). Civano residents reported more visits to public spaces than Sierra Morado and Mesquite Ranch. Completing a Mann-Whitney U test determined between which neighborhoods this statistical difference occurred. The only relationship that differed significantly was that between Civano and Mesquite Ranch which showed a small effect size (z = -2.517; p = .012, r = 0.2). Effect size simply reveals the strength of the relationship between the two variables. In this case, the relationship is significant but small. Further, the difference was still significant after accounting for the Bonferroni

adjustment, which involves revising the alpha level by dividing 0.05 by 3 (number of tests between the neighborhoods) in order to avoid Type 1 errors (Pallant, 2010).

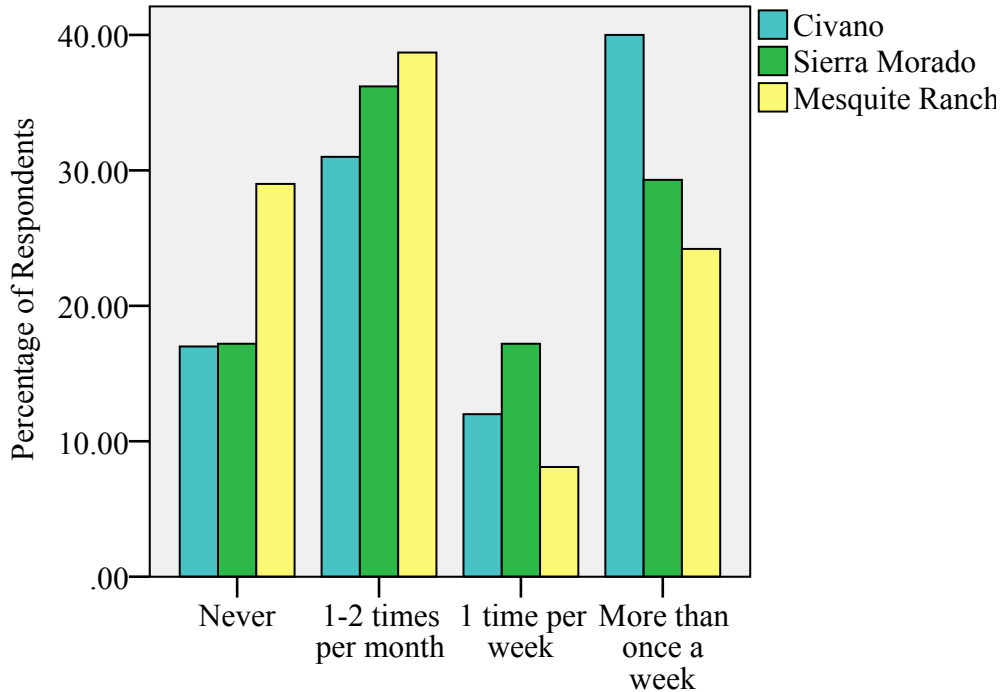


Figure 8. How often do you use neighborhood public space when weather permits?

Beyond public space in Civano, the businesses within and on the periphery of the community are also of interest for this study to help determine the use of nearby amenities in the neighborhood. It is expected that not many residents visit the businesses in the town center; visits to the Valero, the closest gasoline station to Civano, should be higher. Figure 11 depicts frequency by business. Note that neither the Civano Plant Nursery nor the Valero Station is located in the town business center and ‘other’ represents any other business in the Civano neighborhood. The overwhelming majority of Civano respondents never visit the businesses in the town center. 70% of residents frequent the Civano Plant Nursery 1-2 times per month located on the western periphery of the development (near

the entrance), and 46% of residents visit the Valero gas station 1-2 times per month. Visits to the businesses in Civano from the other two communities had even lower percentages and are not presented here as they are not considered local amenities to those living in Sierra Morado or Mesquite Ranch.

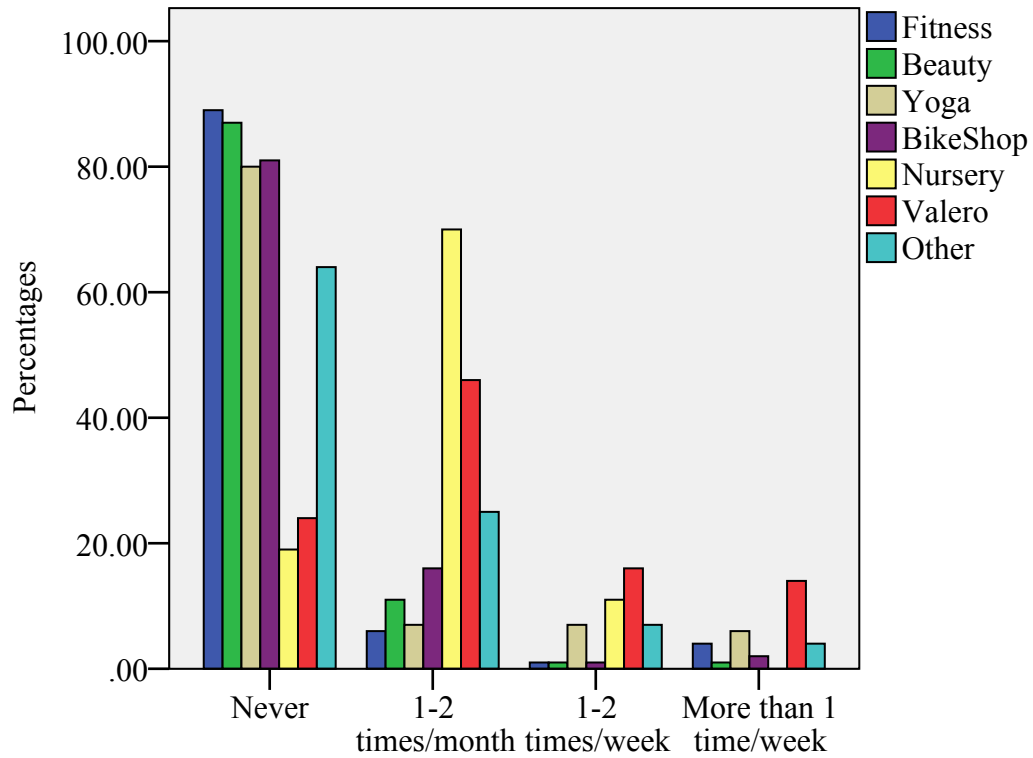


Figure 9. Answers by percentage of respondents from Civano: How often do you visit the following businesses in the area?

Transit to Public Space

The second part of the New Urbanist framework, and the second research question of this study, examines whether neighborhood design increases walking and biking for transportation in the neighborhood. In this case, non-vehicular travel to public space is the most important variable to examine between the three communities, and it is expected that Civano residents will utilize non-vehicular modes of travel more than the other two neighborhoods. A Kruskal-Wallis test

revealed that Civano (n=83), Sierra Morado (n=47), and Mesquite Ranch (n=43) differed significantly ($\chi^2 = 10.851$, $df=2$, sig. 0.004) in the use of non-vehicular travel to public space. Mesquite Ranch had a slightly higher level of respondents reporting that they more frequently go by non-vehicular travel modes than Civano. Sierra Morado residents reported the lowest average; however, on this scale 4 indicates non-vehicular travel to public space about half of the time, and all neighborhoods averaged above this. It is important to point out that the median in Mesquite Ranch is 7, meaning that more than half of the respondents *always* travel by non-vehicular modes.

Table 5
Median and Mode for non-vehicular visits to public space

Civano	N	83.0
	Mean	5.5
	Median	6.0
Sierra Morado	N	47.0
	Mean	4.2
	Median	5.0
Mesquite Ranch	N	43.0
	Mean	5.6
	Median	7.0

The Mann-Whitney U tests show that both Civano and Mesquite Ranch have significantly higher levels of non-vehicular transport to public space than Sierra Morado. Between Civano and Sierra Morado there is a medium effect size with Civano having a higher frequency of non-vehicular travel to public space ($z = -3.107$; $p = .002$, $r = 0.27$). Mesquite Ranch also has significantly higher levels of non-vehicular travel to public space than Sierra Morado ($z = -2.429$; $p = .015$, $r = 0.26$).

Walking and Biking in the Community

Increasing walking and biking in the neighborhood is also a goal of the Civano community through design. Although Sierra Morado also is depicted as an “outdoor lifestyle” community, it is hypothesized that the design of Civano will encourage walking and biking more. To test this, the difference in walking and biking between the respondents’ last neighborhood and current neighborhood were used. A Chi-Square test for independence was used and revealed that in walking, which found significance between the neighborhoods for biking ($\chi^2 (4, n = 209) = .003$; $\phi = .19$) and walking ($\chi^2 (4, n = 190) = .000$; $\phi = .267$) in the community. Both of these relationships have small effect sizes (under .3). Civano residents report more frequently that they walk more (58%) in their current neighborhood than those in Sierra Morado (21%) or Mesquite Ranch (21%). As do Civano residents report more biking (68%) now that they live in their current neighborhood than those in Sierra Morado (13.3%) or Mesquite Ranch (18.7%).

Neighborhood Design and Levels of Sense of Community

Sense of Community as measured by a composite scale (Cronbach’s Alpha = .831) was used to test for differences among the three neighborhoods. In Figure X, you can see the non-normal distribution, requiring the use of non-parametric tests; both the skew and kurtosis reported were out of the range of normality. For the Sense of Community composite measure it is hypothesized that Civano will perform with higher levels than Sierra Morado and Mesquite Ranch. Indeed, Civano ($n = 99$), Sierra Morado ($n=58$), and Mesquite Ranch ($n=61$)

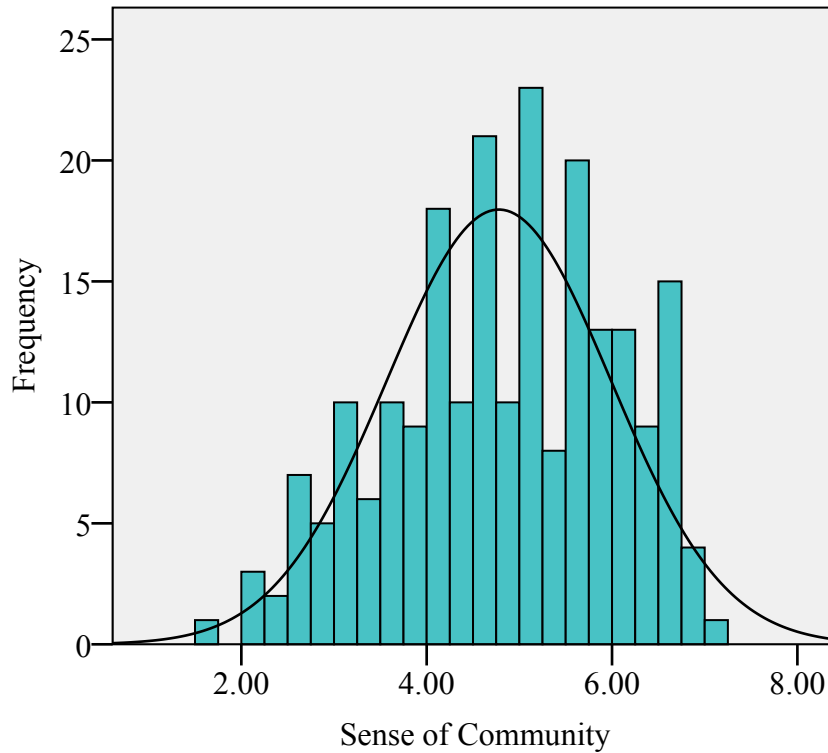


Figure 10. Sense of Community Composite Measure frequencies

differ significantly ($\chi^2 = 25.924$, $df=2$, sig. 0.000). Both Civano (Md = 5.5) and Mesquite Ranch (Md = 4.7) showed significantly higher levels of sense of community than Sierra Morado (Md = 4.3) (See Figure 12). When determining where the significant difference exists, Mann-Whitney U tests were used. Civano ($n = 99$) shows significantly higher sense of community scores than Sierra Morado with a medium effect size ($z = -4.529$; $p = .000$, $r = .351$). Similarly, Civano also has a significantly higher level of sense of community than Sierra Morado with a medium effect size ($z = -3.807$; $p = .000$, $r = 0.301$). These differences are represented in Figure 13 where an a/b relationship depicts significance. Here you can see the differences between the means measured from each neighborhood. Civano stands out with an average above 5.

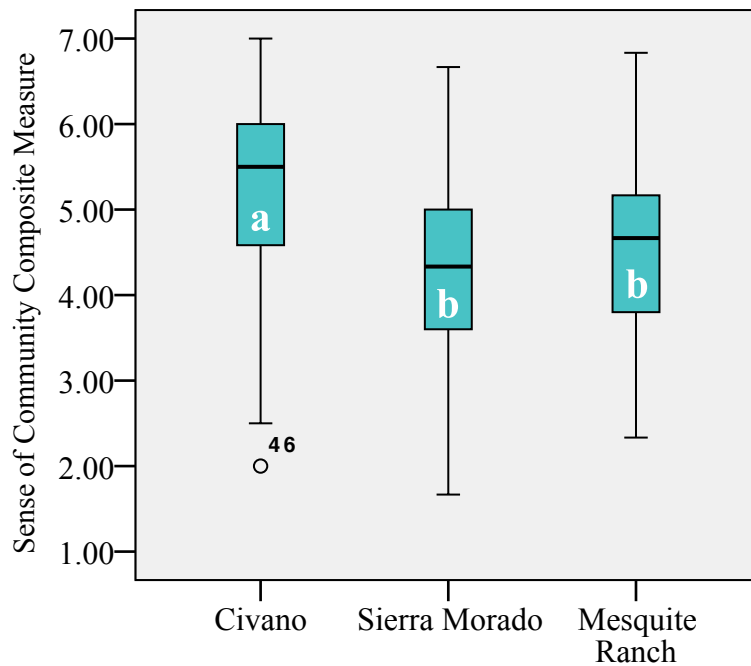


Figure 11. Mean score of neighborhoods on the Sense of Community Composite Measure.

Other Measures of Community

As mentioned in Chapter 4, other ways to discern sense of community were also examined. Some of these were presented in Likert Scales of 1 to 7 and the means from respondents by community are seen in Table 6. Similar to the composite measure, it is expected that Civano will have higher levels here, as well; however, these measure serve more as an exploratory opportunity into other aspects and ways to determine levels of community experience and feelings. “I don’t care whether or not this neighborhood does well” is the last statement on Table 6 and is the item removed from the composite measure due to it not complying with the tests of validity. It has the highest consistent mean values of the measures in all three neighborhoods. Lower averages are seen in the question asking about participation in informal or formal neighborhood groups. Also,

feelings of efficacy, or influence over neighborhood decisions, are low as well.

Feelings of trust are particularly high in Civano and in Mesquite Ranch but not as

Table 6
Other Measures of Sense of Community, Mean Scores

	Civano	Sierra Morado	Mesquite Ranch
I know the majority of my neighbors on my street.	4.6	3.3103	3.1
I feel like I can influence decisions that affect my neighborhood.	3.732	2.5	3.0333
Members of my household participate in formal or informal neighborhood associations or groups.	3.3636	2.1034	2.1833
My neighbors and I talk about our neighborhood.	5.3737	3.9828	4.0806
I would recommend this neighborhood to a friend or family member.	6.37	5.3966	5.5968
I have made trusting relationships with my neighbors (i.e. would feel comfortable calling them if there is an emergency).	6.0202	4.4912	5.1667
I feel comfortable lending and/or borrowing items from my neighbors.	5.8878	4.1071	4.7667
I DON'T care whether this neighborhood does well. (Reverse Coded)	6.55	6.5517	6.7419

much in Sierra Morado. ‘Knowing neighbors’ is lower for Mesquite Ranch than Sierra Morado and Civano. After running Mann-Whitney U tests, it was found that all of the variables were significantly different between Civano and Sierra Morado and Civano and Mesquite Ranch but not between Sierra Morado and Mesquite Ranch (with the exception of ‘I don’t care whether this neighborhood does well’ where no significant difference was discovered). Effect sizes were in

the medium range where $r = 0.3$ or close to it. Other variables may account for sense of community.

Two questions asked about in-home socializing. This may account for some amount of social interaction that does not take place in public space. Socializing in this way was more common in Civano. In all three communities there are significant positive correlations between in-home visits and the composite sense of community measure. The correlations are all consistently medium to large in strength as seen in Table 5.

Table 7
Correlations of Sense of Community and Social Invitations

	In own home social invite	In neighbor's home social invite
Sense of Community		
Civano	.453**	.486**
Sierra Morado	.483**	.554**
Mesquite Ranch	.582**	.585**

** Correlation is significant at the 0.01 level (2-tailed).

Public Space and Sense of Community

By examining the correlation between walking to public space and the levels of sense of community from the composite measure, a better idea of what is possibly contributing to levels of sense of community can be explored. Specifically, frequenting public space and non-vehicular travel to public space are correlated by running Spearman's Rank Order tests as the composite measure is not normally distributed. In line with the New Urbanist framework, it is hypothesized that those who frequent public space more often will exhibit higher levels of sense of community. Those spending time on the sidewalk and trails (examined though measuring non-vehicular travel to public space) should also

have heightened sense of community. Table 8 shows the correlations of use of public space, non-vehicular travel to public space, and tested demographics.

Reference it for a quick summary of significant correlations.

Use of Public Space and Levels of Sense of Community. In both Civano and in Sierra Morado, there were significant and positive correlations between the use of public space and sense of community composite measure. In Civano, this relationship was of average strength, $\rho = .347$, $n = 99$, $p < .0004$. Similarly, in Sierra Morado, this relationship was of average strength, $\rho = .369$, $n = 58$, $p < .004$. Both of these correlations have moderate shared variance as calculated from the rho value.

Walking to Public Space and Sense of Community. There were no significant correlations found in any of the neighborhoods when testing the relationship between the composite sense of community measure and the frequency of non-vehicular travel to public space (-0.060, -0.204, and 0.227 were the correlation coefficients for Civano ($n = 83$), Sierra Morado ($n = 47$), and Mesquite Ranch ($n = 43$) respectively). This was also true when examining correlations between all cases (not separated by neighborhood with a correlation coefficient of 0.035).

Demographic Correlates of Sense of Community. Certain demographic relationships must be considered when examining what might impact the sense of community in a neighborhood. These are things such as income, tenure, presence of children in the household, gender, and educational attainment. In Table 7 the significance of these with sense of community is summarized by neighborhood.

Again, Spearman's Rho was used to determine significance. As a non-parametric test, it does not require normality, but it does require linearity. It allows for use of ordinal variables, as well as categorical as long as the cases have similar n values. While each variable did not pass the test of linearity, there is still the ability to determine whether or not correlations exist that will be more accurately examined after a relationship is established. Looking at Table 8, very few significant relationships of correlations are found: In all communities, children in households and use of public space have a slightly positive correlation. In Civano tenure and use of public space have a slightly negative significant correlation, while in Sierra Morado there is a positive correlation. Use of public space has a positive and significant correlation with educational attainment in Sierra Morado. Ultimately none of these relationships have strong enough correlations to require further investigation into the possibility of them impacting the results reported.

The relationship between gender and Sense of Community was also examined because of such high numbers of female respondents in Sierra Morado. A Mann-Whitney U test revealed a significant difference where females have higher levels than males ($n = 215$, $p = .013$, $z = -2.493$, $r = .17$). This, however, was a low effect size and similar testing done by neighborhood revealed that this was a significant relationship in Civano only meaning that sense of community measures in Sierra Morado were not skewed by the increased number of female respondents.

Table 8
 Cross Tab Correlations to determine demographic impacts on Sense of Community and Use of Public Space

		Use of Public Space	Non-vehicular Travel to Public Space	Educational Attainment	Income	Tenure	Children in Household
Civano	Sense of Community	.347**	-0.085	0.092	0.113	0.352	0.282
	Use of Public Space	-	-	0.17	-0.02	-0.197*	0.254*
	Non-vehicular Travel to Public Space	-	-	-0.09	0.159	-0.037	-0.114
Sierra Morado	Sense of Community	.369**	-0.149	0.108	0.125	0.005	-0.11
	Use of Public Space	-	-	0.258*	-0.034	0.302*	0.297*
	Non-vehicular Travel to Public Space	-	-	0.087	-0.025	0.104	0.006
Mesquite Ranch	Sense of Community	0.035	0.023	-0.176	-0.041	0.144	0.181
	Use of Public Space	-	-	-0.085	0.08	-0.207	0.217*
	Non-vehicular Travel to Public Space	-	-	-0.053	0.101	0.239	-0.111

**Correlation is significant at the 0.01 level (2-tailed).
 *Correlation is significant at the 0.05 level (2-tailed).

Time Spent in the Car

Recognizing that the study site is located on the periphery of the city, travel time in the car, a common ill of suburban living, was examined. Initially, Civano was intended to be in a corridor with access to transit. The vision was to eliminate car usage, but that idea is a figment of past intentions. For this reason it is hypothesized that no difference should be found between the neighborhoods and time spent in the car. Using a Kruskal-Wallis test, there were no significant differences between Civano, Sierra Morado, and Mesquite Ranch for Driving for Work ($\chi^2 = 1.043$, $df=2$, sig. 0.594), Driving for Errands ($\chi^2 = .394$, $df=2$, sig. 0.821), and Other Driving ($\chi^2 = 1.003$, $df=2$, sig. 0.606). All neighborhoods reported similar travel habits.

Reason for Neighborhood Choice

While some of the data show that Civano performs higher in terms of sense of community and use of public space, it is important to determine whether this may be accounted for by the reasons residents relocated to their community. The series of questions asking the importance of neighborhood characteristics allows us to examine this issue as some of them are specific to New Urbanist design and how the neighborhoods are marketed. In a Kruskal-Wallis test, the following aspects were found to have significant differences:

- Affordability of housing
- Quality of schools
- High sense of community
- Easy to walk to places
- Energy efficiency of household
- Public amenities

Safety and Peace and Quiet seem to be something all residents require. Mann-Whitney tests were used to follow up and determine which relationships are significant. Between Civano and Sierra Morado, were all aspects of the neighborhood that Civano respondents valued more. Quality of schools ($z = -3.254$; $p = .001$, $r = .267$) was more important to Sierra Morado residents for relocation. Between Civano and Mesquite Ranch, significance of relationships was nearly identical, except for that of public amenities. Sense of Community

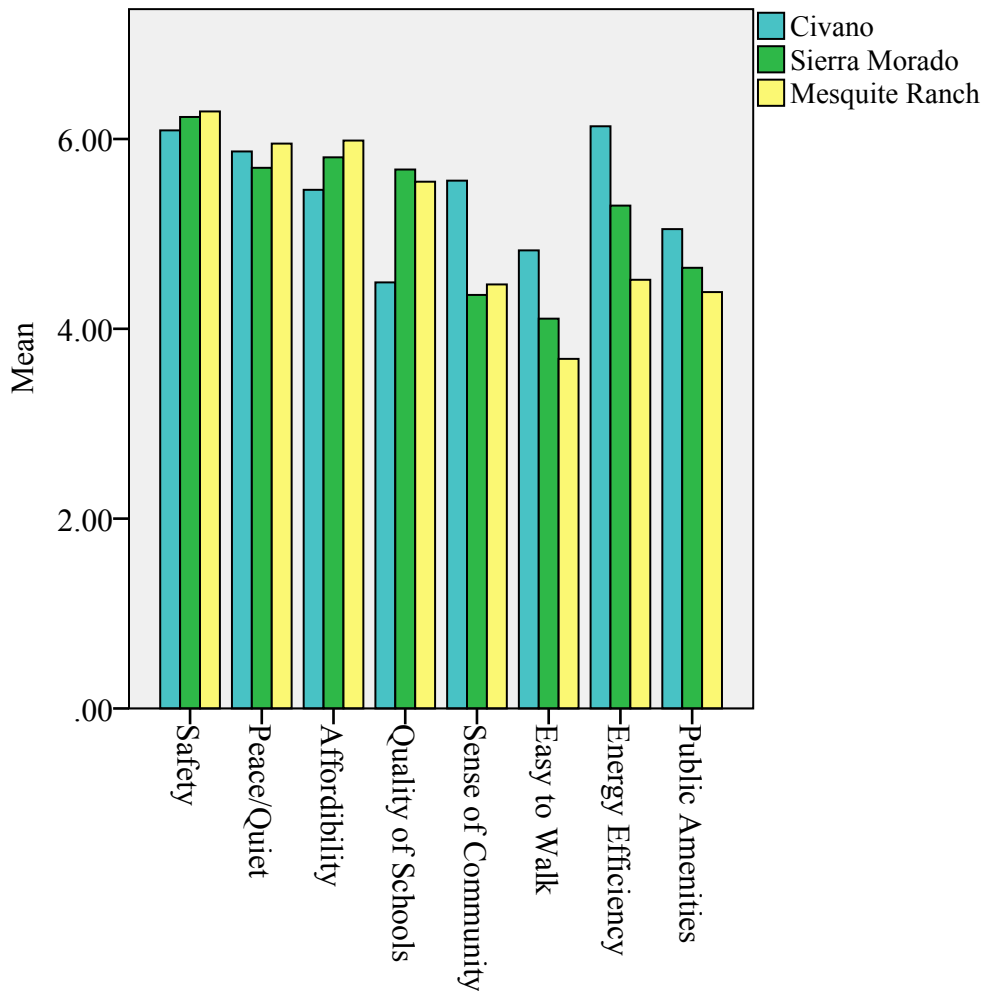


Figure 12. Reasons for Relocating to Current Neighborhood

($n = 160$, $z = -4.536$; $p = .000$, $r = .359$), Walking ($n = 158$, $z = -3.937$, $p = .000$, $r = .313$), and Energy Efficiency ($n = 157$, $z = -6.772$, $p = .000$, $r = .540$) were all rated significantly higher in Civano than in Mesquite Ranch. There was also a significant relationship with a small effect size ($n = 161$, $z = -2.509$; $p = .012$, $r = .2$) where Civano residents valued more the presence of public amenities when relocating to their community. Quality of schools ($n = 152$, $z = -3.214$; $p = .001$, $r = .261$) was also more important to Mesquite Ranch residents for relocation.

The data that come from the survey are fairly representative of the entire population as described in Chapter 4 (at the 95% confidence level the margin of error is 5.9); therefore, these data can be used to draw conclusions in the following chapter about the relationship between neighborhood design and our other variables as extended to the general population.

CHAPTER 6: DISCUSSION

This chapter provides an interpretation of the survey results in order to answer the research questions of the study. It is important to recall the study site environments and context before discussing the implications of the survey results: What the three neighborhoods have in common are their location on the fringe of Tucson; also, all boast mid to high household incomes, some form of public space (at least two) that are central and within the boundaries of the neighborhood, a network of walking paths, and similar housing unit densities. The neighborhoods are all fairly new (not much time since development), but Sierra Morado is a bit younger than the other two. Development is still ongoing in parts of Civano and Sierra Morado. What differs most are neighborhood characteristics in the built environment and the varying degrees of public amenities available. Using neighborhoods as proxies for different built environments, this study aims to discover what design-oriented aspects of Civano might enhance the residential and community experience in the neighborhood; in turn, here the role of the built environment and design in neighborhood development is discussed with consideration of how certain practices may lead to better neighborhoods.

Fulfilling the Goals of New Urbanism in Civano

Civano's goal was to create a neighborhood that would foster social interactions and sense of community on the street and in public places. The findings show that in contrast to Sierra Morado and Mesquite Ranch, Civano

repeatedly performed higher in most of the measures used to quantify these goals. The statistical significance is telling, but taking a closer look, all three of the neighborhoods typically score above the mid-range of the measure at hand, showing that all of the neighborhoods have some level of enhanced community through visits to public space, walking, and sense of community. There are exceptions and a more thorough examination of relationships between neighborhood and measures provide insight into what the possible meaningful differences imply for the neighborhood study.

Public Space and Businesses. Use of public space, as it was hypothesized, does change by neighborhood. In Civano, 40% of residents use public space more than once a week. In contrast, nearly 30% of Mesquite Ranch residents never use public space, still on a scale of 1 to 4, all neighborhoods showed average scores of above 2. Civano residents reported significantly higher visits to public space than Mesquite Ranch but only slightly higher than Sierra Morado (not significant). Although all neighborhoods have at least two areas designated as community space, both Civano and Sierra Morado boast more opportunities for use of public space than Mesquite Ranch. This difference easily could have impacted the use of public space for residents that may live at the periphery of the neighborhood in Mesquite Ranch as the public space available there is centrally located and possibly inconvenient.

Use of public space also positively correlated with presence of children in the household for all three communities, which can be expected, but it also means that there is room for more work to include amenities that engage households

without children. Also, interesting to consider is the fact that Sierra Morado neighborhood reports much higher numbers of households with children; therefore, one would expect that Sierra Morado residents would report more frequent visits to public space. This was not the case.

Tenure was only slightly positively correlated with use of public space in Sierra Morado indicating that newcomers to the community are less likely to visit public space. Is this due to the fact that the neighborhood environment is bad at quickly integrating new residents? Or are the newest tenants possibly those on the periphery of the neighborhood (where build out is still occurring)? It also could be a function of Sierra Morado being a newer community.

Other local amenities, such as the businesses in the Civano town center, are rarely used by residents. This was expected as many of the shops are fairly specialized and probably lack appeal to the majority of the residents. New Urbanism relies on the fact that the town center will have a mix of uses. There simply is not the girth or the breath to the diversity of the businesses in Civano to meet this goal. This is a failure to which founders and residents of Civano have already admitted (Nichols & Laros, 2009). Without something like a grocery store that would bring people to this area daily, it is unlikely that visits will increase. As some of the last build out phases of Civano and Sierra Morado are completed, it is possible that something like a small grocery store could be supported by the population, but it should still be of concern to the communities.

The Valero gas station and the Civano Plant Nursery are visited the most out of all of the businesses in the area by Civano, Sierra Morado, and Mesquite

Ranch residents. In Civano, around 80% visited both places at least once a month. While numbers are not very high, it is important to note that neither business is located in the town center. Such failure to provide adequate commercial amenities to residents can have a direct impact to the frequency of residents visiting the town center. Without a vibrant core with uses for more people in the community, there are fewer opportunities for interaction beyond the use of the pool, park, or street.

Transportation Habits. In other studies investigating similar aspects of New Urbanism, travel is an important aspect of the research (Lund, 2003; Podobnik, 2002, 2011); however, these usually examine neighborhoods that are integrated within a city, rather than on the periphery. Still, as this research deals with the possible impacts that walking may have on social interaction, travel to public space and any change in residents' travel habits from their prior neighborhood to their current one indicate different outcomes for how Civano has performed in this way. First, traveling to public space by non-vehicular travel was higher in Mesquite Ranch than it is in Civano (not significantly, though). This is a surprise and warrants further investigation. Remember that only 60% of respondents utilize the public space in Mesquite Ranch. Again, the location of public space in Mesquite Ranch may indicate that those who live close enough to walk might be more inclined to go. A resubmission to IRB to use the locations of respondents in relation to their use of public space could help to answer this.

Still, Civano boasts significantly higher levels of non-vehicular travel to public space than Sierra Morado. Their community center and pool are central to

the community but not very connected to residents; in fact, a street and parking lot separate the building and the closest houses which could encourage residents to drive. Despite this potential barrier, Sierra Morado did not have abysmal rates of non-vehicular travel to public spaces indicating that within all three neighborhoods, residents do seem inclined to walk to their neighborhood public space.

The results examining change in walking from the respondents' past residence to their current neighborhood (either Sierra Morado, Civano, or Mesquite Ranch) tell a slightly different story. Significantly more Civano residents report walking and biking with more frequency after moving to Civano. This measure is not limited to walking to public space. Respondents could consider amounts of strolling or walking for exercise or leisure in their answer. Considerably higher values in Civano indicate that Civano is, indeed, meeting its goal of an environment that enhances walking and biking for residents. Street elements that are more developed in Civano can contribute to this, such as ample shade and winding pathways through washes (but a conclusion can not be drawn here). A problem, however, is the Hawthorn effect, where residents report what they think should be happening in their neighborhood rather than what their actual habit is, should account for some of this difference.

Sense of Community. Civano also claims to be a place where sense of community is enhanced. What evidence exists that supports this? The composite measure used evaluates both the psychological aspects of sense of community and basic social interaction. The results of the survey show that Civano does have

higher reported scores on the sense of community measure, but with a small effect size. This indicator does show that Civano performs better here. Sierra Morado performs the worst. The difference between Sierra Morado and the other two neighborhoods may be accounted for in the difference in the age of the neighborhood. Sierra Morado being younger and with a lower level of tenure, may have not had as much time to develop a sense of community.

Looking at other measures helps to build up a better picture of Civano's possible higher sense of community. When comparing the other measures of social interaction, trust, and involvement in the community (not the composite), however, Civano consistently reports significantly higher levels with medium to large effect sizes. This helps to support the idea that Civano residents do reach more heightened experiences in social interactions than the other neighborhoods, specifically higher levels of trust in their community among residents. Trust was also revealed to be an important part of social capital in a study done by Paxton, and here, as a stand alone measure, is higher in Civano than the sense of community composite measure.

Also discovered is that none of the neighborhoods have very high levels of sense of efficacy or involvement in the neighborhood. Most respondents felt that they did not have influence over decisions being made, although Civano's score was significantly the highest. While neighborhood design may account for some of this difference, it is more likely impacted by the different HOA arrangements in the neighborhoods. While this is not directly related to sense of community, it is important when considering how the institutional structure of the

neighborhoods may impact how individuals get involved. Civano's community meetings are open to all people and happen on a near monthly basis. Sierra Morado and Mesquite Ranch have closed HOA meetings that happen bi-annually (you must be a resident to attend). This is simply another point of interaction where residents can come together to meet each other and discuss issues within their neighborhood. It may be that Civano's platform for this involvement is effective for those that want to play a larger role in how their community functions.

Sense of Community and Public Space. If there exists a higher level of community in Civano, then is it associated with use of public spaces? Is it associated with walking to public spaces? This addresses the third research question and ultimately the ability for neighborhood design to impact sense of community. Indeed, for Civano residents and Sierra Morado residents there is a significant correlation between sense of community and visit to public space. This indicates that public space in Mesquite Ranch may not be used for socializing between neighbors but more on an individual basis for each household. For both Civano and Sierra Morado, this correlation accounts for about 35% of the relationship, which is average in such tests. This may be impacted by the type of public space available in the communities, but it still speaks to the fact that Civano and Sierra Morado have more visits to public space. Civano and Sierra Morado aim to bring people together in the town/community center, at the pools and in the green spaces. In Mesquite Ranch this space is just an amenity provided to the residents, not necessarily a place for gathering or interacting.

There were no significant relationships between walking to public space and sense of community, indicating that interaction on the street, the goal of those promoting New Urbanism, may not be that impactful to sense of community. This does not mean that such forms that aim to increase walking should not be promoted, but it does indicate that at least in Civano and in Sierra Morado visiting public space is currently more important than interactions that happen on the way to public space when considering sense of place. This also may be indicative of the context of these neighborhoods as fringe developments, and these results should be taken in this context and not in one where neighborhoods abut major city centers or downtowns.

In summary, neighborhood design does impact use of public space and is positively correlated with sense of community in Sierra Morado and Civano, but non-vehicular travel to these shared spaces does not affect sense of community. Civano residents walk and bike more to public space and report more walking since moving to their community which ultimately shows that they are achieving their goal; however, these levels can be higher (especially in comparison to the two neighborhoods to the south) by creating more places to walk to in the community and more amenities.

Reasons for Moving to Neighborhood. As indicated by Sander (2002), selection bias is a limitation to social research in New Urbanism. The respondent's valuation of reasons for moving to their current neighborhood serve to test for possible self-selection into the neighborhood, but they ultimately also tell us about the values of the residents. Indeed, Civano residents show that there

is possible self-selection in the categories of walking, sense of community, and presence of amenities; however, it is still clear that Civano encourages walking as many people walk significantly more often in Civano than they did in their prior neighborhood. Sense of place as a composite measure is more difficult to discern just how much of the increase is due to possible selection bias, but it is evident that residents in Civano interact with their neighbors more in private spaces and have considerably higher levels of trust. This does not exist as much in the other two neighborhoods, and for a neighborhood that is new, it shows that the residents have been quick to socialize in a more intimate fashion and have moved past just interaction in common public places.

Another outcome of this set of measures shows an extremely high level of value in Civano for energy efficiency. This fact is important to consider why residents choose Civano. It appears to be less for reasons related to walking and sense of place and more for energy efficiency; therefore, the neighborhood, at least to those buying into Civano, is still reflective of the very first goal the community had: to be “off-the-grid”. This is more important to residents than the New Urbanist design aspects of the design.

Policy and Design Implications

The outcomes of this research provide information to the homogenous development patterns found throughout the periphery of most U.S. cities, especially those in the desert southwest. It also informs, at the neighborhood level, the importance of availability of public space and how it might impact the

overall sense of community. Finally, it contributes, specifically, to evaluating the success of the Civano community and how socially the neighborhood has achieved its goals set out at the beginning of development.

The neighborhood of Civano, as a community with intentional goals for encouraging community and certain travel habits, while succeeding in some ways, has failed in others. Moving forward, the neighborhood should continue to provide more diverse opportunities in the town center. There are some policy efforts already in motion to diversify housing types (through a Granny Flat initiative) and to bring a bus line to the area. The new code for the granny flat has the potential to attract different household type and also encourage aging in place. To date the area is not on a transit line, but the City of Tucson is currently in discussions with Civano and Sierra Morado to complete a route to the area. By locating the bus line central to the Civano community, it is possible that it might activate the town center. This should be considered during the planning process for bus access. The form that is already in place (less parking availability and good connectivity) would encourage more walking to the bust stop if it is located in the center, and the survey data shows that at least 40% of Civano residents are willing to use public transportation for travel to work. This emphasizes the importance of function along side neighborhood design.

Use of public space in Civano was higher than it was in Sierra Morado, despite the fact that there were similar amenities. This has implications for neighborhood design, combined with the fact that fewer people in Sierra Morado walk to the public space when visiting, indicates that simple changes in the

neighborhood design could have encouraged more walking. The most notable is the lack of connectivity to the Community Center. This helps to inform future developers that may not have the time and funding to produce a street and landscape like Civano's but can better integrate the neighborhood centers into the rest of the development. If increasing sense of community is a goal, such changes to the neighborhood design, that increase use of public space, could facilitate more interaction and trust among neighbors.

In the context of the desert southwest, where fringe and infill developments are still being built, considering certain design solutions from Civano could be beneficial. As these are new communities, it is good to know that such arrangement of public spaces and trail connectivity can ensure sense of community for a new fringe development, after all, Civano is not a very old neighborhood. It does tell a cautionary tale of attempting to support certain enterprises. If there is uncertainty that a business center will thrive, it may be best to utilize central spaces for other activities. The Civano school, for example, may have better served the neighborhood if it had been in a more central location than its current building south of Civano. By doing so, it would have attracted daily movement to the central area of the neighborhood and to the various businesses and enterprises located there. Lastly, if businesses are to be included in a neighborhood as far removed from the center as Civano is from Tucson then certainty of populations to support such things as a grocery store must be carefully examined before plans are made to include businesses in the neighborhood business and mixed use area.

Further Research

This research on Civano exists in a vacuum of fringe development. A limitation to this study is that it can not claim anything concerning more centrally located neighborhoods. A comparison of this study to a neighborhood closer to central Tucson would be important in examining how Civano compares to communities closer to the core but with urban form more similar to Sierra Morado. Specifically, it would inform the research about how other neighborhoods may rate with the social composite measure and other variables. It is also important to measure neighborhoods over time. As all three communities are relatively new, it would be beneficial to examine the changes in sense of community again when construction of the neighborhoods is complete and tenure may be higher for all three communities. It could provide a more important valuation of the successes or failures in Civano and Sierra Morado. It is expected that they would continue to do better in the measurements whereas Mesquite Ranch, nearly at full capacity, does not have much room to evolve or change.

As discussed before, the proximity to and availability of public space seem to be an important aspect of neighborhood design. Quantifying this for comparison between the residents could yield more meaningful. If accepted by IRB, a simple analysis could be done that links distance to public space usage which would help to reason why certain values of transportation to public space in Mesquite Ranch may be higher. It could also be correlated with the composite

measure to examine whether proximity to the core of any of these neighborhoods may impact resident perceptions or experiences within the community.

Conclusions

New Urbanism bases much of its approach on the assumption that neighborhood design plays an important role in impacting how residents interact with one other and how they form travel habits. This study aims to reveal whether that is an accurate assumption through the platform of evaluating a New Urbanist neighborhood within the context of fringe development in the desert southwest. The study informs, specifically, new development on what are some approaches to neighborhood design that encourage social interaction and psychological sense of community among residents. One of the major findings of this study is that the presence of public places within neighborhoods is an important aspect of design, and not only that, but how public places are integrated into the neighborhood spatially could be very important. Getting residents to public spaces increases reported sense of community if the neighborhood design is right. The act of walking or biking to public space is not as important to the neighborhood levels of sense of community as it was thought to be in the relationships tested here; however, neighborhood design did seem to impact non-motorized travel indicating that for health reasons, it is possible that the New Urbanist design can be beneficial to residents.

Although not all of the findings were supportive of Civano being a better neighborhood in the social realm, it does begin to paint a picture of a place where

neighbors do know each other better, more walking does occur, and the potential for an even stronger community exists. The excessive process that Civano planners and designers traversed in the first years could possibly be avoided in new developments, yet very similar design attributes, the ones that matter, can be incorporated in future neighborhood projects.

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APPENDIX A

CHARTER OF THE NEW URBANISM

CHARTER OF THE NEW URBANISM

The Congress for the New Urbanism views disinvestment in central cities, the spread of placeless sprawl, increasing separation by race and income, environmental deterioration, loss of agricultural lands and wilderness, and the erosion of society's built heritage as one interrelated community-building challenge.

We stand for the restoration of existing urban centers and towns within coherent metropolitan regions, the reconfiguration of sprawling suburbs into communities of real neighborhoods and diverse districts, the conservation of natural environments, and the preservation of our built legacy.

We advocate the restructuring of public policy and development practices to support the following principles: neighborhoods should be diverse in use and population; communities should be designed for the pedestrian and transit as well as the car; cities and towns should be shaped by physically defined and universally accessible public spaces and community institutions; urban places should be framed by architecture and landscape design that celebrate local history, climate, ecology, and building practice.

We recognize that physical solutions by themselves will not solve social and economic problems, but neither can economic vitality, community stability, and environmental health be sustained without a coherent and supportive physical framework.

We represent a broad-based citizenry, composed of public and private sector leaders, community activists, and multidisciplinary professionals. We are committed to reestablishing the relationship between the art of building and the making of community, through citizen-based participatory planning and design.

We dedicate ourselves to reclaiming our homes, blocks, streets, parks, neighborhoods, districts, towns, cities, regions, and environment.

Continued on back...

The region: Metropolis, city, and town

- 1) Metropolitan regions are finite places with geographic boundaries derived from topography, watersheds, coastlines, farmlands, regional parks, and river basins. The metropolis is made of multiple centers that are cities, towns, and villages, each with its own identifiable center and edges.
- 2) The metropolitan region is a fundamental economic unit of the contemporary world. Governmental cooperation, public policy, physical planning, and economic strategies must reflect this new reality.
- 3) The metropolis has a necessary and fragile relationship to its agrarian hinterland and natural landscapes. The relationship is environmental, economic, and cultural. Farmland and nature are as important to the metropolis as the garden is to the house.
- 4) Development patterns should not blur or eradicate the edges of the metropolis. Infill development within existing urban areas conserves environmental resources, economic investment, and social fabric, while reclaiming marginal and abandoned areas. Metropolitan regions should develop strategies to encourage such infill development over peripheral expansion.
- 5) Where appropriate, new development contiguous to urban boundaries should be organized as neighborhoods and districts, and be integrated with the existing urban pattern. Noncontiguous development should be organized as towns and villages with their own urban edges, and planned for a jobs/housing balance, not as bedroom suburbs.
- 6) The development and redevelopment of towns and cities should respect historical patterns, precedents, and boundaries.
- 7) Cities and towns should bring into proximity a broad spectrum of public and private uses to support a regional economy that benefits people of all incomes. Affordable housing should be distributed throughout the region to match job opportunities and to avoid concentrations of poverty.
- 8) The physical organization of the region should be supported by a framework of transportation alternatives. Transit, pedestrian, and bicycle systems should maximize access and mobility throughout the region while reducing dependence upon the automobile.
- 9) Revenues and resources can be shared more cooperatively among the municipalities and centers within regions to avoid destructive competition for tax base and to promote rational coordination of transportation, recreation, public services, housing, and community institutions.

The neighborhood, the district, and the corridor

- 10) The neighborhood, the district, and the corridor are the essential elements of development and redevelopment in the metropolis. They form identifiable areas that encourage citizens to take responsibility for their maintenance and evolution.
- 11) Neighborhoods should be compact, pedestrian friendly, and mixed-use. Districts generally emphasize a special single use, and should follow the principles of neighborhood design when possible. Corridors are regional connectors of neighborhoods and districts; they range from boulevards and rail lines to rivers and parkways.
- 12) Many activities of daily living should occur within walking distance, allowing independence to those who do not drive, especially the elderly and the young. Interconnected networks of streets should be designed to encourage walking, reduce the number and length of automobile trips, and conserve energy.
- 13) Within neighborhoods, a broad range of housing types and price levels can bring people of diverse ages, races, and incomes into daily interaction, strengthening the personal and civic bonds essential to an authentic community.
- 14) Transit corridors, when properly planned and coordinated, can help organize metropolitan structure and revitalize urban centers. In contrast, highway corridors should not displace investment from existing centers.
- 15) Appropriate building densities and land uses should be within walking distance of transit stops, permitting public transit to become a viable alternative to the automobile.
- 16) Concentrations of civic, institutional, and commercial activity should be embedded in neighborhoods and districts, not isolated in remote, single-use complexes. Schools should be sized and located to enable children to walk or bicycle to them.
- 17) The economic health and harmonious evolution of neighborhoods, districts, and corridors can be improved through graphic urban design codes that serve as predictable guides for change.
- 18) A range of parks, from tot-lots and village greens to ballfields and community gardens, should be distributed within neighborhoods. Conservation areas and open lands should be used to define and connect different neighborhoods and districts.

The block, the street, and the building

- 19) A primary task of all urban architecture and landscape design is the physical definition of streets and public spaces as places of shared use.
- 20) Individual architectural projects should be seamlessly linked to their surroundings. This issue transcends style.
- 21) The revitalization of urban places depends on safety and security. The design of streets and buildings should reinforce safe environments, but not at the expense of accessibility and openness.
- 22) In the contemporary metropolis, development must adequately accommodate automobiles. It should do so in ways that respect the pedestrian and the form of public space.
- 23) Streets and squares should be safe, comfortable, and interesting to the pedestrian. Properly configured, they encourage walking and enable neighbors to know each other and protect their communities.
- 24) Architecture and landscape design should grow from local climate, topography, history, and building practice.
- 25) Civic buildings and public gathering places require important sites to reinforce community identity and the culture of democracy. They deserve distinctive form, because their role is different from that of other buildings and places that constitute the fabric of the city.
- 26) All buildings should provide their inhabitants with a clear sense of location, weather and time. Natural methods of heating and cooling can be more resource-efficient than mechanical systems.
- 27) Preservation and renewal of historic buildings, districts, and landscapes affirm the continuity and evolution of urban society.

APPENDIX B
IRB APPROVAL

To: Emily Talen

From: Mark Roosa, Chair
Soc Beh IRB

Date: 11/29/2011

Committee Action: **Exemption Granted**

IRB Action Date: 11/29/2011

IRB Protocol #: 1111007140

Study Title: Effects of the Urban Environment on Residential Habits and
Neighborhood Sense of Place in 3 Communities in Tucson, AZ

The above-referenced protocol is considered exempt after review by the Institutional Review Board pursuant to Federal regulations, 45 CFR Part 46.101(b)(2) .

This part of the federal regulations requires that the information be recorded by investigators in such a manner that subjects cannot be identified, directly or through identifiers linked to the subjects. It is necessary that the information obtained not be such that if disclosed outside the research, it could reasonably place the subjects at risk of criminal or civil liability, or be damaging to the subjects' financial standing, employability, or reputation.

You should retain a copy of this letter for your records.

APPENDIX C
SURVEY INSTRUMENT AND LETTER



<date>

Dear Resident,

Your household has been randomly selected to participate in a survey of residents in your neighborhood, as part of a research study sponsored by Arizona State University (ASU) and the Phoenix Urban Research Lab (PURL). The purpose of this project is to study how residents feel about living in the Sierra Morado, Civano, and Mesquite Ranch neighborhoods.

To show our appreciation for your participation, everyone that completes the survey will be entered into a random drawing for a chance to win one of three \$100 Visa pre-paid cards. The survey takes about 10 minutes to complete.

How is the survey completed? You decide. You can return the attached survey by mail, go online, or call us.

- **Mail:** Complete the attached survey and return it by mail in the pre-paid postage envelope.
- **Go online:** Visit our webpage <http://issrweb.asu.edu/tucson> ; you will be redirected to the survey start page. **You will be asked to enter your LogIn ID, which is INSERT.** If you have any problems getting online, send an e-mail to Mike.McLaen@asu.edu and he will send you a link you can click on to take the survey.
- **Call us:** Call the Institute for Social Science Research (ISSR) at (480) 965-4082 to schedule a telephone interview. You will reach voice mail, please leave your name and number, and we will return your call.

All respondents must be at least 18 years old. By completing and submitting the survey by one of the methods listed above, you are agreeing to participate in the study.

Your answers are confidential. This scientific survey has been designed by ASU faculty and I can assure you that you will not be asked to purchase anything or for any kind of donation, and your answers will be completely confidential. Your name or address will never be attached to your responses. Data from the study will be grouped together for reports and analysis. If you chose to participate in the random drawing for a chance to win a Visa pre-paid card, your answers will remain confidential and separate from your address.

If you do not wish to take part in this study, please call (480) 965-4082 or e-mail Mike.McLaen@asu.edu, and let him know; we will not contact you again.

Thank you in advance.

Sincerely,

A handwritten signature in blue ink that reads "Emily Talen".

Emily Talen, Ph.D.
Professor, School of Geographical Sciences and Urban Planning
Arizona State University

The survey is 3 pages total, starting on the other side of this page → → → →

For each question, please circle the letter or number next to your answer.

1. Which of the following neighborhoods do you live in?
 - a. Civano
 - b. Sierra Morado
 - c. Mesquite Ranch
 - d. None of the above
2. How long have you lived in your current residence?
 - a. Less than 1 year
 - b. 1-3 years
 - c. 4-6 years
 - d. 7-9 years
 - e. 10 or more years
3. How many months of the year do you occupy your residence?
 - a. I am a year-round resident
 - b. 1-5 months, my primary residence is elsewhere
 - c. 6-11 months, this is my primary residence but I spend more than a month in another home
4. Before moving to your current residence, which of the following describes the community in which you lived?
 - a. City
 - b. Suburb
 - c. Rural, outside of a city or town
 - d. Small town
5. How similar was the neighborhood you moved from to your current neighborhood?
 - a. Very similar
 - b. Somewhat similar
 - c. About the same
 - d. Somewhat different
 - e. Very different

Please rate the following statements using a scale from 1 to 7. N/A may be answered if the statement does not apply to you.

6. I know the majority of my neighbors on my street.

1	2	3	4	5	6	7	N/A
(none of my neighbors)			(half of the neighbors)			(all of my neighbors)	

7. I feel like I can influence decisions that affect my neighborhood.

1	2	3	4	5	6	7	N/A
(no influence)			(influence over only some)			(I am the most influential)	

8. Members of my household participate in formal or informal neighborhood associations or groups.

1	2	3	4	5	6	7	N/A
(no involvement)			(some involvement)			(all of household involved)	

Please rate the following statements using a scale from 1 to 7, where 1 is "Strongly disagree", 4 is "Neutral", and 7 is "Strongly agree". Circle the number that best matches your level of agreement.

	1	2	3	4	5	6	7	N/A
	Strongly Disagree			Neutral			Strongly Agree	
9. My neighbors and I talk about our neighborhood.	1	2	3	4	5	6	7	N/A
10. I would recommend this neighborhood to a friend or family member.	1	2	3	4	5	6	7	N/A
11. I have made trusting relationships with my neighbors (i.e. would feel comfortable calling them if there is an emergency).	1	2	3	4	5	6	7	N/A
12. I feel comfortable lending and/or borrowing items from my neighbors.	1	2	3	4	5	6	7	N/A
13. People here know they can get help from others in the neighborhood if they are in trouble.	1	2	3	4	5	6	7	N/A
14. I am similar to most people who live in my neighborhood.	1	2	3	4	5	6	7	N/A
15. If I feel like talking, I can generally find someone in this neighborhood to talk to right away.	1	2	3	4	5	6	7	N/A
16. I DON'T care whether this neighborhood does well.	1	2	3	4	5	6	7	N/A
17. My friends in this neighborhood are part of my everyday activities.	1	2	3	4	5	6	7	N/A
18. If I had an emergency, even people I do not know in this neighborhood would be willing to help.	1	2	3	4	5	6	7	N/A
19. If someone does something good for this neighborhood, that makes me feel good.	1	2	3	4	5	6	7	N/A
20. I spend too much time in the car.	1	2	3	4	5	6	7	N/A
21. There is too much car traffic in my neighborhood.	1	2	3	4	5	6	7	N/A
22. I feel safe walking in my neighborhood.	1	2	3	4	5	6	7	N/A

23. In a typical month, how many times do you invite a neighbor over to your house to socialize?
 a. never b. once or twice c. three or more times

24. In a typical month, how many times are you invited to a neighbor's house to socialize?
 a. never b. once or twice c. three or more times

How important were the following items when you chose to live in your current residence?
 Please rate each one using a scale from 1 to 7, with 1 being "Not important at all" and 7 being "You would not have relocated to your current residence without it." Circle the number that is most appropriate for you.

	1 Not important at all	2	3	4 Moderately important	5	6	7 Would not relocate without it
25. Safety	1	2	3	4	5	6	7
26. Peace and quiet	1	2	3	4	5	6	7
27. Affordability of housing	1	2	3	4	5	6	7
28. Quality of schools	1	2	3	4	5	6	7
29. High sense of community	1	2	3	4	5	6	7
30. Easy to walk to places	1	2	3	4	5	6	7
31. Energy efficiency of household	1	2	3	4	5	6	7
32. Public amenities (i.e. basketball courts, pool, community space)	1	2	3	4	5	6	7

Approximately how much time do you spend in the car on average per day doing each of the following?

33. Errands a. 10-15 min b. 15-30 min c. 30 min to 1 hour d. more than 1 hour
 34. Work a. 10-15 min b. 15-30 min c. 30 min to 1 hour d. more than 1 hour
 35. Other activities a. 10-15 min b. 15-30 min c. 30 min to 1 hour d. more than 1 hour

36. How often do you use neighborhood public spaces (park, pool, tennis courts, basketball courts) when weather permits?
 a. Never b. 1-2 times a month c. 1 time a week d. more than once a week

37. If you visit the neighborhood public spaces, how often do you get there by a mode of transportation other than a car?
 1 (Never) 2 3 4 (half of the time) 5 6 7 (Always)

How often do you visit each of the following businesses in the area?

38. Valero Corner Store a. Never b. 1-2 times a month c. 1 time a week d. more than once a week
 39. Civano Nursery a. Never b. 1-2 times a month c. 1 time a week d. more than once a week
 40. Uno's Bike Shop a. Never b. 1-2 times a month c. 1 time a week d. more than once a week
 41. Yoga House a. Never b. 1-2 times a month c. 1 time a week d. more than once a week
 42. Beauty Is... a. Never b. 1-2 times a month c. 1 time a week d. more than once a week
 43. Skin and Body Fitness a. Never b. 1-2 times a month c. 1 time a week d. more than once a week
 44. Other businesses a. Never b. 1-2 times a month c. 1 time a week d. more than once a week

If you visit the businesses in Civano, how often do you:

45. Drive there? 1 (Never) 2 3 4 (half of the time) 5 6 7 (Always)
 46. Bike there? 1 (Never) 2 3 4 (half of the time) 5 6 7 (Always)
 47. Walk there? 1 (Never) 2 3 4 (half of the time) 5 6 7 (Always)
 48. Get there another way? 1 (Never) 2 3 4 (half of the time) 5 6 7 (Always)

Compared to where you used to live, how often do you and the rest of your household do each of the following now?

49. Drive? a. much less often b. about the same c. much more often
 50. Ride a bike? a. much less often b. about the same c. much more often
 51. Carpool? a. much less often b. about the same c. much more often
 52. Walk? a. much less often b. about the same c. much more often

The following questions may be approximated:

53. In the last year, what was the highest electric bill you received? \$ _____
 54. In the last year, what was the lowest electric bill you received? \$ _____
 55. In the last year, what was the highest water bill you received? \$ _____
 56. In the last year, what was the lowest water bill you received? \$ _____
 57. In the last year, what was the highest gas bill you received? \$ _____
 58. In the last year, what was the lowest gas bill you received? \$ _____

Please turn the page over and complete the other side. → → → →

Please rate the following on a 1 to 7 scale where 1 is "Strongly disagree", 4 is "Neutral", and 7 is "Strongly agree".
Circle the number that is appropriate for you.

	1 Strongly disagree	2	3	4 Neutral	5	6	7 Strongly agree
59. I believe that climate change is affecting the environment.	1	2	3	4	5	6	7
60. I make a considerable effort to recycle things that I use.	1	2	3	4	5	6	7
61. I don't really pay attention to the amount of energy used in my household.	1	2	3	4	5	6	7
62. I have made considerable efforts to change my habits in the past five years because of environmental issues.	1	2	3	4	5	6	7
63. If available, I would be willing to use a public transit system from my home to work.	1	2	3	4	5	6	7
64. Our household makes an effort to purchase energy efficient appliances.	1	2	3	4	5	6	7
65. Climate change is something humans do NOT influence.	1	2	3	4	5	6	7

This last section contains questions about you and your household. Please remember, all answers are confidential.

66. Are you:
a. Female b. Male c. I do not want to declare.

67. What is your age? _____

68. How many children under the age of 18 live in your household? _____

69. Do you rent or own your current residence?
a. Rent b. Own

70. What is your highest level of education?
a. Some high school
b. GED/High School Diploma
c. Some college
d. Completed Associates degree
e. Completed Bachelor degree
f. Completed Masters degree
g. Completed Doctorate or other advanced degree

71. If there are elementary-aged children in your household, please indicate where they attend school (check all that apply):
____ Senita Valley Elementary School
____ Civano Community School (either lower or upper school)
____ There is/are no child/children in the household eligible to attend either school.
____ There is/are a child/children in the household eligible to attend but they attend school elsewhere.

72. What is your current employment status?
a. Employed full time
b. Employed part-time
c. Unemployed
d. Retired
e. Student
f. Other (Please specify) _____

73. What is your approximate annual household income (the total of all incomes of your household combined)?
a. Less than \$20,000
b. \$20,000-\$35,000
c. \$35,000-\$50,000
d. \$50,000-\$65,000
e. \$65,000-\$80,000
f. \$80,000-\$95,000
g. More than \$95,000

Thank you for completing the survey. If you would like to be entered into the random drawing for a chance to win 1 of 3 \$100 gift certificates, please enter your full name and mailing address below.

Name _____
Mailing address _____

If you have any comments about this survey, please feel free to write them in the space below.