UNIVERSITY OF CALIFORNIA,
IRVINE

Creative Class and the Promotion of Sustainability: Insights from the Five-county Region of Southern California

DISSERTATION

submitted in partial satisfaction of the requirements
for the degree of

DOCTOR OF PHILOSOPHY

in Planning, Policy, and Design

by

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Dissertation Committee:
Associate Professor Ajay Garde, Chair
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Associate Professor Jae Hong Kim

2018

DEDICATION

To

my mom and dad

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LIST OF ACRONYMS

AB 32 – Assembly Bill 32
ACS – American Community Survey
ADA – American Disabilities Act
AW – Average Weighted Concordance Scores
BLS – Bureau of Labor Statistics
CBSC – California Building Standards Commission
CPAD – California Protected Area Database
FAR – Floor Area Ratio
GHG – Green House Gas Emissions
GIB – Green Infrastructure and Buildings
GIS – Geographic Information Systems
LEED-ND – Leadership in Energy and Environmental Design at the Neighborhood Level
NPD – Neighborhood Pattern and Design
OCTA – Orange County Transportation Authority
SB 375 – Senate Bill 375
SCAG – Southern California Association of Governments
SLL – Smart Location and Linkage
SOC – Standard Occupational Code
UFI – Urban Form Index

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Apart from my committee members, I would like to thank other members of the UCI community for their professional support. Professor Richard Matthew and Professor John Whiteley offered much valuable insight and support throughout my program and Professor John Hipp gave me the opportunity to work at MFI, an experience that improved my understanding of the Southern California region. Kevin Kane took time to share his knowledge on the subject matter, and Tony Soeller helped me to improve my GIS mapping skills. In addition, administrative staff member, Janet Gallagher and Jennifer Craig were ready to answer all my questions, provide feedback and prompt support. Next, I want to thank the School of Social Ecology, UC Irvine Graduate Division, and Phi Beta Kappa Alumni for providing financial support to complete this dissertation. I would also like to thank the planning staff of the various cities in Southern California who took time from their busy schedules to support academic research and provide valuable insights to my research.

I greatly appreciated my friends at UCI who helped all along the way. I am so glad to have met Andrea Hoff, my dear friend whose friendship, relentless support, and compassion, I will cherish lifelong. I am also grateful for my friend Karna Wong, whose constant support and positive attitude kept me motivated at the time I needed it the most. I am also thankful for my friends, Allison Laskey, Laureen Hom, Santina Contreras, and Brian Hui (particularly for his support during the final round), who made this doctoral journey a pleasant one. I am grateful for other friends at and outside UCI who deserve my thanks for being there by my side.

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Masters in Urban and Environmental Planning
Thesis: Spatial Equity of Close-to-Home Parks: Phoenix Mesa Urbanized Area
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Mumbai University 2006
Bachelors in Architecture with honors
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TEACHING EXPERIENCE

University of California, Irvine Apr–Jun 2018
Teaching Associate (sole instructor), PPD 100: Introduction to G.I.S
Independently designed, developed and taught the course
Collaborated with community organization of Santa Ana to prepare high-quality thematic maps of their "Community Land in Community Hands Campaign."
Assisted student create websites (e-portfolios) of thematic maps for job market

University of California, Irvine Jun–Aug 2014; 2015; Sep–Dec 2017
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Teaching Assistant, Department of Planning Policy and Design
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PPD 107: Urban and Regional Planning (approx. 40 students)
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RESEARCH EXPERIENCE

Climate Action Fellow, Climate Neutrality Initiative, UCI Jan–Sep 2015
Performed a feasibility study of cool roofs for the existing buildings on UCI campus to develop a proposal for a phase-wise implementation plan of cool roofs for the Office of Sustainability.

Graduate Student Researcher,
Diverse Educational Community and Doctoral Experience (DECADE) Graduate Student Diversity Grant Research, PPD, UCI Dec 2013–Mar 2014
Conducted interviews with underrepresented minority professionals and scholars in local universities and documented findings of this research to the DECADE graduate division.

Graduate Student Researcher, UCI Jun 2012–Dec 2015
Collected and organized data for research on form-based codes for cities within Southern California. Performed qualitative analysis using Atlas Ti software, and assisted with final report.

Graduate Student Researcher, Metropolitan Futures Initiative, UCI Jun–Sep 2013
Conducted spatial data analyses in ArcGIS environment. Worked with large quantitative datasets in preparation for statistical analyses. Estimated a set of statistical models, designed to determine the relationships among socio-economic and/or built environment variables for the Southern California region. Documented the research processes and findings under the supervision of Metropolitan Futures Initiative faculty members

Research Technician, Phoenix Urban Research Laboratory, ASU Jan–Jun 2011
Involved with GIS mapping and analysis of existing site conditions at a parcel level around Phoenix Metro light rail area. The work entailed the collection of social, economic, and physical data for the City of Phoenix from various data sources. This involved cleaning of data, using either Excel or Access software. Responsible for the creation of building footprints shapefiles for the study area that provided the zoning and structural information obtained from the City Assessor website.

Research Associate, Arizona State University Jan 2009–Mar 2010
Digitized, cleaned and analyzed geospatial data. Investigated, developed and presented sustainable indicators for the City of Nogales. Prepared cartographic products and illustrations using GIS. Produced graphs, charts, and technical reports. Conducted statistical analysis for the US-Mexico Border region. Exhibited results through a website and PowerPoint presentation.

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Presenter, Towards a Just Metropolis: From Crisis to Possibilities Conference Jun 2010
Presenter, paper on "Sustainable Tourism in India" at the ARCASIA conference Nov 2004

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Department student representative, Planning Policy and Design, UCI 2013-2014
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Participant and Volunteer of Arizona Planning Conference, Prescott 2009
Participant of National American Planning Conference, Minneapolis 2009
President/Vice President/Class Representative, respectively, Student Council, University of Mumbai 2004-2005
Member of Organizing Committee, International Conference on Humane Habitat and International Association of Humane Habitat, 2002-2005
Participant for Slum Redevelopment Scheme, Asia link program I, RCA, India, 2005

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Arc Map 10.4, Arc Catalog 10.4, AutoCAD, Adobe Creative Suite, SPSS, Microsoft Access & Google Sketch Up, Atlas Ti, Adobe Creative Suite, CorelDraw, Stata, Microsoft Word, Microsoft Excel, Microsoft PowerPoint, Microsoft Outlook

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ABSTRACT OF THE DISSERTATION

Creative Class and the Promotion of Sustainability:
Insights from the Five-county Region of Southern California

By

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Doctor of Philosophy in Planning, Policy, and Design

University of California, Irvine, 2018

Professor Ajay Garde, Chair

This research examines the extent to which the presence of the creative class in cities is associated with the promotion of sustainability, particularly as reflected in development regulations adopted by cities. Focusing on the incorporated cities in the five-county Southern California region, this study employed a mixed-method approach conducted in two phases. The first phase examined the association between the presence of the creative class and six sustainability-related urban form characteristics for 167 incorporated cities. Using four different combinations of the two variables—the size of the creative class and the level of the urban form index—eight cities were purposefully selected for an in-depth analysis for the second phase. The LEED-ND rating system was used as an evaluative framework to examine the current downtown specific plans of the selected eight cities to determine the extent to which downtown specific plan regulations reflected sustainability principles. Additionally, interviews with planners in the select cities were conducted to provide greater insights.

Considerable variation was found in the promotion of sustainability among cities. Generally, cities with a higher proportion of the creative class integrated LEED-ND principles to a greater extent than those with a lower proportion. However, not all cities with a higher

proportion of the creative class promoted more sustainability principles and to a stronger extent than those with a lower proportion. Findings from the first phase suggested that there was no statistically significant relationship between the size of the creative class and sustainability-related urban from characteristics, except for access to open space, which was positively correlated with the size of the creative class. This finding was further supported in the study's second phase, which revealed that not all cities with a higher presence of the creative class promoted compact, mixed-use development. Furthermore, cities with a stronger presence of the creative class promoted more green building and infrastructure related sustainability principles; however, considerable variation existed. Regardless of the size of the creative class, cities are promoting sustainability in various ways. This study provides valuable insight for cities considering zoning reform to increase the promotion of sustainability.

CHAPTER 1: Introduction

The primary objective of my research is to examine the extent to which the presence of the creative class in cities is associated with the promotion of sustainability. In his highly acclaimed book, *The Rise of the Creative Class*, Richard Florida (2002) argued that a certain group of talented individuals, which he called "the creative class," is a key driver of economic growth of regions. Furthermore, he argued that the quality of place is a key factor for attracting the creative class. Since the publication of the book, city planners and public officials in the United States have tried to attract the creative class to their cities and regions primarily to promote economic growth (Bloomberg, 2012; Evans, 2009; Florida, 2014; Peck & Theodore, 2010; Scott, 2006). Given that the quality of place involves physical design characteristics of buildings, streets, and neighborhoods, and that the concept of sustainability has gained considerable popularity in recent years, it is possible that certain sustainable design principles reflected in the built environment are appealing to the creative class. Therefore, it is likely, one will find a stronger presence of the creative class in cities that promote sustainability.

Furthermore, in a seminal article, Tiebout (1956) argued that individuals will choose or move to a community that provides services that satisfy their preferences. This "Tiebout sorting" (Musso, 2001) occurs when people "vote with their feet" and move to localities that offer their preferred bundles of goods. Peterson (1981) argued that local governments understand the rationale behind residents' locational choices, and therefore compete with each other to attract certain types of people (and their tax revenues) by offering bundles of public goods and amenities. Local governments use zoning regulations and other land use controls as tools to attract a certain set of residents, in particular high income residents (Heikkila, 1996; Paulsen,

2014; Peterson, 1981). Given this, it is possible that city planners and public officials are promoting certain sustainable design principles in the design of buildings and neighborhoods through development regulations in their cities and regions, since they are more appealing to the creative class. Furthermore, as quality of place is an important factor for the creative class, it is possible that the members of the creative class will sort themselves into communities/cities where certain sustainable design principles are promoted in the design of buildings and neighborhoods through development regulations.

Using the theoretical framework of Tiebout sorting and the concept of the creative class, I sought to discover whether the presence of the creative class is associated with sustainability principles reflected in cities in their existing *urban form* and their recently adopted *development regulations.* This dissertation focuses on the "product" (existing urban form and development regulations) of urban development processes, rather than the processes of urban development.

Existing urban form characteristics such as land use mix, density, and diversity of housing types are largely a function of zoning regulations and development policies. As zoning regulations are enforceable by law, sustainability principles integrated in zoning regulations are more likely to promote sustainability. Therefore, I specifically examined whether the presence of a high or low level of the creative class in cities is associated with (1) certain sustainability-related existing urban form characteristics and (2) the extent that cities have integrated sustainability criteria into their zoning regulations.

Background and context in brief

In this study, I focused on the incorporated cities within the five-county region of Southern California to examine the association between the presence of the creative class and the promotion of sustainability. The political, social, and spatial fragmentation of this decentralized

region which includes 183 incorporated cities in five counties—Los Angeles, Orange, San Bernardino, Riverside, and Ventura (Fogelson, 1993)—lends itself as the perfect setting to observe Tiebout sorting. In addition, the multi-city, politically fragmented Southern California region is expected to grow by 3.8 million residents in the next 25 years, making the region home to 22 million people by 2040 (Southern California Association of Governments, 2016).

The creative class is prevalent in California, which has the highest number of creative occupations in the United States, according to the report, "Creative Economy," (Otis, 2018). But members of the creative class are not evenly distributed among California cities. A report by CityLab (2015) indicated a strong variation in the proportion of the creative class at the city level in the state, with extremely high and extremely low proportions of the creative class side by side in adjacent cities. The five-county Southern California region includes Santa Monica, which ranks among the top 20 cities nationwide in the proportion of the creative class, as well as Huntington Park, Lynwood, Southgate, Compton, Santa Ana, and Rialto, which rank among the bottom 20 (CityLab, 2015).

In addition, in his relatively recent book, *The New Urban Crisis*, Florida (2017) claimed that the creative class is responsible not only for economic growth, but also for increasing spatial and social segregation. Therefore, any association between the presence of the creative class and promotion of sustainability in Southern California cities is worth examining.

Research Objective and Questions

This dissertation contributes to empirical research on the association between the presence of the creative class and sustainability principles and focuses primarily on the "product," such as the existing urban form characteristics and development regulations in the

five-county Southern California region. Focusing on incorporated cities within the region, my guiding research questions are:

1) To what extent is the presence of the creative class in cities associated with six sustainability-related urban form characteristics, measured individually and as a composite index: density (compactness), connectivity (street connectivity), accessibility to commercial uses, mix of uses, diversity of housing types, and access to open space?
2) To what extent is the presence of the creative class in cities associated with the sustainability principles integrated into cities' zoning regulations and development policies?

Research Approach in Brief

To complete this research using a mixed-methods approach, I conducted the data collection and analyses for this study in two phases. First, I examined the association between the presence of the creative class and sustainability-related urban form characteristics for incorporated cities in the five-county Southern California region with a population greater than 10,000 and less than 500,000. Specifically, I selected six sustainable design-related urban form characteristics (density or compactness, connectivity or street intersection density, accessibility to commercial uses, mix of uses, diversity of housing types, and access to open or green space) in 167 cities within the region. More importantly, using four different combinations of the two variables—proportion of the creative class and level of the urban form index (a composite index of the six urban form characteristics)—I purposefully selected eight cities, two from each combination, for in-depth analysis. The analytic conclusions I derived from the varying cases expanded the discussion and provided more robust findings.

Second, using the Leadership in Energy and Environmental Design at the neighborhood level (LEED-ND) rating system (U.S. Green Building Council, 2013) as the evaluative framework, I examined the most current downtown specific plans of the eight selected cities to determine the extent to which the presence of the creative class is associated with the sustainability principles reflected in the regulations in these plans. In addition, I conducted interviews with planners in the selected cities to provide additional insights.

Structure of the dissertation

In this dissertation, I begin with a review of literature related to the creative class, sustainability principles, and Tiebout sorting. In Chapter 3, I present the methodology of the two phases of this study in detail. In Chapter 4, I present the results of Phase I in which I examined the association of the presence of the creative class and the six sustainability related urban form characteristics. In Chapter 5, I present the results of Phase II, in which I used the LEED-ND rating system as an evaluative framework to provide in-depth analyses of the eight downtown specific plans, based on the presence of the creative class. I also provide insights from interviews with city planners, and present variations across groups and within groups of cities with a higher (or lower) proportion of the creative class in combination with a higher (or lower) urban form index. In Chapter 6, I discuss my findings and conclude with suggestions for future research.

CHAPTER 2: Literature Review

In this chapter, I review the literature that guided my research, specifically, the literature (1) related to the creative class, with a focus on the built environment; (2) that related to sustainability principles, with a focus on existing urban form and development regulations; and (3) that related to Tiebout sorting. Finally, I describe the use of the two theoretical frameworks of Tiebout sorting and the creative class as a frame of reference to guide this research.

Literature review of the creative class

Definition of the creative class. Florida (2002a, 2012, 2014) has argued that a certain group of talented individuals, "the creative class," is a key driver of economic growth in metropolitan regions. Florida's main argument revolves around three main factors: technology, talent, and tolerance: Cities that are more tolerant tend to attract talent (the creative class), which in turn attracts high-tech industries, leading ultimately to economic growth. Florida (2012) sorts the members of the creative class by occupations in two broad categories: the "super creative core" and "creative professionals" (Table 2.1). The super creative core includes occupations that produce new ideas or products, such as "scientists and engineers, university professors, poets and novelists, artists, entertainers, actors, designers and architects, nonfiction writers, editors, cultural figures, think tank researchers, analysts and other opinion makers (Florida, 2012, p. 38). The second category, creative professionals, includes experts in a wide range of knowledge industries that require creative thinking to address problems, such as high-tech, financial services, legal and health care professionals, and business management (Florida, 2012, p. 39).

Table 2.1.
List of major occupational groups within the two broad categories that define the creative class

Creative class
1. Super creative core
Computer and mathematical occupations
Architecture and engineering occupations
Life, physical, and social science occupations
Education, training, and library occupations
Arts, design, entertainment, sports, and media occupations
2. Creative professionals
Management occupations
Business and financial operations occupations
Legal occupations
Health care practitioners and technical occupations
High end sales and sales management occupations

Source: Florida (2012)

According to Florida, the creative class represents only one-third of all occupations in the United States but one half of the country's wages and salaries. (Florida, 2002a; Florida, 2012; Florida, 2014a).[1] Measuring the proportion of the creative class at the metropolitan level, Florida found that the average wages for workers in the creative class was higher than for those in jobs unrelated to the creative class; however, annual wages of the creative class varied, and not all occupational groups within the creative class had high annual wages (Florida, 2014a; Florida, Mellander and Stollarick, 2008). Metropolitan areas with a higher concentration of technology, arts, and cultural workers contributed most to regional wages followed by business professionals. On the other hand, regions with a higher concentration of education- and medical-related occupations contributed relatively less to regional wages than the rest of the creative class related occupations.

[1] Wages were measured based on the sum of the wages and salaries and on total money earnings received for work performed as an employee in the region. It includes wages, salary, armed forces pay, commissions, tips, piece-rate payments, and cash bonuses earned before deductions were made for taxes, bonds, pensions, union, dues, etc., and measured on a per worker basis using BLS data (Florida, et al., 2008).

In addition, Florida found variations in the makeup of the creative class across regions, with some having a higher proportion of technology-related occupations and others with a higher proportion of medical-related jobs. For instance, in the San Jose-Sunnyvale-Santa Clara region, Florida (2012) found a higher proportion of technology and science occupations and in the Los-Angeles-Long Beach-Glendale region, a higher proportion of arts, culture, and media occupations. Such variations in the makeup of the creative class across regions tend to influence the total wages generated in those regions because some creative class occupations receive higher wages more than others. However, in this study, I focused on the share of the creative class as a whole, at the city level as guided by my theoretical framework discussed in detail later in this chapter.

Critiques of the creative class as a measure to predict economic growth. Florida's concept of the creative class has drawn considerable attention from city planners, policy makers, and public officials in the United States and around the world (Bloomberg, 2012; Evans, 2009; Florida, 2014a; Peck & Theodore, 2010; Scott, 2006). Some criticism has to do with Florida's use of occupations as the measure to predict economic growth. Rather than the more traditional measure, education (the share of the population with at least a bachelor's degree), Florida (2012) argued that occupations are a better predictive measure of economic growth. In particular, he argued that workers who engage in creative thinking or creative problem-solving stimulate economic growth. Several researchers have examined his arguments (Glaeser, 2005; Marlet & Van Woerkens, 2004; McGranahan & Wojan, 2007; Rausch & Negrey, 2006), but without conclusive evidence.

In their cross-sectional study of the 50 largest Dutch cities, Marlet and Van Woerkens (2004) found the creative class was a better predictor of employment growth than education (the

share of the population with at least a bachelor's degree), but using metropolitan population growth as a proxy for economic growth, Glaeser (2005) found that education was a better indicator of economic growth. (In response to Glaeser (2005), Florida (2014a) maintained that metropolitan growth is not a good proxy for economic growth because the two measures are not positively correlated.) Using Florida's (2002a) definition of the creative class, McGranahan and Wojan (2007) re-casted the measure of the creative class using census occupational data. They found the size of the creative class was positively correlated with county-level employment growth in the United States; however, they removed certain major occupational groups[2] from the creative class. In parallel with Glaeser (2005), Donegan, Drucker, Goldstein, Lowe, and Malizia (2008) found the creative class had no association with economic growth at the metropolitan level. Variations in the operationalization of either the creative class or economic growth may be factors in researchers' inconclusive evidence regarding Florida's argument for occupations as a better measure of economic growth.

In a more recent study, Florida (2017) noted that although the creative class is responsible for economic growth, it is also responsible for income inequality and segregation, which raises concerns for planners and policy makers to address. However, examining this relationship is beyond the scope of my study. Instead, I focused only on the extent to which the presence of the creative class may be associated with the promotion of sustainability in cities, as reflected in existing built environment and development regulations.

Creative class, quality of place, and the built environment. In addition to technology, tolerance, and talent, Florida (2002a, 2012, 2014a) identified "quality of place" (also referred to as "territorial assets") as a key factor for attracting the creative class to certain places.

[2] McGranahan and Wojan (2007) excluded two major occupational groups: education, training and library occupations; and healthcare practitioners and technical occupations.

Characteristics that define quality of place include what's there (the built and natural environment), who's there (diverse people), and what's going on (vibrant street life, café culture, arts, music, and outdoor activities (Florida, 2012, p. 281). According to Florida (2012), the creative class is drawn to places with a certain type of built environment, and city planners can promote these built environment characteristics that are more appealing to the creative class.

Although Florida (2012) defined quality of place, he did not explicitly describe characteristics of the built environment that tend to draw the creative class. "Territorial assets" are a certain set of qualities that attract the creative class to some places over others, but the majority of these qualities that Florida (2012) described have to do with "who's there" and "what's going on." Florida (2012) emphasized the type of people and activities being offered: places with thick labor markets (good employment in a wide variety of jobs); places that reflect diversity in age groups, ethnicities, and so on; places with vibrant scenes that establish a "buzz"; and places that offer ways to engage with the community and create a sense of identity.

In terms of the built and natural environment (what's there), Florida also addressed these characteristics broadly, without specific details. For instance, he argued that the creative class seeks places with a variety of amenities, such as outdoor parks, nightlife, and entertainment (symphonies, jazz bars, and coffee shops), that encourage social interaction and offer opportunities to integrate work and community. According to Florida, the creative class looks for places that are authentic, such as those with historic buildings and other cultural attributes. Based on these qualities, the creative class is likely to be attracted to places in which the built environment provides a mix of uses within close proximity and that retain historic buildings; however, Florida's description of "quality of place" only minimally addresses physical attributes such as buildings, streets, lots, and green spaces that make up the built environment.

Based on Florida's premise that the creative class promotes economic growth, scholars have examined the potential link between a variety of urban amenities and residential locations of the creative class. Using surveys and interviews, Lawton, Murphy and Redmond (2013) investigated the creative class's residential preferences in Dublin, Ireland. They examined whether the members of the creative class prioritized factors such as openness, tolerance, and amenities that Florida (2002) identified as important factors to attract the creative class, compared with classic factors, such as the cost of housing. They found no difference in the creative class's residential preferences compared with the general population; specifically, the creative class assigned highest preference to classic factors such as the size of residences and the distance to workplaces rather than soft factors such as the proximity to pubs/nightclubs and availability of day care centers.

Similarly, Brown and Mecyzynski (2009) found that the creative class prioritized a mix of hard labor market and economic factors (jobs, good employment opportunity, higher wages, good transportation links, and housing affordability) and soft factors (personal connection with the city such as family or friends there). Although the city's size was an important factor because a sufficient population is necessary to support a wide variety of employment opportunities and rich social networks, Brown and Mecyzynski (2009) noted that factors that Florida (2012) deemed important, such as tolerance, cultural diversity, proximity to the natural environment, diversity of leisure and entertainment facilities, were less important as initial attractors to a city.

Although these studies found little to no evidence to support Florida's claim that quality of place is an important factor in attracting the creative class, other scholars have found evidence that a city's cultural and income diversity may be important. Using a survey of creative class workers in Germany, Zenker (2009) found "urbanity and diversity" to be important for attracting

the creative class. He defined urbanity and diversity as a combination of "openness and tolerance of a city; presence of many different cultures and subcultures; the energy of a city; the urban image of a city; a variety of shopping opportunities; and a wide range of cultural activities" (p. 26). Using tract level census data in Chicago, Bereitschaft and Cammack (2015) found that the percentage of gay households in a location and income diversity were positively correlated with the size of the creative class, and in a survey of 13 European cities, Musterd and Gritsai (2013) found weather/climate, cultural diversity, tolerance, friendliness, and diversity of the built environment were important factors to retain rather than attract the creative class.

Other researchers have found that access to open spaces is an important factor to attract the creative class. Using comparative case study analysis of three cities with distinct natural landscapes, Ling and Dale (2010) found that ecological features such as dominant natural landscapes may attract the creative class. Although additional research is needed, Ling and Dale (2010) found that the creative class and three distinct natural landscapes—island, coastal, and mountain—appeared to be mutually reinforcing. In a tract-level analysis in the Chicago area, Bereitschaft and Cammack (2015) found the presence of the creative class was positively correlated with the availability of open space. Using the National Land Cover database, they approximated availability of open space based on land-use classifications of open space or bodies of water within a two-kilometer radius of each census tract. Similarly, Mansury, Tontisurin, and Anantsuksomsri (2012) found open space to be positively associated with the presence of the creative class.

In addition, certain residential locations within a city may tend to draw members of the creative class. Although the evidence is limited, some research indicates that the creative class may prefer to reside within inner cities and areas in proximity to a mix of uses. In their

investigation of creative households in Bangkok, Mansury et al. (2012) found the creative class tended to live within the inner city ring and closer to shopping malls, parks, and railway stations.

In contrast to the previous studies focusing on where the creative class resides, some researchers have examined the built environment characteristics of places where creative industries are located, or creative clusters or neighborhoods. Wood and Dovey (2015) defined creative clusters as "a small-scale, socio-spatial assemblage of people and activities without any center boundary or scale (p. 54)," and Spencer (2015) defined creative neighborhoods as census tracts with a higher proportion of creative industries, which include film, media or art related industries. These studies suggests that creative clusters or creative neighborhoods tend to be located in inner cities and areas characterized by higher density and a mix of uses. Wood and Dovey (2015) reported the key factors in creative clusters were small grain (lot size), post-industrial buildings, hospitality, and bohemia. They found that creative clusters had "a mix of mixes," that is, a mix of a variety of factors, such as function, lot sizes, building ages, or building interfaces. Spencer (2015) found creative industries were most likely to be located in dense, mixed-use neighborhoods in close proximity to the city core.

Based on Florida's premises and other studies, some researchers suggest that the members of the creative class are attracted to dense (Brown & Mecyzynski, 2009) urban environments characterized by diverse mix of uses (Spencer, 2015; Wood & Dovey, 2015) and prefer locations with rich social networks (Brown & Mecyzynski, 2009). Additionally, the members of the creative class are attracted to places that have availability of open space (Bereischaft & Cammack, 2015; Ling & Dale, 2010; Mansury et al., 2012). Therefore, it is possible that members of the creative class sort themselves in places that provide these amenities.

Sustainable design principles

My primary research objective was to examine the extent to which the presence of the creative class may be associated with sustainability. In particular, in this study I examined the extent to which the presence of the creative class is associated with sustainability principles as reflected in existing urban form and development regulations. In this section, I first review the literature on sustainability principles, focusing on urban form and it's certain characteristics frequently associated with sustainable design principles. Second, I review the literature on sustainability principles, focusing on development regulations.

Urban form and sustainable design principles. Defined in several ways, urban form is hard to operationalize in a manner acceptable to all researchers. Lynch (1981) identified urban form as "the spatial pattern of the large, inert, permanent physical objects of the city" (p. 47). Talen (2003, 2011) defined it as comprising of buildings, streets, lots, spaces and all other physical characteristics that make up the urban realm. According to Jabareen (2006), urban form is a combination of urban patterns that include street patterns, block size and form, street design, and lot configuration and orientation.

Urban form characteristics associated with sustainable urban design—termed sustainable urban form—were developed in response to the built form called "sprawl," which refers to areas of low density patterns and segregated, single use, super block projects (Galster et al., 2001; Ewing, Pendall, & Chen, 2002; Jabareen, 2006; Talen, 2011). Sprawl has a negative connotation associated with a variety of ills, ranging from high cost of service provision to environmental degradation (Beatley & Manning, 1997; Calthorpe & Fulton, 2001). In contrast, design principles associated with sustainable urban form promote walkable, well-connected streets, compact

building forms, well-designed public spaces, diverse uses, and a mix of housing types (Jabareen 2006; Talen, 2011; Wheeler, 2005). In addition, these principles also promote provision of green spaces and passive building design features, such as orientation, siting, and landscaping to reduce energy consumption (Jabareen, 2006; Thomas, 2003).

Scholars have argued that urban form characteristics associated with sustainable design principles have a number of benefits, such as reduced vehicle mile trips per capita (Cervero, 1997), lower carbon emissions (Jabareen, 2006; Jenks, Burton, & Williams, 1996), protection of rural areas (Jabareen, 2006), and quality of life that encourages social interactions (Jabareen, 2006; Jacobs, 1961; Talen, 2011) through the inclusion of a mix of uses within close proximity. Although the advantage of certain characteristics of sustainable urban form may be debatable, such as density (Burton, 2002), there generally is growing agreement on the positive impact of these characteristics associated with sustainable urban design principles (Jabareen 2006; Talen, 2011).

For this study, I drew upon the characteristics of urban form frequently associated with sustainable design principles. I compared selected studies published since the year 2000, as these were most relevant and tended to capture the design principles discussed in earlier studies (Table 2.2). Majority of these studies discussed these characteristics in an effort to measure sprawl (Ewing et al., 2002; Galster et al., 2001; Song & Knapp, 2004) or carbon footprint (Southworth, Sonnenberg, & Brown, 2008), whereas others sought to measure sustainable urban form (Jabareen, 2006; Talen, 2011). In addition, urban form characteristics have been measured using different spatial units of analysis. Studies have focused either on metropolitan areas (Ewing, 1997; Ewing et. al, 2002; Galster et al., 2001; Southworth et al., 2008) or the city level (Neumann, 2005; Song & Knapp, 2004; Talen, 2003).

Table2. 2.
Review of urban form characteristics associated with sustainable design principles

Study	Galster et al., 2001	Ewing et al., 2002*	Song and Knapp, 2004	Jabareen, 2006	Southworth et al., 2008	Talen, 2011
Unit of analysis	Urban areas	Metropolitan area	City	N/A	Metro area	Census tract and census block group
Characteristics of urban form	Density	Residential density (7)	Street design and circulation systems	Density	Metropolitan density	Accessibility
	Continuity	Neighborhood mix of homes, shops and offices (6)	Density	Compactness	Centrality (absolute)	Connectivity
	Concentration	Strength of metropolitan centers (6)	Land use mix	Mixed use	Centrality (relative)	Density
	Clustering	Accessibility of the street network (3)	Accessibility	Diversity	Concentration	Diversity
	Centrality		Pedestrian access	Passive solar	Job housing balance	Nodality
	Nuclearity			Sustainable transport	Mass transit effect	
	Mixed uses			Greening		
	Proximity					

Note. *The number in parenthesis indicates the number of measures used for each characteristic for that study

To identify urban areas characterized by sprawl, Galster et al. (2001) created a multifaceted, cross-sectional index for land use patterns for 13 urban areas (UA) within the United States. They defined sprawl as land use patterns having low levels of eight dimensions or characteristics: density, continuity, concentration, nuclearity, clustering, centrality, mixed use, and proximity (Table 2.3). They weighted each of these dimensions equally using statistical measures, assuming that each plays a similar role in promoting sprawl. Urban areas were ranked for each individual dimension of land use pattern and also on a composite index that included all eight dimensions, to avoid the possibility that a certain dimension might be responsible for the composite score.

Similarly, Ewing et al. (2002) operationalized the built form construct of sprawl at the metropolitan area level in the United States. These researchers conducted a principal component analysis as they looked at a wide range of variables that might contribute to sprawl. They proposed four groups—density, land use mix, degree of centering, and street accessibility—to capture the wide range of variables measured in the study. Using a similar unit of analysis, Southworth et al. (2008) investigated the carbon footprint of U.S. metropolitan areas, proposing proposed six measures of urban form: metropolitan density, centrality (absolute), centrality (relative), concentration, job housing balance, and mass transit effect.

In contrast to studies of metropolitan regions and urban areas, Song and Knapp (2004) evaluated the development patterns and trends of land use patterns in western Oregon, using single-family home data at the neighborhood level. They examined the impact of recent regulations on urban form, measuring the effectiveness of government regulations reflected in trends in the land use patterns of urban form. Using INDEX software, they operationalized five measures of urban form: street design and circulation systems, density, land use mix,

accessibility, and pedestrian access. They analyzed patterns of development over time at the at three different neighborhood levels: census tract, block group, and subgroup levels using regression techniques. They found that neighborhoods defined at the block group level provided more details than neighborhoods defined at census tract level and provided similar information to that of sub-block groups.

Table 2.3
Dimensions of land use patterns

Dimension	Definition
Density	The average number of residential units per square mile of developable land in an urban area
Continuity	The degree to which developable land has been built upon at urban densities in an unbroken fashion
Concentration	The degree to which development is located disproportionately in relatively few square miles of the total urban area rather than spread evenly throughout
Clustering	The degree to which development has been tightly bunched to minimize the amount of land in each square mile of developable land occupied by residential or non-residential uses.
Centrality	The degree to which residential or non-residential development (or both) is located close to the central business district of an urban area
Nuclearity	The extent to which an urban area is characterized by a mononuclear (as opposed to a poly-nuclear) pattern of development
Mixed uses	The degree to which two different land uses commonly exist within the small area, and this is common across the urban area
Proximity	The degree to which different land uses are close to each other across the urban area

Source: Galster et al. (2001)

In contrast to previous studies, Jabareen (2006) developed a conceptual framework to define sustainable urban form. Using thematic analysis, he identified seven concepts associated with sustainable urban form: compactness, sustainable transport, density, mixed land use, diversity, passive solar design, and greening; however, he did not operationalize these concepts. Identifying five important dimensions of sustainable urban form (accessibility, connectivity, density, diversity, and nodality), Talen (2011) provided a definition of sustainable urban form that can be measured and evaluated.

Urban form characteristics frequently associated with sustainable design principles and which best fit at the city level across these studies are density, connectivity, accessibility, mix of uses, diversity of housing types, and amount of green space or open space. (See Chapter 3 for details on the measure of each of these urban form characteristics.) To begin with, **density** is present across all studies. Although there is considerable debate on the association of this characteristic with sustainable design principles (Neumann, 2005), researchers generally agree that dense cities are likely to be more sustainable from an environmental perspective (Ewing, Bartholomew, Winkelman, Walters, & Chen, 2008; Jabareen, 2006; Song & Knaap, 2004; Talen, 2011). For instance, dense urban form is important for maintaining pedestrian-oriented development for a vibrant quality of life (Jacobs, 1961; Kunstler, 1994) along with environmental and economic benefits. Low density has been associated with increased automobile dependence and air pollution (Cervero, 1997; Stone, 2008; Talen, 2011). For the purpose of this study, the urban form of cities with higher density reflects higher levels of sustainable design principles.

Accessibility. This characteristic is a key component of sustainable urban form (Jacobs, 1961; Lynch, 1981; Talen, 2011) and provides various benefits, ranging from improved health to reduced carbon emission (Ewing et al., 2008; Talen, 2011). Therefore, for this study, the urban form of cities with higher levels of accessibility reflects higher levels of sustainable design principles.

Connectivity. This characteristic refers to a physical layout that includes short blocks and well-connected gridded streets with nodes that serve as shared spaces (Carmona, Heath, Oc, & Tiesdell, 2003, 2010; Galster et al., 2001; Talen, 2011). Increased connectivity is more likely to promote interaction among residents (Carmona et al., 2003, 2010) and to increase residents'

interactions with the environment and economic activity such as access to jobs (Talen, 2011). Thus, for this study, the urban form of cities with higher levels of connectivity reflects higher levels of sustainable design principles. Together, the measures of accessibility and connectivity reflect the concept of compactness, defined as urban connectivity between future development and existing development (Jabareen, 2006; Wheeler, 2000).

Diversity. Diversity is an essential characteristic of sustainable design principles (Jabareen, 2006; Jacobs, 1961; Talen, 2011). Lack of diversity could result in homogenous, segregated development, and encouraging a mix of housing types tends to promote equity goals (Garde, 2009; Jabareen, 2006; Talen, 2011). For this study, the urban form of cities with higher levels of diversity reflects higher levels of sustainable design principles.

Mix of land uses. This characteristic encourages walkability and accessibility to various services. In addition, encouraging a mix of neighborhoods addresses equity goals. For this study, the urban form of cities with a higher mix of uses reflects higher levels of sustainable design principles.

Green space. Although the urban characteristic of greening (or green spaces) is not frequently addressed across these studies, Jabareen (2006) identified this concept as key to sustainable urban form. He argued that the provision of green spaces will most likely reduce pollution and enhance the city's image, and eventually increase the city's economic attractiveness. Although possibly captured within the characteristic of mix of land uses, greening carries enough importance to be considered an additional urban characteristic associated with sustainable design principle. Therefore, in this study, the urban form of cities with higher levels of access to green space reflects higher levels of sustainable design principles.

Development regulations and sustainable design principles. In this section, I focus on sustainability principles reflected in development regulations (such as zoning ordinances or specific plan regulations) because they are enforceable laws as compared with most local plans that are only advisory (Baer, 1997; Garde & Kim, 2017). Zoning codes play an important role in promoting sustainability, as they directly affect the built form (Talen, 2012). Therefore, when sustainability principles are integrated into zoning codes, one can expect that these principles will most likely be reflected at least minimally in the resultant built form (Talen, 2012).

Most prior evaluations of a city's ability to pursue sustainability have examined either comprehensive plans (Berke & Conroy, 2000), surveys (Jepson, 2004; Saha & Paterson, 2008), or policies (Bowman, 2005; Lubell, Feiock, &Handy, 2009; Portney, 2003; Portney, 2013a). More recently, some researchers have examined development regulations such as zoning ordinances or specific plan regulations of cities to evaluate how these regulations may promote certain sustainability principles (Garde, Kim, & Tsai, 2015; Garde, 2018; Garde & Hoff, 2017; Garde & Kim, 2017; Hirt, 2013; Jepson & Haines, 2014).

Although scholars generally agree on a broad definition of sustainable development, there are variations (APA, 2000; Berke & Conroy, 2000; Portney, 2003; Portney, 2008; Lubell et al., 2009; Saha & Paterson, 2008). Generally, the concept is defined as the balance of the "three E's," environment, equity, and the economy (Campbell, 1996; Berke & Conroy, 2000; Jepson & Haines, 2014). In this section, I review in chronological order how researchers have defined sustainability or evaluated the promotion of sustainability principles.

Berke and Conroy (2000) employed content analysis to evaluate 30 comprehensive plans in the United States to determine the presence of sustainability principles in these plans. To do this, they developed six principles to define sustainability: harmony with nature, livable

community, place-based economy, equity, polluters pay, and responsible regionalism. The first four principles address a community's long-term ability to sustain itself, while the last two address the "local link to global concerns." To achieve sustainable development, the authors argued, communities must strike a balance between all six principles.

In 2000, the American Planning Association (APA) identified four objectives needed to address the environmental, economic, and social goals of sustainability: 1) reduce dependence upon fossil fuel, extracted underground metals, and minerals; 2) reduce dependence on chemical and other manufactured substances that can accumulate in nature; 3) reduce dependence on activities that harm life sustaining ecosystems; and 4) meet the hierarchy of present and future human needs fairly and efficiently. Using these four objectives as a framework, the APA provided a guide of actions for planners to develop a thorough strategy for achieving sustainability. The actions cater to a broad range of areas: land use, transportation, housing and building, economic development, open space and recreation, infrastructure, growth management, floodplain management, watershed planning, planning processes, and education. With this action guide, communities or cities can respond to local priorities while keeping the four objectives of sustainability in mind (APA, 2000); however, the guide does not provide any normative measures to integrate sustainability policies into land use regulations.

Saha and Paterson (2008) presented a list of 36 local initiatives for promoting sustainable development. Among these initiatives, eight were organized under the three E's of sustainability: environment, equity, and economy. Initiatives grouped under "environment" include efforts to address energy efficiency, pollution prevention and reduction, open space and natural resource protection, transportation planning, and to track progress on environmental protection. In

addition, the study cited two initiatives under "economy" (smart growth measures and promotion of local employment) and one initiative under "equity" (promotion of social justice and equity).

Lubell et al. (2009) defined sustainability by developing a sustainability index using environmental indicators borrowed from Portney (2003) and Bowman (2005). They identify 50 policies grouped into eight clusters:

- pollution prevention and mitigation (10 policies)
- economic development/ redevelopment (9)
- land use (8)
- zoning (6)
- transportation (6)
- resource conservation (5)
- green symbols and membership (4)
- administration and coordination (2).

Portney's (2003, 2013a) sustainability index score was based on 34 measures in seven broad categories. He utilized the sustainability index to examine the pursuit of sustainability in 55 largest U.S. cities, awarding a score of 1 or 0 for the presence of each sustainability principle; however, this method does not capture any variations in the extent that a city may promote sustainability principles.

In addition, there are market-driven approaches to evaluate sustainable development. For example, the US Green Building Council, Congress of New Urbanism and the Natural Resource Defense Council partnered in 2009 to develop the Leadership in Energy and Environmental Design at the neighborhood level (LEED-ND). The LEED–ND rating system is composed of 56 prerequisites and credits organized into three main groups: smart location and linkage,

neighborhood pattern and design, and green infrastructure and buildings. Two additional categories are innovation and design process and regional priorities. Developers of the LEED-ND rating system argue that incorporation of the concepts of the rating system into cities' land use regulations will help promote sustainable development (U.S. Green Building Council, 2013). Similarly, the Sustainable Tools for Assessing and Rating (STAR) system was developed in 2012 to assess the sustainability of local governments (Star Communities, 2012). This measurement has a total of 44 objectives with seven thematic goals: the built environment, climate and energy, economy and jobs, education arts and community, equity and empowerment, health and safety, and natural systems. However, both LEED-ND and STAR are voluntary, and therefore, developers and/or cities that are more passionate about sustainability are more likely to use them.

More recently, some scholars have used content analysis of zoning ordinances to measure the integration of sustainability principles in cities' development regulations (Garde et al., 2015; Garde, 2018; Garde & Hoff, 2017; Garde & Kim, 2017; Jepson & Haines, 2014; Talen & Knaap, 2003). Zoning regulations that strongly integrate sustainability principles are more likely to achieve sustainability objectives than those that reflect fewer principles or are only advisory (Garde & Kim, 2017).

In their study, Jepson and Haines (2014) identified nine sustainability principles and 53 associated regulatory items that might be included in a zoning ordinance to achieve sustainability. Their list of principles included: 1) encourage higher density development, 2) encourage mixed use, 3) encourage local food production, 4) protect ecosystems and natural functions, 5) encourage transportation alternatives, 6) preserve or create a sense of place, 7) increase housing diversity and affordability, 8) reduce the use of fossil fuels/encourage the use of

fossil fuel alternatives, and 9) encourage the use of industrial byproducts. Jepson and Haines (2014) also assign a value of 0 or 1 to denote whether each sustainability principle was reflected in a city's land use regulations. Again, this coding method does not capture the extent to which a sustainability principle may be addressed, and certain sustainability principles may be frequently mentioned in the regulation, but not strongly addressed throughout. In comparison, Talen and Knaap (2003) utilized quantitative measures to capture the extent to which smart growth principles were reflected in zoning regulations. They compared the minimum lot size allowed in R-1 zones of zoning regulations across cities with the optimal standards prescribed by smart growth principles. This method provided a more detailed analysis than simply using a binary code (0 or 1) for the presence of the minimum lot size.

Garde, Kim, and Tsai (2015) investigated the differences in the extent to which development regulations—form-based codes versus conventional zoning codes—reflected LEED-ND rating system criteria in the city of Miami. This coding approach could captured the extent to which a sustainability principle was promoted as opposed to its mere presence or absence in the regulations. Researchers also used this approach to examine the differences between form-based codes and conventional zoning codes related to integration of sustainability principles in Southern California cities (Garde, 2018; Garde & Kim, 2017) and in Denver (Garde & Hoff, 2017). Following Garde et al. (2015), I used a similar framework and coding approach to capture the extent to which sustainable design principles are integrated in development regulations of downtown specific plans in the five-county Southern California region.

Literature related to Tiebout sorting

The focus of my dissertation is on the "product" of the urban development processes (urban form, zoning regulations, and policies adopted by cities) rather than the process itself;

however, an understanding of how certain processes influence urban development is important because these will eventually be reflected in the "product," the existing urban form, the development regulations, and the resultant urban form. Therefore, in this section, I review the literature on how certain urban development processes influence urban form or development regulations with a focus on Tiebout sorting. For this study, I mainly used two theoretical frameworks, Tiebout sorting and the creative class, which provide some important insights about these processes. However, I used these theoretical frameworks only as a frame of reference because urban development processes eventually will influence development regulations and the resultant urban form, which is the primary focus of my study.

In his seminal article, Charles Tiebout (1956) developed public choice theory based on an individual's locational decisions and public goods. He claimed that individuals will select a community that provides services that satisfy their preferences. He argued, "The consumer-voting may be viewed as picking that community which best satisfies his preference pattern for public goods" (p. 418). This "Tiebout sorting" (Musso, 2001) occurs when people "vote with their feet" and move to localities that offer their preferred bundles of goods. A criticism of Tiebout's model, however, is that it assumes individuals face no mobility restrictions and zero moving costs.

With less restrictive assumptions, Peterson (1981) expanded upon Tibeout's (1956) theory and noted that residents choose to live in communities that provide a maximum cost-to-benefit ratio of local government services. He argued that local planning officials understand the rationale behind residents' locational choices, and therefore compete with each other to attract certain types of people (and their tax revenues) by offering bundles of public goods and amenities. Acting in their cities' economic interests, local decision makers favor developmental

policies (financial subsidies for businesses) over redistributive policies (financial subsidies for low-income housing). Local governments also avoid allocation policies because these measures have neutral effects on the cost-benefit ratio of local government services. Using Peterson's argument, Schneider (1989) posited, "Competition to lure attractive, fiscally productive individuals, families, and firms increases the incentives of local governments to invest in the developmental services which will appeal to them" (pp. 71–72).

In addition, Peterson (1981) posited that land is the factor of production over which cities can exercise control, as they seek to attract a certain set of residents, particularly those in the highly skilled labor market, to promote economic growth. Since local governments cannot directly control the flow of residents into cities, they use tools such as zoning regulations and other land use controls to attract desirable skilled workers (Heikkila, 1996; Paulsen, 2014; Peterson, 1981). Specifically, cities use the power of eminent domain and zoning regulations to plan the use of local land as well as regulate the size, content, and purpose of buildings within their jurisdictions (Peterson, 1981). They also provide amenities such as parks, recreation areas, and good quality schools to ensure that the benefits of public services offset the costs for their residents.

Using factor analysis followed by variance analysis of a broad range of 1990 socioeconomic census data for municipalities within Los Angeles region, Heikkila (1996) examined whether municipalities function as "Tieboutian clubs." He discovered Tiebout sorting along four dimensions—urban scale, ethnicity, household type, and economic class—affected by land use regulations and building by-laws. In contrast, Banerjee and Verma (2005) primarily focused on land use configurations of 85 municipalities within Los Angeles County. They suggest that land use configurations are largely a function of public policy measures such as

zoning, subdivision regulation, redevelopment projects, planning standards such as floor area ratios, and increasingly, private-public development deals involving large-scale projects. They argued that communities are likely able to exclude certain populations by limiting density or certain types of housing like apartments, townhomes, and trailer parks. Using these land use configurations, they identified city types—edge cities, industrial cluster city, suburban cities, greyfield cities, apartment cities, and generic cities—which they then examined against socioeconomic characteristics and found Tiebout sorting by income and ethnicity in cities within the Los Angeles region. On the other hand, Garde (2010) found no general association between design characteristics of neighborhood scale projects and income and population characteristics. He used survey data to examine whether certain neighborhood projects were promoted in certain cities, concluding that a variety of neighborhood projects may be found in different types of cities. However, he noted that residents may choose communities based on preferences other than the design characteristics of neighborhood projects, and therefore, Tiebout sorting might still exist. While the debates continue, cities may promote certain types of development regulations that reflect the designs and physical layouts that are attractive to certain potential residents, eventually resulting in Tiebout sorting.

Conceptual framework: Creative class and sustainable design principles

Considering the theory of Tiebout sorting, we may conclude that the creative class also is likely to sort itself into communities that offer certain preferred goods and amenities. As discussed, quality of place is an important factor for the creative class (Florida, 2012), and therefore, the creative class may sort into cities with certain types of land uses, types of buildings, or lot layouts. Although limited, the literature on the creative class and adoption of sustainability principles suggests that cities with a larger proportion of the creative class tend to

promote more sustainability policies (Lubell et al, 2009; Portney, 2013a, 2013b), a finding that may indicate sorting based on development regulations that reflect sustainability principles. Such development regulations are likely to be reflected in these cities' built environments, as the built environment is largely a function of development policies including zoning regulations (Banerjee & Verma, 2005). As discussed above, six urban form characteristics are frequently associated in the literature with sustainable design principles and best fit the city level: density, connectivity, accessibility, mix of uses, diversity of housing types, and amount of green/open space.

Portney (2013a, 2013b) found cities with a larger proportion of the creative class tended to be the same ones that pursued sustainability policies and experienced greater economic growth. Similarly, Lubell et al. (2009) examined adoption of environmental policies in central California and found cities with a higher intellectual capital adopted more sustainability principles. Using business patterns data at the zip code level, they defined intellectual capital as the proportion of business establishments that were professional and scientific, education, managerial, and health and social services. Given this, higher intellectual capital is most likely to capture creative professionals, essential members of the creative class. According to Portney (2013a), members of the creative class are possibly either drawn to cities that promote sustainable design principles or demand these principles from their cities; however, that process is beyond the scope of this study. Instead, my focus is on the product—the existing urban form and development regulations and its association with the size of the creative class.

Sustainable principles are intended to provide public goods, such as environmental quality (Lubell et. al, 2009), which is a key element of quality of place for the creative class (Florida, 2002a, 2012; Trip, 2007); therefore, we can expect the proportion of the creative class in a city's population to be positively correlated with regulations that reflect sustainability

principles. Although previous studies are limited, one can conclude that the development regulations of cities with a higher proportion of the creative class are likely to reflect higher levels of sustainability principles (Table 2.4).

Existing urban form characteristics are largely a function of development regulations (Banerjee & Verma, 2005); therefore, regulations that include sustainable design principles will result in an emerging built form reflective of these principles, and similarly, we can expect cities with a larger proportion of the creative class to be more likely to have an existing urban form that reflects sustainability principles. Also, studies indicate that members of the creative class are attracted to dense (Brown & Mecyzynski, 2009) urban environments characterized by diverse uses (Spencer, 2015; Wood & Dovey, 2015), and therefore, we can expect the proportion of the creative class in a city's population to be positively correlated with density, mixed use developments, diversity of land uses, and diversity of housing types.

Table 2.4
Hypothesized direction of relationship between the proportion of the creative class and sustainability related urban form characteristics and development regulations.

Urban form characteristics	**Proportion of the creative class**
Density (compact development)	+
Connectivity (street connectivity)	+
Accessibility (access to commercial uses)	+
Mix of uses	+
Diversity of housing types	+
Open/green space (access)	+
Combined urban form index	+
Sustainability principles reflected in development regulations	+

In addition, the creative class tends to prefer locations that have rich social networks (Brown & Mecyzynski, 2009), and connectivity and accessibility are key components of sustainable urban form that are more likely to increase residents' interactions (Carmona et al., 2003, 2010) and thereby provide opportunities for social connections. Therefore, we can expect

the percentage of the creative class in a city to be positively correlated with accessibility and connectivity. Similarly, we can expect the proportion of the creative class in a city to be positively correlated with open space. Therefore, in this study, I postulated that the percentage of the creative class overall would be positively correlated with the composite urban form index.

Study area

In this study, I focused on 167 incorporated cities within the five-county region of Southern California to examine the association between the presence of the creative class and the promotion of sustainability. The political, social, and spatial fragmentation of this decentralized region which includes 183 incorporated cities in five counties—Los Angeles, Orange, San Bernardino, Riverside, and Ventura (Fogelson, 1993)—lends itself as the perfect setting to observe Tiebout sorting. In addition, the multi-city, politically fragmented Southern California region is expected to grow by 3.8 million residents in the next 25 years, making the region home to 22 million people by 2040 (Southern California Association of Governments, 2016).

The creative class is prevalent in California, which has the highest number of creative occupations in the United States, according to the report, "Creative Economy," (Otis, 2018). But members of the creative class are not evenly distributed among California cities. A report by CityLab (2015) indicates a strong variation in the proportion of the creative class at the city level in the state, with extremely high and extremely low proportions of the creative class side by side in adjacent cities. The five-county Southern California region includes Santa Monica, which ranks among the top 20 cities nationwide in the proportion of the creative class, as well as Huntington Park, Lynwood, Southgate, Compton, Santa Ana, and Rialto, which rank among the bottom 20 (CityLab, 2015).

On the other hand, the state of California is known for its strong leadership in environmental policy and planning. The adoption of the Global Warming Solutions Act (AB 32) in 2006 and the Sustainable Communities and Communities and Climate Protection Act (SB 375) in 2008 demonstrate steps the state has taken towards a cleaner environment. In addition, California is the first state in the nation to adopt statewide green buildings code requirements (Frielich & Popowitz, 2010).

CHAPTER 3: Research Method

As discussed earlier, the main objective of this study is to examine the extent to which the presence of the creative class is associated with sustainability. In this study, I focused on the incorporated cities within the five-county region of Southern California. Using a mixed-methods approach using quantitative and qualitative data, I conducted the data collection and analyses for this study in two phases. In the first phase, I examined the association between the size of the creative class and six sustainable design-related urban form characteristics (compactness, mixed use, diversity of housing types, street intersection density, access to commercial uses, and access to open space) across 167 cities within the Southern California region. More importantly, using four different combinations of the two variables, size of the creative class and level of the urban form index (composite index of the six urban form characteristics), I purposefully selected eight cities, two cities from each combination, for an in-depth analysis. The analytic conclusions derived from varying cases based on the size of the creative class and urban form index allows to expand the discussion on the size of the creative class and sustainability principles, reflected in development regulations adopted by cities and provides more robust findings. In Phase II, using LEED-ND rating system as the evaluative framework, I examined the most recent downtown specific plans of the selected eight cities to determine the association between the presence of the creative class and sustainability principles, reflected in the downtown specific plan regulations of these cities. Below, I provide a detailed description of the two phases of this study.

Phase I

In this phase, I used three steps to exam the association between the sustainable design-related urban form characteristics of cities and the size of the creative class in these cities. First, I evaluated the size of the creative class in 167 incorporated cities in the five-county Southern

California region using U.S. Census city-level occupation data. I excluded census designated places (CDPs) and incorporated cities with a population less than 10,000 and greater than 500,000. I excluded incorporated cities with a population below 10,000 and above 500,000, as they more likely to be outliers and could bias the results making generalizability more difficult. The City of Los Angeles, with a population greater than 500,000, was specifically excluded because land planning programs for such large cities are considered unique and not generalizable. Smaller cities, with populations less than 10,000, were excluded because they were likely to lack resources to initiate a sufficient planning effort (Berke & Conroy, 2000). Additionally, the cities of Vernon and Industry had very little residential development, and therefore, were not generalizable. These population parameters reduced the sample population to 167 incorporated cities.[3] Next, to develop a composite index of sustainable urban form characteristics, I measured six urban form characteristics associated with sustainable urban form, including density, mix of land uses, diversity of housing types, street intersection density, access to commercial uses and access to open space (Jabareen, 2006; Galster et al., 2001; Talen, 2011). Third, I examined the association between the sustainability-related urban form characteristics (individually and collectively in a composite index) and the size of the creative class in these cities. Furthermore, using the median value of the size of the creative class, I divided the cities into two groups, based on a higher or lower proportion of the creative class, to compare the means of the sustainable design-related urban form characteristics across the two groups. Next, I purposefully selected eight cities based on the presence of higher (or lower) size of the creative class in combination with higher (or lower) composite urban form index. The results of this

[3] Sixteen incorporated cities were excluded: Vernon, Industry, Bradbury, Irwindale, Rolling Hills, Hidden Hills, Needles, Indian Wells, Big Bear Lake, La Habra Heights, Villa Park, Ojai, Calimesa, Rolling Hills Estates, and Westlake Village with populations less than 10,000; and the City of Los Angeles with a population greater than 500,000.

phase will indicate whether there is any association between the six existing sustainability related urban form characteristics. Further, the results will indicate whether the six existing sustainable design-related urban form characteristics are statistically different across cities that have a higher (or lower) proportion of the creative class. Provided below are the details of the three steps of the first phase.

Size of the Creative Class. The creative class is defined as the sum of the total number of people employed within each occupational group listed under the super creative core and creative professionals. According to Florida (2012), members of the creative class are employed either in the super creative core or creative professional category. Florida measures the creative class using the occupational categories of the 2010 Bureau of Labor Statistics (BLS) Occupational Employment Survey data available at the *metropolitan level* (Bureau of Labor Statistics, 2010). Table 1 below presents the three classes developed by Florida along with the major occupational groups listed within each class and their respective Standard Occupational Code (SOC)[4]. However, the BLS data is not available at the city level. To determine the size of the creative class at the city level, I collected occupation data using ACS 5-year estimates (2010–2014) available through the U.S. Census Bureau website. Using the major occupational groups and Standard Occupational Code (SOC) as a reference, I collected occupational data for super creative core related occupations (see Table 3.1), assuming that these occupations would require more creativity than those classified under creative professionals. I collected data for five major occupational groups within the super creative core category individually and then combined

[4] The Standard Occupational Classification (SOC) code is used by federal statistical agencies to classify workers into occupational categories (2010 SOC User Guide, 2014). The SOC comprises 23 major groups and 840 detailed occupations. Occupation data collected through the American Community Survey (ACS) is coded according to the SOC system. The U.S. Census Bureau also has 23 major occupation categories, but with 539 detailed occupations rather than the BLS's 840.

these to obtain the total number of people employed in super creative core related occupations at the city level.

Table 3.1
List of Major Occupational Groups that Define the Creative Class

	Class	Standard Occupational Classification (SOC) code (major groups)
Creative class	**Super creative core**	
	Computer and mathematical occupations	15-0000
	Architecture and engineering occupations	17-0000
	Life, physical, and social science occupations	19-0000
	Education, training, and library occupations	25-0000
	Arts, design, entertainment, sports, and media occupations	27-0000
	Creative professionals	
	Management occupations	11-0000
	Business and financial operations occupations	13-0000
	Legal occupations	23-0000
	Health care practitioners and technical occupations	29-0000
	High-end sales and sales management	41-0000
	Working class	
	Construction and extraction occupations	47-0000
	Installation, maintenance, and repair occupations	49-0000
	Production occupations	51-0000
	Transportation and material-moving occupations	53-0000
	Service class	
	Health care support occupations	31-0000
	Food preparation and food-service related occupations	35-0000
	Building and grounds cleaning and maintenance occupations	37-0000
	Personal care and service occupations	39-0000
	Low-end sales and related occupations	41-0000
	Office and administrative support occupations	43-0000
	Community and social services occupations	21-0000
	Protective service occupations	33-0000
	Agriculture	
	Farming, fishing, and forestry occupations	45-0000

Source: Florida (2014)

Next, I measured the size of the super creative core related occupations (see Table 1). Here, the size refers to the percentage of people employed in super creative core occupations over the city's workforce. Thus, the size of the super creative core related occupations is the sum

of the total number of people employed in the five major occupational groups within the super creative core category divided by the total number employed within all occupations for a given city. For this study, the super creative core related occupations will now onward be referred to as the creative class.

Sustainable urban form characteristics. The second step was to develop a composite index of six urban form characteristics associated with sustainable urban design principles, including density, mix of land uses, diversity of housing types, street intersection density, access to commercial uses, and access to open space (Galster et al., 2001; Jabareen, 2006; Talen 2011; Wheeler, 2005). Table 3.2 presents the six select urban form characteristics associated with sustainable urban design principles, how they were measured, their spatial unit of analysis, and their data sources.

Table 3.2.
Select Characteristics of Urban Form Associated with Sustainable Urban Design Principles

Characteristic	Measure	Spatial Unit	Source
Density	Dwelling unit per acre of residential land	City level	ACS; SCAG
Mixed-use	Mean of entropy score at block group level	City level	SCAG
Diversity of housing types	Simpson's diversity index	City level	ACS
Connectivity	Street intersection density	City level	ACS
Access to commercial uses	Percentage of estimated housing units with access to one or more commercial parcels within a quarter-mile radius	City level	SCAG
Access to Open space	Percentage of estimated housing units with access to one or more parks within a quarter-mile radius	City level	SCAG; CPAD

Source: American Community Survey (ACS) (2010–2014); Southern California Association of Governments (SCAG) (2012); California Protected Area Database (2016)

I collected secondary data from various sources. Data for urban form characteristics were obtained from the ACS 5-year estimates (2010–2014) dataset, U.S. Census Tiger shape files, and the Southern California Association of Governments (SCAG, 2012) land use shape files. The

ACS, conducted annually by U.S. Census Bureau, provides vital information about the United States and its people (U.S. Census Bureau, 2017). The U.S. Census Tiger Shapefiles, available from the U.S. Census Bureau, provide information on spatial features such as roads, legal and statistical boundaries (U.S. Census Bureau, 2017). The SCAG 2012 land use dataset includes existing land use information at the parcel level for the six-county Southern California region based on "SCAG 2008 land use information, 2008–2012 new construction data, as well as inputs from local jurisdictions in the SCAG region received during the SCAG's local input process" (SCAG, 2012). In addition, I obtained data on open space from the California Protected Area Database (CPAD, 2016), which contains spatial data on lands protected for open space purposes that are owned in fee by governments, non-profits, and some private entities. The data include all such areas in California, from small urban parks to large national parks and forests, mostly aligned to assessor parcel boundaries.

Employing these datasets, I used Geographic Information Systems (GIS) to measure the following six urban form characteristics associated with sustainable urban design principles.

Density. This urban form characteristic was calculated as net residential density based on data obtained from the ACS 5-year estimates (2010–2014) city-level data available through the U.S. Census Bureau and the SCAG land-use (2012) parcel level data. Net residential density is equal to the total number of housing units per acre of residential land, where residential land is the amount of land in acres designated for residential development for a given city. The SCAG defines residential land as areas of "single family residences, multi-unit dwellings, mobile homes, and mixed residential category that consists of two or more of the aforementioned groups" (SCAG Land Use Classification, 1990). For my study, I aggregated these land uses at the parcel level to measure the total amount of residential area in acres for a city. Then, the net

residential density was measured as the total number of housing units divided by the total amount of residential area (in acres). The higher the value, the greater the net residential density.

Diversity. For this urban form characteristic, I used the ACS 5-year estimates (2010–2014) dataset on housing characteristics and Simpson's diversity index (Talen, 2008; U.S. Green Building Council, 2013; Talen, 2011) to calculate diversity for the 167 incorporated cities within Southern California. I identified eight housing categories: 1 unit detached, 1 unit attached, 2 units, 3 or 4 units, 5–9 units, 10–19 units, 20–49 units, and 50-plus units. Simpson's diversity index is calculated as:

$$\text{Score} = 1-\sum (n/N)^2$$

where n = the total number of dwelling units in a single category, and N = the total number of dwelling units in all categories at the city level. The Simpson's diversity index ranges between 0 and 1, with a higher value (closer to 1) representing a greater diversity of housing types.

Mixed-use. Drawing upon the SCAG land-use parcel-level data (2012) and census block group administrative boundary data, I measured mixed-use as entropy scores for multiple walking destinations, such as housing, offices, and commercial land use categories (Brown et al., 2009). Entropy is a measure of the variety of land uses within a given radius (Spears & Boarnet, 2009). I classified the various land uses into 11 broad categories similar to those developed for the Metropolitan Futures Initiative Regional Study, 2014 (see Appendix 4.1). I determined entropy scores using a mix of three land use categories (residential, commercial, and offices) at the block group level for the 167 incorporated cities in the study. The residential land use category includes three land use categories (single family residential, multi-family residential, and other types of residential). Following Frank et al, (2005), entropy score was measured using the three land use category mix (Frank et. al, 2005) where:

Land use mix = (-1)*[(B1/a) ln (B1/a) + (B2/a) ln (B2/a) + (B3/a) ln (B3/a)]/ln (n3); Where: a = total area of land uses present in a block group; B1 = residential; B2 = commercial; B3 = office; N3 = 0 – 3, summing the number of different land uses present.

Entropy scores range from 0 to 1 where 0 represents a homogenous distribution of land use and 1 represents equal mixes of land use categories present in the equation. In other words, a block group with an entropy score of zero represents a homogenous distribution of land uses whereas a block group with an entropy score of one represents an equal distribution of the three land use categories (residential, commercial and offices). The proportion of each land use to the total block group area was used to account for the "missing land uses" excluded in the entropy score (Frank et al., 2004). I measured entropy at the block group level, then calculating the city's entropy score as the average entropy score of all the block groups within the city.

Accessibility. Using SCAG (2012) land-use parcel level data and GIS, I measured accessibility as the percentage of estimated housing units with access to one or more commercial parcels within a quarter-mile radius. Residential parcels designated as single-family or multi-family residential were included. As data for housing units was unavailable through SCAG, I borrowed methodology from Metropolitan Futures Initiative Research Center (MFI) to estimate number of housing units within each city[5]. Although MFI had created estimates for Orange County alone, borrowing their method, I calculated estimates for the study area to maintain consistency throughout the five-county region. For this study, commercial use—parcels that broadly include areas predominantly used for business or the sale of products and their associated services—consisted primarily of retail stores, restaurants, offices, and locations for

[5] Permission to use this method was obtained from Metropolitan Research Institute

personal services, included associated facilities and parking areas and other commercial areas (SCAG Land Use Classification, 1990).

Next, applying GIS and using Euclidean distance (straight line distance), I determined the number of commercial and services parcels within a quarter-mile radius of each residential parcel. Although several studies have used travel distance, Boscoe, Henry, and Zdeb (2012) found the added precision offered by travel distance, travel time, or both was highly insignificant. I then divided the number of estimated housing units with access to one or more commercial parcels by the total number of estimated housing units for a given city. (Although a residential unit may have access to more than one "commercial use," this measure did not take into consideration the count of commercial parcels.) The higher the resulting percentage, the greater the city's level of accessibility to commercial uses. In other words, a higher percentage of accessibility indicates a higher number of estimated housing units in that city have access to commercial uses within a quarter mile radius.

Access to open space. Using SCAG land-use parcel-level data (2012), the California Protected Area Database (CPAD, 2016), and GIS, I measured access to open space as the percentage of estimated housing units in a city with access to one or more protected areas within a quarter-mile radius. The CPAD (2016) contains data on lands protected as open space that are owned in fee by governments, non-profits, and some private entities. Data includes all such areas in California, from small urban parks to large national parks and forests, mostly aligned to assessor parcel boundaries. As described above, with the measure of accessibility, I used estimated housing units within each city to gauge access to open space, as actual data for housing units was unavailable through SCAG. Similarly, I used Euclidean distance (straight line distance) to calculate the number of city parks that fall within a qaurter-mile radius of each residential

parcel. Then, I divided the number of estimated housing units with access to one or more parks by the total estimated housing units for a given city. (Although a residential unit may have access to more than one protected area, this measure did not take into consideration the count of parks within a quarter-mile radius.) The higher the resulting percentage, the greater the level of accessibility to open space. In other words, a higher percentage of "access to open space" indicates a higher number of estimated housing units in that city have access to open space within a quarter mile radius.

Connectivity. To measure connectivity, I used the U.S. Census (2015) roads shapefile available for each individual county in the study region (Ventura, Los Angeles, Orange, San Bernardino, and Riverside). As connectivity is a measure developed to promote and encourage walking, I excluded primary roads (freeways and ramps) and secondary roads (county highways and toll roads). I calculated connectivity as street intersection density (the number of street intersections within each city) divided by that city's total area. Using GIS, I calculated the points at which two streets intersect, excluding cul-de-sacs. Next, I summed these total points within each city and divided by the city's area. Figure 3.1 depicts an example of street connectivity within the city of Garden Grove, Orange County, where each dot represents the intersection of two streets. The higher the number of dots for a given area indicates higher levels of connectivity. In other words, the higher the street intersection density, the greater the levels of connectivity. In other words, a city that has higher street intersection density is more likely to promote and encourage walking than a city that has lower street intersection density.

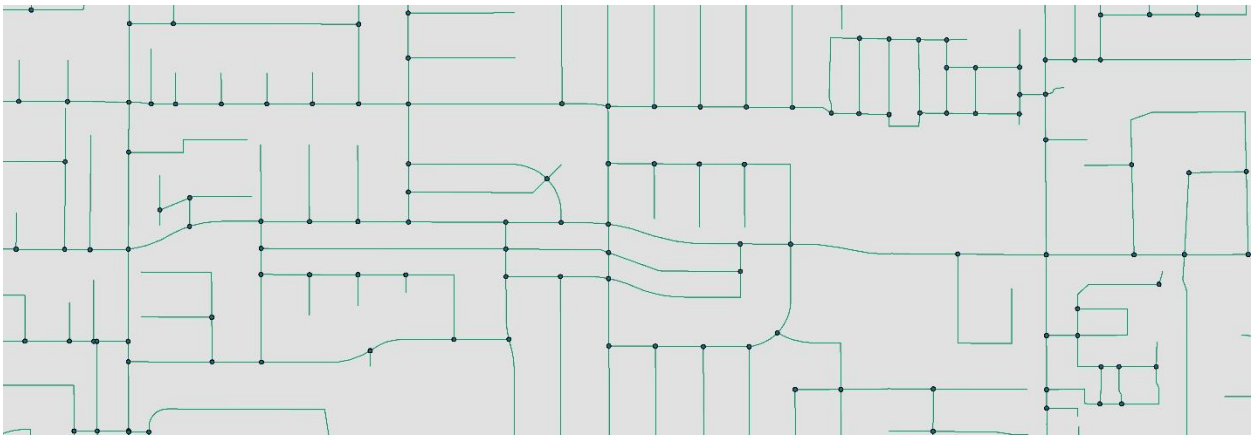


Figure 3.1. Street connectivity for a portion of the city of Garden Grove, Orange County (2015), where a dot represents where two streets intersect.

Next, I combined the six urban form characteristics associated with sustainable urban form to develop an urban form index (UFI). To do so, I first calculated a z-score statistic for each characteristic such that each dimension was weighted equally (Galster et al., 2001). A z-score is the number of standard deviations a city's characteristic is from the mean of the distribution for that characteristic. Then, I added the z-scores for each urban form characteristic to obtain a composite urban form index associated with sustainable urban form for each city. For the purpose of this study, a higher z-score for each individual urban form characteristic reflects higher levels of sustainable design principles. Given this, a higher UFI index reflects higher levels of sustainable design principles. Because an extreme z-score of one or two characteristics might drive the overall value of the composite urban form index, I used both the actual values for each characteristic individually as well as the composite urban form index in my analysis.

Creative class and sustainable urban form characteristics. For the third step in this phase, I examined the association between the urban form characteristics (individually and as a composite index) and the size of the creative class across 167 incorporated cities within the five-county region of Southern California. To do so, I first obtained the descriptive statistics for the study variables using Statistical Product and Service Solutions (SPSS). Next, with the use of

SPSS, I applied Pearson's two-tailed bivariate correlation tests to examine the associations between the select urban form characteristics (individually and collectively in the composite index) and the size of the creative class. In addition, I also conducted a one-way ANOVA to determine any statistically significant differences among the sustainability-related urban form characteristics of cities with a higher (or lower) proportion of the creative class. Using the median value of the size of the creative class as the cutoff value, I categorized the cities into two groups. Cities with a size of the creative class greater than the median value were categorized as "cities with a higher proportion of the creative class"; similarly, cities with a size of the creative class lower than the median were categorized as "cities with a lower proportion of the creative class." Finally, I purposefully selected eight cities for an in-depth analysis in Phase II.

Phase II

In the second phase of data collection and analyses, I focused on the most recent downtown specific plans of eight cities to examine the extent to which certain sustainable design principles reflected in these plans might be associated with the size of these cities' creative class. In addition, I conducted interviews to gain additional insight into the role of the creative class and the promotion of sustainable design principles in these selected cities.

City selection criteria. A selection of varying cases for analysis ensures that the conclusions are more robust than those based on a single case study (Hanna, 2005). Therefore, for an in-depth analysis, I selected eight cities that depicted different situations of the variables, the creative class and the urban form index, two with the criterion described in each of the four cells presented in Figure 3.2. The case studies were purposefully sampled to reflect the range of the creative class and urban form index based on the results obtained from the quantitative analysis in Phase I. In addition, to assure the downtown specific plans reflected recent practice

(Berke & Conroy, 2000), I selected from among cities that had current downtown specific plans since January 1, 2008.

		Proportion of the creative class	
		Low	**High**
Urban form index (UFI)	**High**	Select two cities that have a lower proportion of the creative class and a high urban form index	Select two cities that have a higher proportion of the creative class and a high urban form index
	Low	Select two cities that have a lower proportion of the creative class and a low urban form index	Select two cities that have a higher proportion of the creative class and a low urban form index

Figure 3.2. Selection method for identifying eight cities for an in-depth analysis

The UFI for 167 incorporated cities were arranged in ascending order and split into four groups using the quartile value (where 1 = high value of UFI; 4 = low value of UFI). Similarly, the z-scores for the size of the creative class were arranged in ascending order and split into four groups using the quartile value (where 1 = high value of the size of the creative class; 4 = low value of the size of the creative class). Cities that received 1 for the size of the creative class and for UFI were categorized as the "high-high" group. Cities that received 4 for the size of the creative class and for UFI were categorized as the "low-low" group. Similarly, cities with a creative class size of 1 and a UFI of 4 were categorized as the "high-low" group, and those with a creative class size of 4 and a UFI of 1 were categorized as the "low-high" group[6]. I selected the first two cities that satisfied each cell criterion and had a downtown specific plan that was adopted after January, 2008 for an in-depth analysis, resulting in a total of eight cities.

I focused on downtown specific plans for several reasons. First, creative industries tend to aggregate in inner cities (Durmaz, 2015; Wood & Dovey, 2015), and people employed in these industries tend to reside closer to their workplaces (Spencer, 2015). In the United States,

[6] If a city that satisfied all criteria were not found in the first group of low-low (where UFI = 1 and CC = 1), then I selected a city from the next group (where CC = 2 and UFI = 4), or the next group (where CC = 1 and UFI = 3)

downtowns that formerly were strictly business-oriented now are dense, walkable mixed-use places that are attractive to various users (Birch, 2002, 2005, 2009). Growth trends in downtowns indicate an increase in the percentage of residential development. In addition, small scale leisure and night life districts including restaurants, bars, and cafes are being developed in or near downtowns generating a vibrant, diverse atmosphere (Campo & Ryan, 2008). The presence of employment nodes and high land values make downtowns a strong contributor to a city's tax base (Birch, 2009). Given this, I focused on downtown specific plans for an in-depth analysis.

I analyzed downtown specific plans—a zoning tool that establishes regulations for a district (downtown) tailored to that site, consistent with the general plan (Governor's Office of Planning and Research, 2001). A regulatory specific plan has advantages over zoning. Zoning's regulatory effects are immediate as compared with the long-term provisions of a general plan (Governor's Office of Planning and Research, 2003). With zoning as the only option, planners can face difficulties in phasing a long term project to meets the general plan's objective. In such cases, specific plans are useful, as planners can regulate the development timing for the particular site (downtown) or schedule its infrastructure installation (Governor's Office of Planning and Research, 2003). As cities are investing heavily in downtowns to attract multiple users—residents, worker and visitors (Birch, 2009)—an analysis of the downtown specific plan would most likely capture implementation of the local governments' latest efforts. Therefore, I focused on current downtown specific plans that were adopted after 2008.[7]

Downtown specific plan evaluation. Based on the selection criteria, the eight cities selected for in-depth analysis are as follows:

[7] Downtown specific plans of El Segundo and Redlands were partially updated in 2017.

High-high group: Santa Monica and El Segundo[8]

High-low group: Yorba Linda and Redlands[9]

Low-high group: Hawthorne and Huntington Park

Low-low group: Desert Hot Spring and Baldwin Park

I contacted the planning staff of the eight selected cities during November 2017 through April 2018. Between November and December 2017, I emailed the planning offices to ask whether their city had a downtown specific plan and when it was adopted. I also retrieved information on downtown specific plans from individual city websites, and in one case, I collected a physical copy of the downtown specific plan from the city. Cities that did not respond to email were contacted via telephone. After collecting the downtown specific plans, I analyzed the content using Atlas Ti software.

Evaluative framework. I used the Leadership in Energy and Environmental Design at the neighborhood level (LEED-ND) rating system as the analytical framework of sustainability principles to evaluate the content of the downtown specific plans and determine the degree to which the regulations reflected or integrated sustainability principles. Other researchers have employed a similar approach (Garde, 2018; Garde et al., 2015; Garde & Hoff, 2017; Garde & Kim, 2017). The LEED-ND rating system was developed collaboratively in 2009 by the United States Green Building Council (USGBC), the Natural Resources Defense Council and the Congress for New Urbanism and updated in 2013 and in January 2018 (USGBC, 2018). I used the 2013 updated version for this study.

A point system used to rank neighborhood development projects, the LEED-ND framework consists of five main categories: 1) Smart Location and Linkage (SLL); 2)

[8] El Segundo's downtown specific plan was adopted in 2000 and partially updated in 2017.
[9] Redlands' downtown specific plan was adopted in 1994 and partially updated in 2017.

Neighborhood Pattern and Design (NPD); 3) Green Infrastructure and Buildings (GIB); 4) Innovation and Design Process; and 5) Regional Priority Credit. The first three categories include operationally defined criteria and sub-criteria for which points are awarded. The remaining two categories award points for criteria not addressed in the previous three categories. To examine the extent to which the cities' downtown specific plan regulations reflected sustainable design principles, I focused on only the first three categories: SLL, NPD, and GIB, which consist of 41 criteria. Nevertheless, if the cities' development standards promoted strategies not addressed in these three categories, I listed them under Innovation and Design Process to draw attention to these cities' additional efforts. (For a complete list of the LEED-ND criteria and their associated weights, see Appendix 4.2.)

The Smart Location and Linkage (SLL) category primarily focuses on the location of sites in order to minimize the adverse environmental impact of new development. The majority of the nine criteria and their respective sub-criteria in this category prioritize locations close to existing development, infill sites, and previously developed sites (USGBC, 2018). As these sites have existing infrastructure, it reduces the need to build new infrastructure and the increase of impervious land. In addition, certain criteria in this category aim to protect ecologically sensitive habitat and water bodies caused by fragmented development.

With 15 criteria and their respective sub-criteria, the Neighborhood Pattern and Design (NPD) category focuses on creating well-connected, compact, walkable mixed-use neighborhoods. This category aims to avoid fragmented development and seeks to encourage the use of alternate modes of transportation by making transit more economically viable. In addition, well-connected compact development allows for more pedestrian and biking opportunities.

These criteria promote diverse housing types that can accommodate a range of income, ages, and physical abilities.

The Green Infrastructure and Buildings (GIB) category focuses on actions to reduce the environmental impact of construction and operations of buildings and neighborhood infrastructure. With 17 criteria and their respective sub-criteria, GIB addresses energy and water efficiency of buildings and infrastructure through the promotion of green certified buildings, on-site renewable energy efficiency, solid waste recycling, district heating and cooling systems, passive and active solar orientation systems, and measures to reduce urban heat islands (USGBC, 2018).

For this study, I evaluated the extent to which each of the 41 criteria for sustainable design principles in these LEED-ND categories were reflected in the cities' downtown specific plans. The analytical approach I used is described in detail below.

Downtown specific plan analysis. First, I coded the contents of each downtown specific plan on a five-point scale (Table 3.3) for concordance with the 41 LEED-ND criteria (Garde et. al, 2015).

Table 3.3.
Levels of concordance

Score	Level	Measure
4	Excellent	Criterion is addressed to the extent that maximum points can be achieved
3	Good	Criterion is addressed to the extent that more than minimum but less than maximum points can be achieved
2	Fair	Criterion is addressed in the regulations to the extent that minimum points can be achieved
1	Weak	Criterion is addressed in the regulations but no points can be achieved
0	None	Criterion is not addressed or has no relevance

Note. Criterion = sustainability design principle.

Table 3.4.
Examples of analytical coding

Regulation	LEED-ND criterion	Assigned score and rationale
Eliminate bicycle network gaps in Downtown including Broadway bike lane west of 6th Street and connections to expo light rail station (City of Santa Monica, 2017, p. 177).	SLL: Bike network and storage	Score of 4. This regulation addresses the intent of the criterion to "promote bicycling and transportation efficiency, including reduced vehicles miles traveled. To support health by encouraging utilitarian and recreational physical activity" (USGBC, 2013, p. 29). This regulation received a score of 4 as the regulation went beyond the intent of providing bike lanes to eliminate any gaps that may exist to improve connectivity
Lighting for commercial uses shall be appropriately shielded so as not to spill over into the residential area or impact the residential units in any way (City of Huntington Park, 2008, p. 87).	GIB: Light pollution reduction	Score of 3. This regulation addresses the intent of the criterion to "minimize light trespass from project sites". However, it does not address specific requirements of the criterion. For instance, it does not indicate whether the regulation adheres to allowable light trespass standards measured in foot candles.
The City should encourage the use of alternate transportation modes, such as transit and bicycling and should encourage transportation demand management programs to reduce overall demand for parking (City of Baldwin Park, 2017, p. 125)	SLL: Locations with reduced automobile dependence	Score of 2. This regulation addresses the intent "to encourage development in locations shown to have multimodal transportation choices or otherwise reduced motor vehicle use, thereby reducing greenhouse emissions air pollution" (USGBC, 2013, p. 27); however, the regulation is not strictly mandated, as indicated by the word *should.*
Mixed-use development (housing over commercial) may be included as part of a Specific Plan (City of Yorba Linda, 2011, p.15)	NPD: Mixed-use neighborhood centers	Score of 1. This regulation addresses the intent to "group diverse land uses in accessible neighborhoods and regional centers to encourage daily walking, biking and transit use, and to reduce vehicle miles traveled" (USGBC, 2013, p. 55); however, it is not mandatory, as indicated by the word *may*.
		Score of 0. LEED-ND criterion was not addressed in the regulations.

Table 3.4 provides examples of the analytical approach I used to code the eight downtown specific plans. Among these examples, Santa Monica's downtown specific plan regulation includes an action item stating, "Eliminate bicycle network gaps in Downtown including Broadway bike lane west of 6th Street and connections to expo light rail station" (City of Santa Monica, 2017, p. 177). This regulation received a score of 4 for addressing the LEED-ND criterion for Bike Network and Storage; the regulation is a mandatory action item in the plan and addresses the intent of the LEED-ND criterion to "promote bicycling and transportation efficiency, including reduced vehicles miles traveled. To support health by encouraging utilitarian and recreational physical activity" (USGBC, 2013, p. 29).

In contrast, Yorba Linda's downtown specific plan regulation states, "Mixed use development (housing over commercial) may be included as part of a Specific Plan" (City of Yorba Linda, 2011, p. 15); although the regulation addresses the intent to "group diverse land uses in accessible neighborhoods and regional centers to encourage daily walking, biking, and transit use, and reduce vehicle miles traveled" (USGBC, 2013, p. 55), the regulation received a score of 1 because the word *may* indicates that this regulation is not mandatory.

In addition, I calculated raw frequencies (F), maximum concordance score (M), and weighted concordance score (W) for each criterion. Raw frequencies (F) indicate the sum of instances each criterion appeared in the downtown specific plan. M refers to the maximum score assigned to a regulation in each zone in the downtown specific plan.

The weighted concordance score was calculated as follows

$$W = \frac{(M_a * W_{ta} + M_b * W_{tb})}{W_{t\_total}}$$

where W = weighted concordance score for a given criterion; M_a = maximum concordance score for a given sub-criterion; W_{ta} = weight assigned for a given criterion a; M_b = maximum

concordance score for a given sub-criterion b; W_{tb} = weight assigned for a given criterion, and W_{t_total} = total weight for the criterion determined in this study.

Given that the LEED-ND rating system assigns points for each criterion, I retained these points as weights for each criterion, similar to the approach used by Garde et. al (2015). The weights were similar to the points assigned to each sub-criterion by the LEED-ND rating system, assuming that the points reflect the relative importance of each sub-criterion in the overall rating system. In this manner, the evaluative framework developed for this study aligns with the intent of the overall LEED-ND rating system.

For sub-criteria without defined points, I used the maximum achievable points for that specific criterion as the weight. Certain LEED-ND criteria have more than one sub-criterion which may be required or optional. In instances in which a criterion has a number of required sub-criteria, I divided the number of maximum achievable points for that specific criterion between each sub-criterion. In instances in which a criterion has a number of optional sub-criteria, each sub-criterion received the maximum achievable points of that specific criterion. In instances in which a criterion has both required and optional sub-criteria, the maximum achievable points were equally divided between the required sub-criteria, and the optional sub-criteria were each given the same maxim achievable sub-criterion points.

I analyzed the regulations applicable to the downtown specific plan as a whole as well as to the specific zones and calculated the weighted concordance scores (W) for each LEED-ND criterion. Then, the average weighted concordance (AW) score were calculated as follows:

$$AW = \frac{W\ for\ regulations\ of\ all\ zones + mean\ of\ W\ for\ each\ specific\ zone}{2}$$

For any sustainable design criterion, a higher W/AW score indicated a stronger propensity to promote that particular criterion (Table 3.5). Findings for each criterion in the

analytical framework were qualitatively compared across the eight downtown specific plans to examine the extent to which certain sustainability principles were reflected in the downtown specific plans for each of the four groups (Table 3.4).

Table 3.5.
Weighted concordance score thresholds

Score threshold	Interpretation
W/AW ≤ .5	Criterion is weakly reflected in the regulations
.5<W/AW ≤ 2.0	Criterion is moderately reflected in the regulations
W/AW >2.0	Criterion is strongly reflected in the regulations

Note: W = Weighted concordance; AW= average weighted concordance

The mean of AW scores for each LEED–ND criterion for each group (group-mean/GMS) was calculated as follows:

$$Group - mean\ (GMS)_a = \frac{AW\ score_{city\ 1} + AW\ score_{city\ 2}}{2}$$

Where a = group type (high-high; high-low; low-high; and low-low)

The sum of group-mean scores for each group (group-total) was calculated as follows:

$$Group - total = Sum\ of\ group\ mean\ scores\ for\ all\ 41\ LEED - ND\ criterion$$

Using W scores that were applicable to all zones and specific zones of each downtown specific plan, I examined the variations across downtown development regulations within each group. Using group-mean scores and group-total scores, I also examined the variations across groups. Assuming that the group that ranks high in size of the creative class and in the urban form index would most strongly reflect sustainable design principles, I examined the variations across the four groups.

Interviews. I conducted a total of seven interviews to gain better understanding of the role of the creative class and the promotion of sustainable design principles in development regulations. The interview questionnaire are included in Appendix 4.3.

Interviewee recruitment. I contacted potential interviewees via the city staff contact information provided on each city website. All subjects were older than 18 years of age and spoke English. Gender was not a selection criterion. I sent follow-up emails requesting a face-to-face or telephone interview between February and April 2018. Planning staff for Huntington Park opted out of the interviews due to scheduling conflicts, and staff of Redlands also opted out, stating, "they would not be a valuable source on this particular topic" (Redlands city staff member, personal communication, 2018).

Insights from interviews. When permission was granted, interviews were audio recorded and transcribed. When permission to record was not granted, hand written notes were taken during the interview. Relevant information from the interviews were selected to reinforce the findings addressing the research question.

In the following chapter, I describe the results of Phase I, provide the descriptive statistics of the various study variables (creative class and urban form characteristics), and describe the results of the statistical analyses. Furthermore, I discuss the selection criteria of the eight cities for an in-depth analysis in phase II.

CHAPTER 4: Results of Phase I

In this chapter, I present the results of Phase I of this study, an analysis of the extent to which the size of the creative class is associated with existing sustainable design-related urban form characteristics in 167 cities within the five-county Southern California region. Additionally, I provide a brief description of the characteristics of the eight cities selected for an in-depth analysis and the cities' respective downtown specific plans. Chapter 5 describes the results of the in-depth analysis of the most recent downtown specific plans for the eight selected cities (Phase II).

This chapter is divided into four sections. The first section presents the descriptive statistics of the study variables—size of the creative class and six existing sustainable design-related urban form characteristics—to understand the variation of each across the study area. The second section provides an analysis of the association between the size of the creative class and the six existing sustainable design-related urban form characteristics. In the third section, I describe the results from the analysis of the difference in means of the select urban form characteristics for cities that have a higher (or lower) proportion of the creative class. Finally, I present the eight cities selected for in-depth analysis, their characteristics, and their respective downtown specific plans.

In general, these findings show no statistically significant association between the size of the creative class and sustainable design-related urban form characteristics, except for "access to open space." In that case, the presence of the creative class and "access to open space" were positively correlated and statistically significant. In other words, cities with a higher proportion of the creative class among their populations had a higher number of housing units with access to open space within a quarter-mile radius. The insignificant correlation coefficients between the

size of the creative class and the other urban form characteristics (individually and as a composite index), however, imply that the relationship between the two are more complex than they appear, and requires further in-depth analysis leading to the second phase of this study.

Next, results from the one-way ANOVA revealed that the mean of urban form characteristic "mixed use" (entropy scores) was significantly lower for cities with a higher proportion of the creative class than those with a lower proportion. In other words, cities with a larger proportion of the creative class were likely to have an unequal mix of residential, commercial, and offices than those with a smaller proportion of the creative class. Additionally, the mean of urban form characteristic "access to open space" was significantly higher for cities with a higher proportion of the creative class than for the cities with a lower proportion. In other words, cities with a larger proportion of the creative class were likely to have a higher percentage of housing units that have access to open space within a quarter mile radius than those with a smaller proportion of the creative class.

Descriptive statistics of the creative class and six urban form characteristics

Table 4.1 displays the descriptive statistics for the raw scores of the study variables for 167 incorporated cities within the five-county Southern California region. Incorporated cities with a population greater than 10,000 and less than 500,000 are included. The descriptive statistics provide the range, mean, and standard deviation of the dependent and independent variables. The City of Sierra Madre had the largest proportion of the creative class, and the City of Cudahy in Los has the smallest proportion of the creative class. Both are located in Los Angeles County.

The urban form characteristic, net residential density, was measured as the total number of housing units per acre of residential land for a city. The City of West Hollywood in Los

Angeles County had the highest net residential density (approximately 40 dwelling units per acre), and the City of Yucca Valley in San Bernardino County the lowest (approximately 1 dwelling unit per acre).

Table 4.1
Descriptive statistics of study variables for the 167 incorporated cities within the five-county region of Southern California

Study Variable	Minimum	Maximum	Mean	Std. Deviation
Size of the creative class	3.63	30.061	12.94	5.63
Net residential density	1.64	40.19	8.5	4.75
Diversity of housing type	.03	.821	.57	.17
Mix of land uses	.17	.56	.38	.07
Connectivity	.029	.534	.18	.10
Accessibility	16.07	100	67..97	23.11
Access to open space	5.20	100	54.18	22.27

Diversity of housing types was measured with Simpson's diversity index using eight housing type categories. The Simpson's diversity index ranges between 0 and 1, with a higher value (closer to 1) representing a higher diversity of housing types for a given city. The City of Stanton in Orange County had the highest diversity (.821), and City of San Marino in Los Angeles County had the lowest diversity (.03), which suggests more homogenous housing development.

Mixed-use at the city level was measured using the average entropy scores for multiple walking destinations, such as housing, offices, and commercial land use categories, at the block group level. Entropy scores may range from 0 to 1, with 0 representing a homogenous distribution of a particular land use and 1 representing equal mixes of land use categories present in the equation. The City of West Hollywood in Los Angeles County had the highest mean entropy score (.56), and the City of San Marino in Los Angeles County the lowest (.17). In other

words, West Hollywood had a relatively equal mix of the three land uses (residential, commercial, and offices) and San Marino a relative unequal mix.

I measured connectivity as street intersection density—the number of street intersections that fall within each city divided by city's total area. The City of Hermosa Beach in Los Angeles County had the highest street intersection density (.534), and the City of Barstow in San Bernardino County the lowest (.029), which indicates that Hermosa Beach is more walkable than Barstow.

Accessibility indicates the percentage of estimated housing units with access to one or more commercial parcels within a quarter-mile radius. In six cities in Los Angeles County, all housing units measured 100% on this accessibility standard: Maywood, Huntington Park, Bell, Bell Gardens, Hawaiian Gardens, and West Hollywood. In these cities, all estimated housing units have access to at least on commercial use within a quarter mile radius. The City of Adelanto in San Bernardino County had the lowest level of accessibility to commercial uses (16.07%).

Access to open space was measured as the percentage of estimated housing units in a city with access to one or more protected areas within a quarter-mile radius. In two cities in Los Angeles County—Hermosa Beach and the Palos Verdes Estates—all estimated housing units had access to open space within a quarter mile radius. The City of Adelanto in San Bernardino County had the lowest access to open space (5.20%).

Figure 4.1 presents the size of the creative class across the 167 incorporated cities within the five-county region of Southern California.

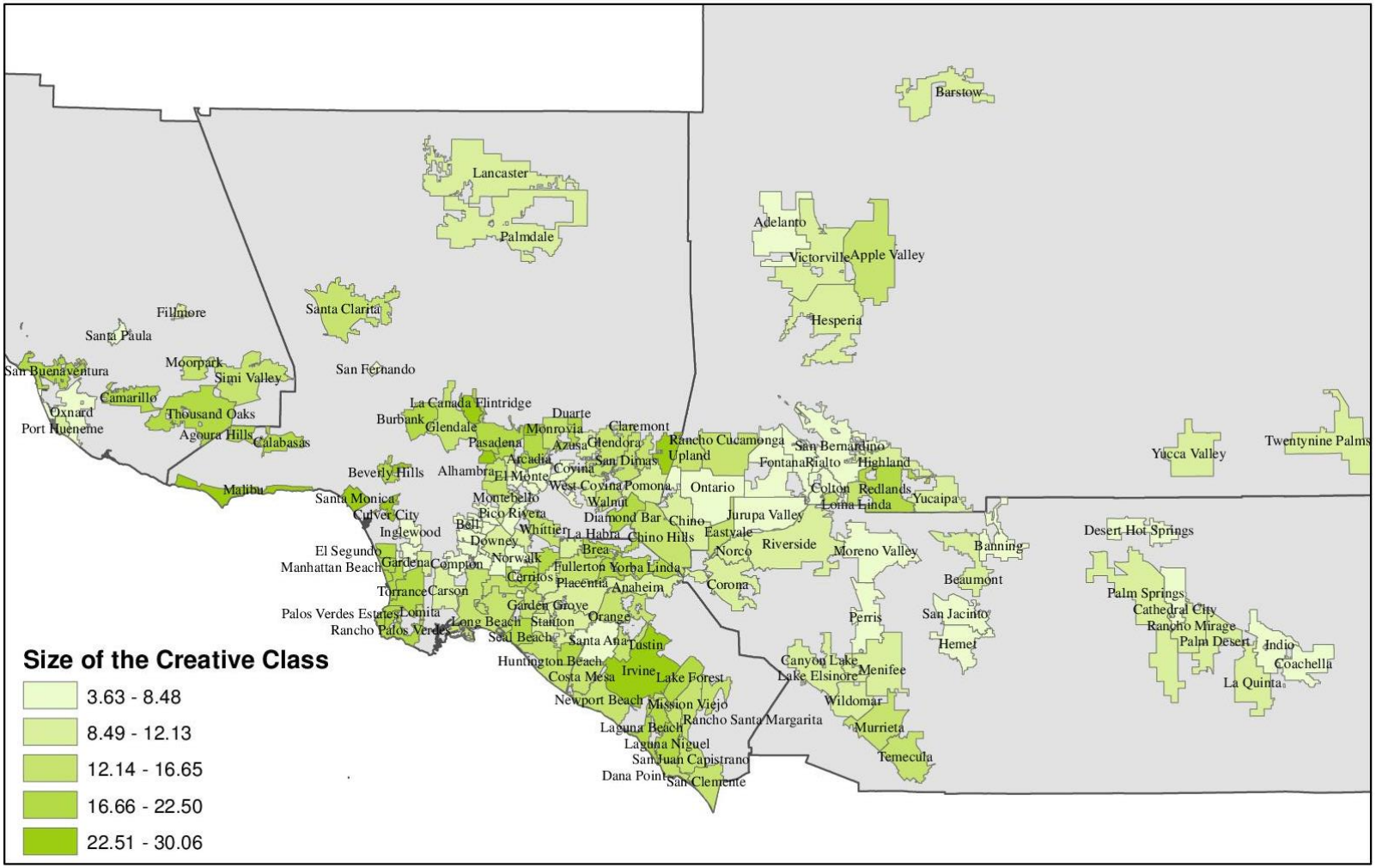


Figure 4.1. Percentage of the creative class across the 167 incorporated cities within Southern California

Association between size of the creative class and the urban form characteristics

Table 4.2 presents the bivariate Pearson's correlation results for the size of the creative class and the six sustainable design-related existing urban form characteristics. The correlation analysis revealed one significant relationship among the six characteristics of sustainable design-related urban form and the size of the creative class: "Access to open space" was statistically significant ($p<.05$) and positively correlated with the size of the creative class ($r = .462$, $p=.01$). Therefore, as the percentage of estimated houses with access to open space for a city increased, the size of the creative class also increased. In other words, cities with a higher presence of the creative class had a higher percentage of housing units with access to open space within a quarter-mile radius.

Table 4.2
Bi-variate correlation analysis of the size of the creative class (CC) and sustainable urban form characteristics

Variables	Size of the CC
1=Net residential density	.043
2=Diversity of housing types	.057
3=Street intersection density	.035
4=Mix of land uses	-.145
5=Accessibility (access to commercial uses)	-.082
6=Access to open space	.462*
Urban form index (sum of z=scores of all six characteristics)	.086
Urban form index V1 (sum of z scores of 1, 2, and 3)	.054
Urban form index V2 (sum of z scores of 1, 2, 3 and 6)	.196*
Urban form index V3 (sum of z scores of 4 and 5)	-.133
Urban form index V4 (sum of z scores of 1, 2, 3, 4, and 5)	-.023

* = Correlation is significant at 0.05 level

The findings of this phase do not provide any conclusive evidence between the two variables but rather suggests that the relationship is more complex, which requires further in depth analysis of policies or regulations pertaining to the built environment. Since policies are

more advisory in nature, I will examine downtown specific plan regulations of varying cases, as discussed in detail in Chapter 5.

The correlation coefficients for the remaining characteristics of sustainable urban form were not statistically significant ($p>.05$); however, they are worth mentioning. Two characteristics, "mixed use" and "access to commercial uses" were negatively correlated with the size of the creative class; however, the correlation coefficient was not statistically significant ($p>.05$). Three urban form characteristics, "net residential density," "diversity of housing types," and "street intersection density" were positively correlated with the size of the creative class, although the correlation values were not statistically significant ($p>.05$). Figure 4.2 provides the scatter plots for the size (percentage) of the creative class and each of the six urban form characteristics individually and composite index to provide a better understanding of the association between the size of the creative class and existing sustainable deign-related urban form characteristics. In addition, I developed four alternate composite index using various combinations of the six individual urban form characteristics and examined its association with the presence of the creative class. The four alternate composite index of the six individual urban form characteristics are: 1) Urban form V1= Composite index of net residential density, diversity of housing types, and street intersection density; 2) Urban form index V2= Composite index of net residential density, diversity of housing types, street intersection density, and access to open space; 3) Urban form index V3= Composite index of mix of land uses and accessibility (access to commercial uses); and 4) Urban form index V4= Composite index of net residential density, diversity of housing types, street intersection density, mix of land uses, and accessibility (access to commercial uses). Figure 4.3 provides the scatter plots for the size of the creative class and the four alternate versions of the urban form index.

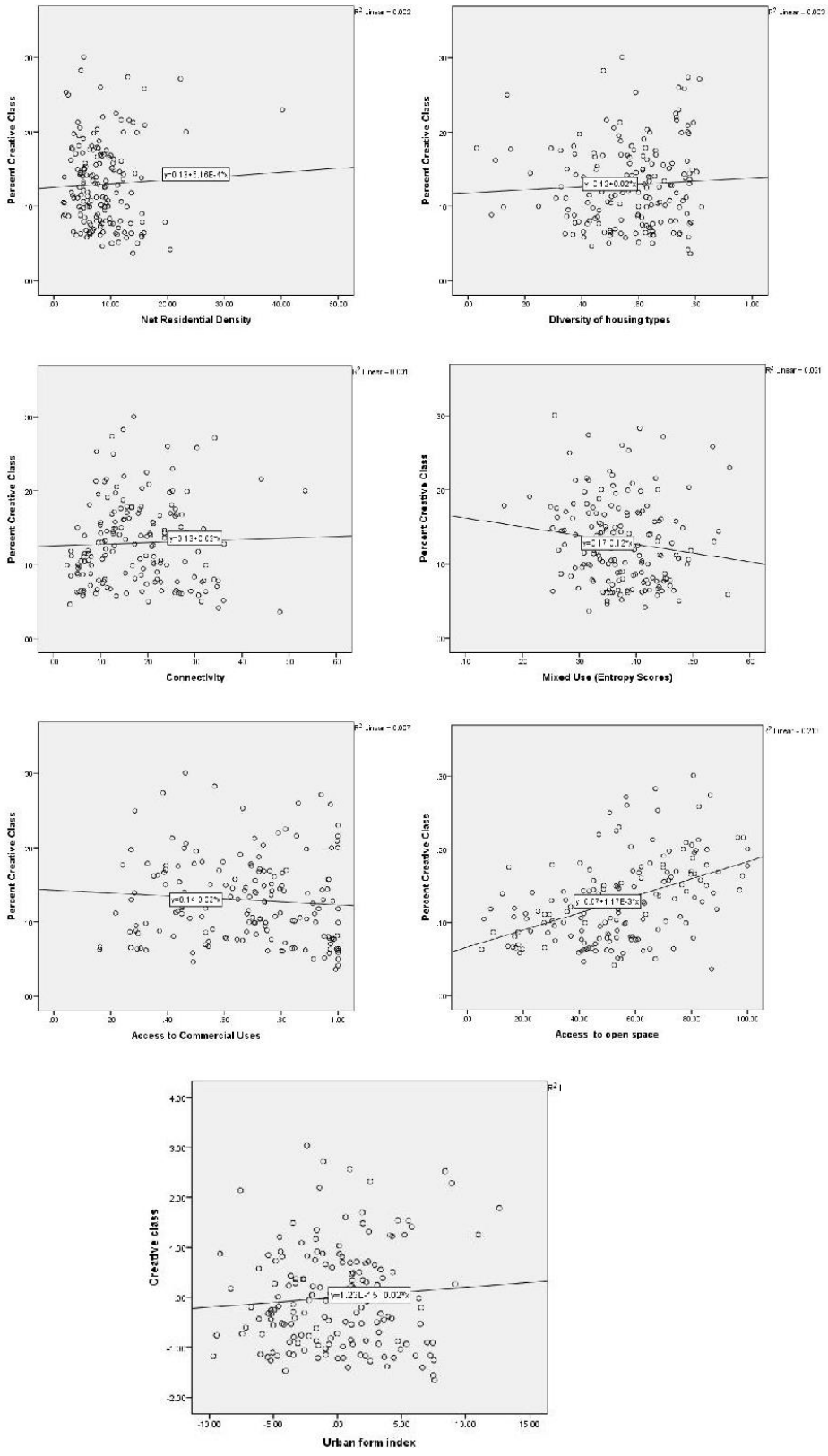
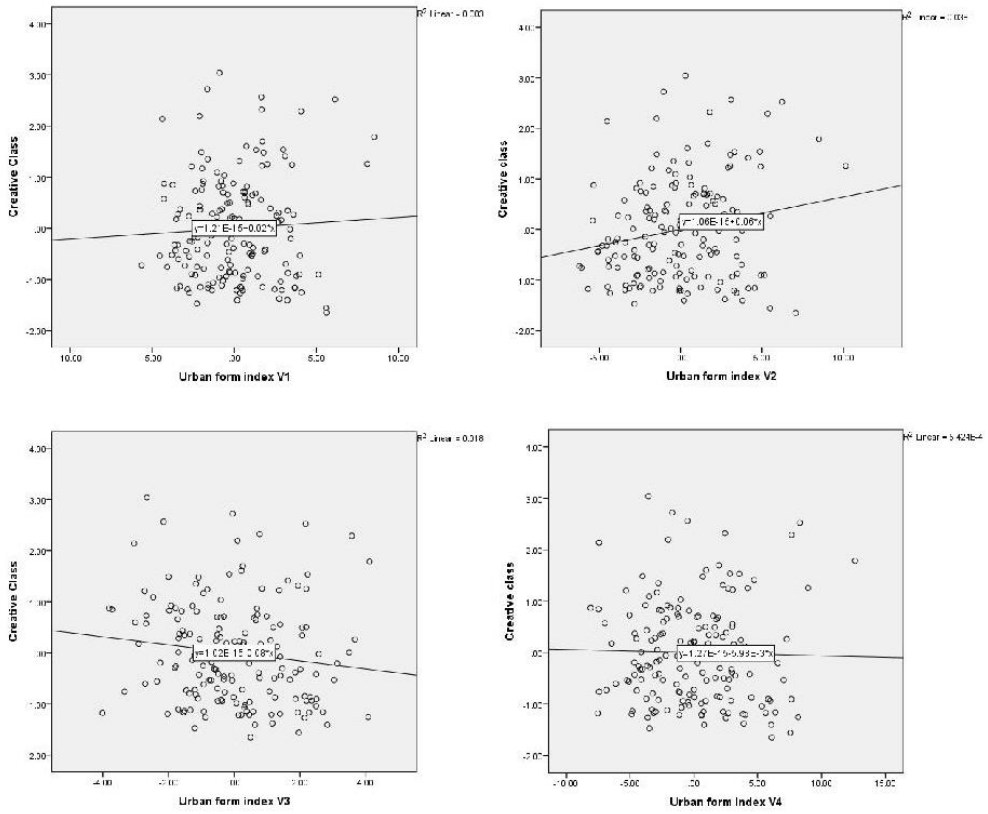


Figure 4.2. Scatter plots for size of the creative class and six urban form characteristics and urban form index

However, the relationship was not statistically significant, except for urban form index V2, which was a sum of z scores of urban form characteristics: 1) net residential density, 2) diversity of housing types, 3) street intersection density, and 4) access to open space. This is likely significant because it includes the urban form characteristics "access to open space", because the alternative urban form index V1 which does not include this characteristic is not statistically significant.



Note. Urban form V1=Net residential density, diversity of housing types, and street intersection density; Urban form index V2= Net residential density, diversity of housing types, street intersection density, and access to open space; Urban form index V3= Mix of land uses and accessibility (access to commercial uses); Urban form index V4= Net residential density, diversity of housing types, street intersection density, mix of land uses, and accessibility (access to commercial uses)

Figure 4.3. Scatter plots for size of the creative class and four alternate versions of urban form index

Table 4.3 provides a better understanding of the variation in the urban form characteristics across and within cities. The table reports the ranking of the urban form

characteristics individually and the UFI (composite index) for the top 10 and bottom 10 ranked cities in the size of the creative class.

The composite index was calculated by summing the z-scores for each of the six urban form characteristics, with the z-score representing the number of standard deviations a city is from the mean of the distribution for that characteristic. I calculated the z-score statistic for each urban form characteristic for the 167 cities such that each characteristic was weighted equally (Galster et al., 2001). Next, I ranked cities based on the size of the creative class, individual urban form characteristics, and the composite urban form index. Thus, a city with the highest value in size of the creative class was ranked 1 and the city with the lowest was ranked 167. I used a similar ranking for the individual urban form characteristics and the composite urban form index.

Not every city that ranked high in size of the creative class also ranked high on the urban form index. For instance, Sierra Madre ranked highest in creative class and 114 on the composite urban form index, and West Hollywood ranked ninth in size of the creative class, but first on the urban form index. In addition, cities with a high (or low) ranking on the composite urban form index did not necessarily have a high (or low) ranking in each individual urban form characteristic. For instance, Sierra Madre ranked high in size of the creative class and high access to open space, but the city ranked low in net residential density. Also, West Hollywood ranked high in net residential density, mix of land uses, and accessibility, but relatively lower in diversity of housing types, street intersection density, and access to open space.

Table 4.3.

Ranking of urban form characteristics individually and as a composite index (UFI) for the top 10 and bottom 10 ranked cities in size of the creative class

Top 10 cities	Creative Class	Density	Diversity of housing types	S.I.D	M.U	ACC	Access to open space	UFI
Sierra Madre	1	124	101	81	162	130	23	114
Claremont	2	135	121	93	56	112	51	97
Irvine	3	23	14	111	139	146	11	73
Santa Monica	4	3	2	9	24	33	74	5
South Pasadena	5	73	30	42	78	44	72	46
Culver City	6	7	22	19	5	21	17	4
Malibu	7	162	90	134	67	99	49	100
La Canada Flintridge	8	161	163	108	153	158	96	163
West Hollywood	9	1	29	37	1	1	81	1
Burbank	10	40	34	67	104	51	91	57
Bottom 10 cities								
La Puente	158	76	116	27	112	54	126	85
Hawaiian Gardens	159	11	13	17	2	3.5	130	7
Banning	160	115	140	152	82	127	153	152
Commerce	161	25	99	100	35	23	78	45
Lynwood	162	35	83	5	79	29	85	31
Compton	163	47	117	65	108	37	80	74
Bell Gardens	164	14	57	16	11	3.5	52	12
Coachella	165	68	134	166	109	126	123	135
Huntington Park	166	4	15	6	47	3.5	93	8
Cudahy	167	18	7	2	135	14	10	6

Note. S.I.D = street intersection density. M.U. = Mixed-use (entropy scores). ACC = access to commercial uses UFI = Urban form index

Comparison of means of urban form characteristics based on the presence of the creative class

I conducted a one-way ANOVA to examine whether there were statistically significant differences among the sustainability related urban form characteristics of cities with higher (or lower) proportion of the creative class. Using the median value of the size of the creative class as the cutoff value, I categorized the cities into two groups, those with a higher proportion of the creative class and those with a lower proportion. Table 4.4 presents the results of the one-way ANOVA, using the two groups.

I found statistically significant differences for the sustainable design-related urban form characteristics of "mixed use" and "access to open space." The mean of mixed use was significantly lower for cities with a higher proportion of the creative class than for those with a lower proportion, F (1,166) = 4.07, p=.045. The mean of access to open space was significantly higher for cities with a higher proportion of the creative class than for the cities with a lower proportion, F (1,166) = 10.217, p=.002. The results revealed no statistical significant differences in the means of the remaining sustainable urban form characteristics, "net residential density," "diversity of housing types," "connectivity," or "accessibility."

Table 4.4.
One-way ANOVA for urban form characteristics by size of the creative class

	Lower proportion of the CC	Higher proportion of the CC	F	Sig.
Mean of net residential density	8.40	8.55	.041	.840
Mean of diversity of housing types	.56	.58	.681	.410
Mean of mixed use	.39	.06	4.077	.045*
Mean of access to open space	.70	.84	10.22	.002*
Mean of connectivity	.17	.19	1.50	.221
Mean of accessibility	.69	.67	.420	.518

*Note.**significant at 0.05 level; CC = creative class

Selection of eight cities for an in-depth analysis

Using four different combinations of the two variables, size of the creative class and level of the UFI, I purposefully selected eight cities, two cities from each combination (see Chapter 3: Research Methods). I focused only on those cities that had adopted downtown specific plans since January 1, 2008 to assure the downtown specific plans reflected current practice (Berke & Conroy, 2000). The analytic conclusions derived from varying cases, based on the size of the creative class and urban form index, allowed for an expanded discussion of the association between the creative class and sustainability principles in development regulations and also provided more robust findings. Table 4.5 lists the eight cities with the year their downtown plans were adopted.

Table 4.5
Eight cities selected for in-depth analysis

		Proportion of the super creative core	
		Low	**High**
Urban form index	**High**	Hawthorne (2016) Huntington Park (2008)	Santa Monica (2017) El Segundo (2017)
	Low	Baldwin Park (2016) Desert Hot Springs (2010)	Yorba Linda (2011) Redlands (2017)

Figure 4.4 further illustrates the variation of the size of the creative class and urban form index of 167 cities within the five-county Southern California region. The scatter plot indicates the cities' z scores for the size of the creative class and the composite urban form index (UFI), with the x-axis representing the creative class and the y-axis the UFI. The eight selected cities can be found within this figure: group **high-high,** Santa Monica and El Segundo, which ranked high in size of the creative class and on the UFI; group **high-low,** Yorba Linda and Redlands, which ranked high in size of the creative class rank and low on the UFI; group **low-high,**

Hawthorne and Huntington Park, which ranked low in size of the creative class and high on the UFI; and group **low-low,** Baldwin Park and Desert Hot Springs, which ranked low in size of the creative class and low on the UFI.

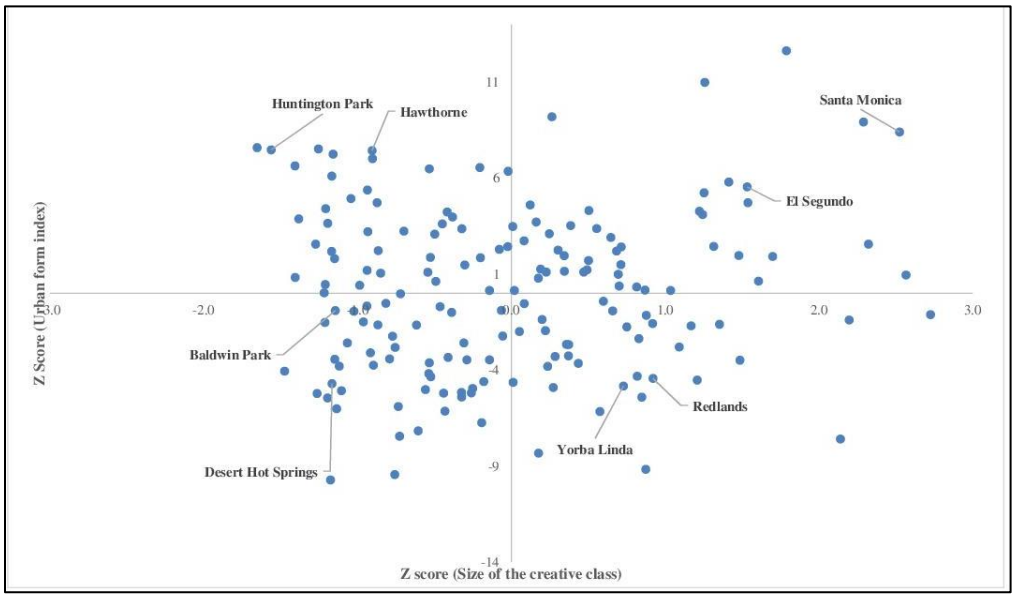


Figure 4.4. Z-scores of the size of the creative class and the urban form index (UFI) depicting the selected eight cites for in-depth analysis

Figure 4.5 below represents the z-scores of each of the six urban form characteristics for the eight selected cities with respect to the mean of each urban form characteristic for 167 cities. A positive z-score for an urban form characteristic represents the number of standard deviations a city is above the mean of the distribution for that characteristic. Similarly, a negative z-score for an urban form characteristic represents the number of standard deviations a city is below the mean of the distribution for that characteristic. For instance, Santa Monica received a z-score of 1.90 for density indicating that the density for Santa Monica is roughly two standard deviations above the mean of density for 167 cities. Overall, among the eight cities, Santa Monica ranked highest on the UFI with a total of 7.35, and Yorba Linda the lowest with a total of -4.83. Among

the eight cities, Santa Monica ranked highest in “net residential density” and “diversity of housing types”; Huntington Park ranked highest in “street intersection density” and “access to commercial uses”; El Segundo ranked highest in percentage of estimated housing units with “access to open space” and Hawthorne ranked highest in “mixed-use” (entropy scores). Yorba Linda obtained negative z-scores for all urban form characteristics, except for “access to open space”; thus, the raw score for most urban form characteristics of Yorba Linda was below the average for each urban form characteristic, except for “access to open space.”

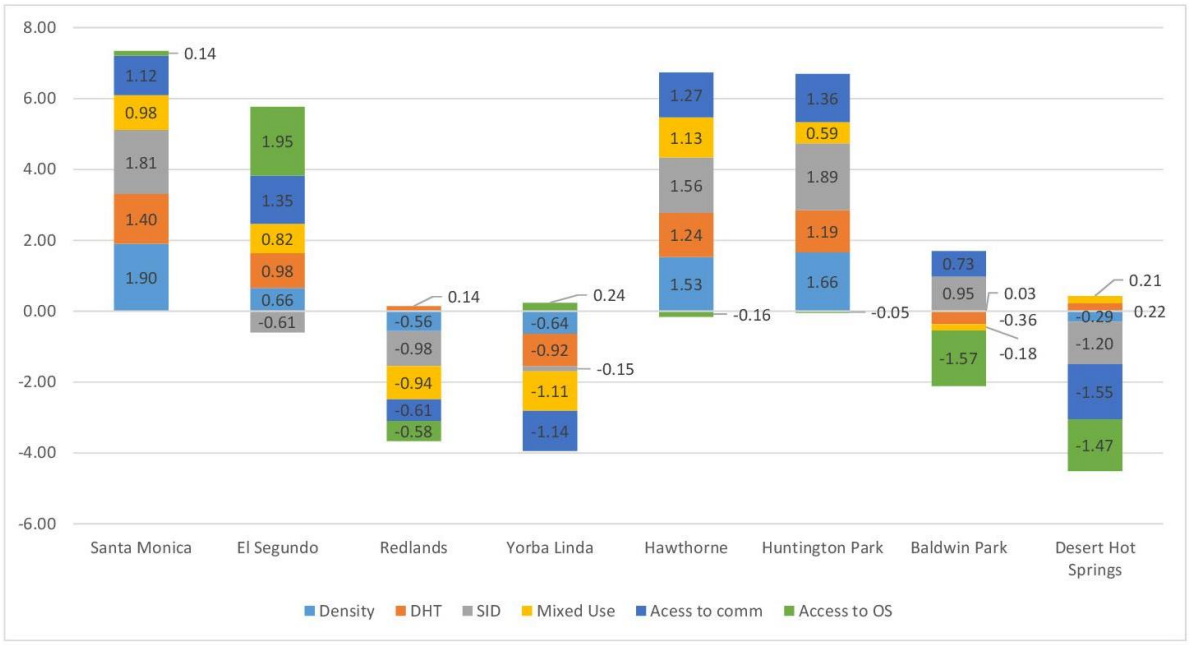


Figure 4.5 Z-scores for each urban form characteristics for the eight selected cities

In the following section, I provide a brief overview of the city characteristics of the short-listed eight cities along with a brief description of their respective downtown specific plans.

Group High-High: High in creative class and high in urban form index

In this study, group high-high consists of cities that rank high in the size of the creative class and the urban form index and have downtown specific plans adopted after January 2008. Group high-high consists of cities’ Santa Monica and El Segundo. Both cities are located in Los

Angeles County, where city of Santa Monica is a coastal city. The city of El Segundo has a population of 16,853 and a median household income of $91,623 (SCAG, 2017). The city of El Segundo is bordered by City of Hawthorne, City of Los Angeles and the City of Manhattan Beach. It is home to several large companies—Chevron, Raytheon, and the Air Force base (City staff, personal communication, 2018). The median age for residents of El Segundo is 41 years as compared to the SCAG region which is 36 years. Hispanics comprise 17.2% of the total population in El Segundo.

In comparison, City of Santa Monica, has a population of 93,640 (SCAG, 2017) and a median household income of $82,123 (SCAG, 2017). The median age for residents of Santa Monica is 42.9 years, as compared to the SCAG region which is 36 years. Hispanics comprise 12.8% of the total population in Santa Monica. City of Santa Monica is well known for its sustainability efforts. The city has established an office of sustainability, which is unique in itself and is the only city to have an urban designer position in the city (City staff, personal communication, 2018)

Santa Monica—The Downtown Community Plan. The Downtown Community Specific Plan of Santa Monica was adopted in 2017. Encompassing an area of 226 acres, the downtown area of Santa Monica is bounded by the Wilshire Boulevard corridor along its northern edge, Lincoln Boulevard along its eastern edge, the I-10 Freeway to the South, and Ocean Avenue and Palisades Park to the west (Figure 4.6). The Downtown Community Plan of Santa Monica is comprised of six land use districts. The six land use districts are Lincoln Transition, Neighborhood Village, Transit Adjacent, Bayside Conservation, Wilshire Transition, and Ocean Transition. The Downtown Community Plan of Santa Monica has specific regulations and guidelines for the various districts in addition to the regulations and guidelines that are

applicable to the plan as a whole. The City of Santa Monica is working on increasing its creative workforce. The Los Angeles High Impact Information Technology, Entertainment and Entrepreneurship, and Communications Hub (LA HI-TECH) Regional Consortium works with Santa Monica High School students to prepare them for higher education in the technology field opening avenues for various creative occupations such as design, visual and media arts, information and communication technology etc.

Figure 4.6. Santa Monica Downtown Community Plan Land Use Districts. Source: City of Santa Monica, 2017

El Segundo—Downtown Specific Plan. The Downtown Specific Plan for El Segundo was partially updated in 2017. Encompassing an area of 26.3 acres, the downtown area of El

Segundo includes the 100–500 blocks of Main Street, the 100–300 blocks of Richmond Street and the abutting property along Grand Avenue (Figure 4.7). The downtown area is bounded by the alleys to the east and west of main and Richmond Street, with the exception of the 300 block east of Main Street as the civic center complex extends to Standard Street (El Segundo, 2017).

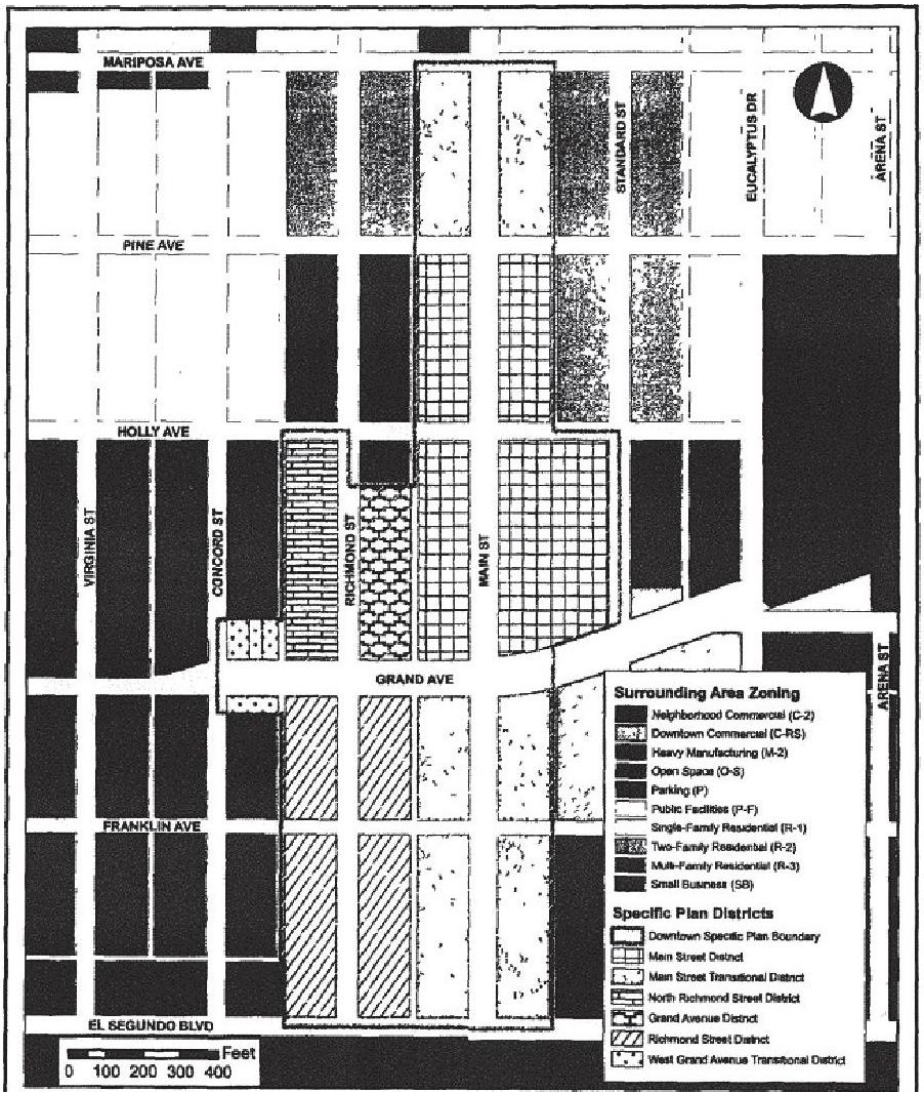


Figure 4.7. Zoning map of El Segundo. Source: City of El Segundo, 2017

The Downtown Specific Plan of El Segundo is comprised of six districts: Main Street District, Main Street Transitional District, Richmond Street District, North Richmond Street District, Grand Avenue District, and West Grand Avenue Transitional District. The downtown

plan has specific regulations and guidelines for the various districts in addition to the regulations and guidelines that are applicable to the plan as a whole.

Group High-Low: High in creative class and low in urban form index

In this study, group high-low consists of cities that rank high in the size of the creative class and low in the urban form index and have downtown specific plans adopted after January, 2008. Group high-low consists of cities' Yorba Linda and Redlands. Located in Orange County, City of Yorba Linda has a population of 67,637 and median household income of $114,058 (SCAG, 2017). The median age for residents of Yorba Linda is 42.5 years, as compared to the SCAG region which is 36 years. Hispanics comprise 15.6% of the total population in Yorba Linda.

City of Redlands is located in San Bernardino County and has a population of 68,368 and a median income of $66,767 (SCAG, 2017). The median age for residents of Redlands is 37.3 years, as compared to the SCAG region which is 36 years. Hispanics comprise 32.6% of the total population in Redlands.

Yorba Linda Town Center Specific Plan. The Town Center Specific Plan for Yorba Linda was adopted in 2011. Encompassing an area of 30 acres, the downtown specific plan area is bounded by Imperial Highway to the west, Yorba Linda Boulevard to the south, Lakeview Avenue to the east, and Lemon Drive to the north (Figure 4.8). The downtown specific plan is comprised of five districts: Historic Town Center, Town Center Commercial District, Civic/Cultural Arts and Public Facilities District, Cottage District, and Multi Family District. The Downtown Specific Plan of Yorba Linda has specific regulations and guidelines for the various districts in addition to the regulations and guidelines that are applicable to the plan as a whole.

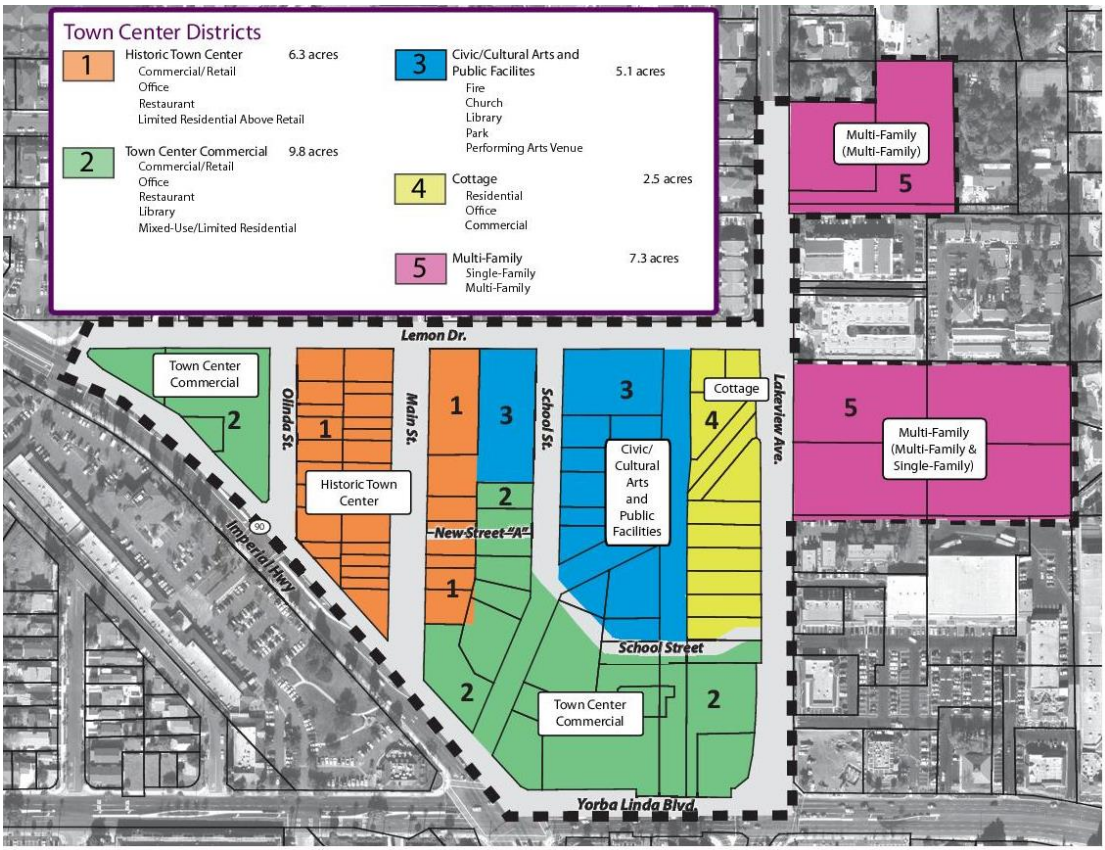


Figure 4.8. Town Center District map of Yorba Linda. Source: City of Yorba Linda, 2011

Redlands Downtown Specific Plan. The city of Redlands downtown specific plan was partially updated in 2017. The downtown area is bounded by Interstate 10 on the north, Redlands Boulevard on the south, Texas Street on the west, and North Church Street on the east (Figure 4.9). The downtown specific plan of Redlands is divided into three districts: Town Center, Town Center Historic Districts, and Service-Commercial District. The Downtown Specific Plan of Redlands has specific regulations and guidelines for the various districts in addition to the regulations and guidelines that are applicable to the plan as a whole.

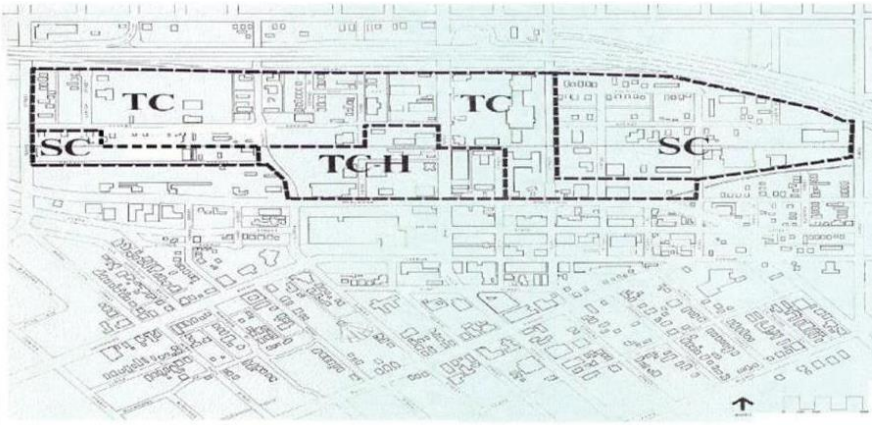


Figure 4.9. Land use districts of Redlands Downtown Specific Plan area. Source: City of Redlands, 2017

Group Low-High: Low in creative class and high in urban form index

In this study, group low-high consists of cities that rank low in the size of the creative class and high in the urban form index and have downtown specific plans adopted after January, 2008. Group low-high consists of cities' Hawthorne and Huntington Park. Located within Los Angeles County, the City of Huntington Park has a total population of 59,718 and had a median income of $36,317. The median age for residents of Huntington Park is 30.8 years, as compared to the SCAG region which is 36 years. Hispanics comprise 97.3% of the total population.

The City of Hawthorne has a total population of 88,003 and a median household income of $45,955. The median age for residents of Hawthorne is 33.5 years, as compared to the SCAG region which is 36 years. Hispanics comprise 56.1% of the total population in Hawthorne (SCAG, 2017).

Hawthorne Downtown Specific Plan. The downtown specific plan for the City of Hawthorne was adopted in 2016. Encompassing an approximate two-mile segment, the downtown area is bounded by the community of Lennox on the north, City of Lawndale on the south, Freeman and Prairie avenues on the east, and Ramona and Inglewood avenues on the

west. The planning area also includes portions of Imperial Highway, 120th Street, El Segundo Boulevard, and Rosecrans Avenue (Figure 4.10).

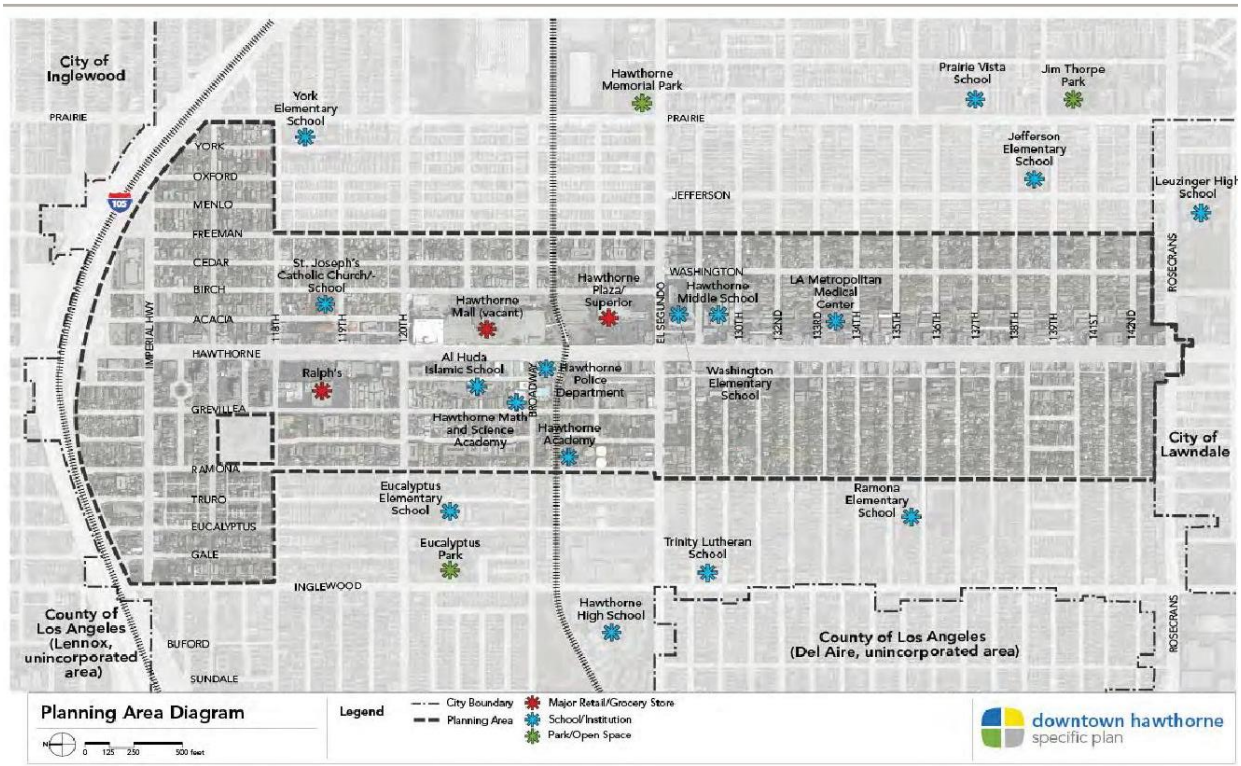


Figure 4.10. Downtown specific plan area of Hawthorne. Source: City of Hawthorne, 2016

The downtown specific plan of Hawthorne has nine districts: low density residential, medium density residential, high density residential, local commercial, general commercial, mixed use, urban open space, public space, and parking. In addition, the specific plan has four transformative projects that have been identified to serve as catalysts to revitalize the downtown: Hawthorne Mall, Civic Center, South Bay Ford, and St. Joseph's Plaza. The downtown specific plan has design guidelines and regulations for its individual zones, in addition to the entire plan and the strategic sites to acts as catalysts to spur growth.

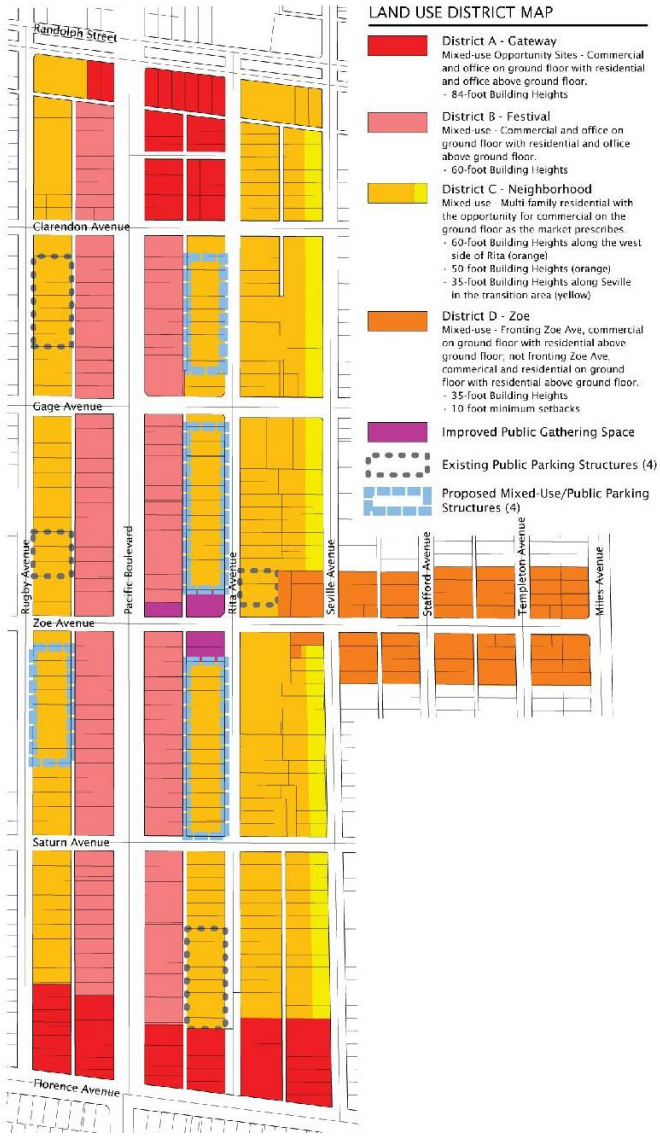


Figure 4.11. Land use district map of Huntington Park downtown specific plan area. Source: City of Huntington Park, 2008

Huntington Park Downtown Specific plan. The downtown specific plan of Huntington Park was adopted by ordinance in 2008. Encompassing an area of 85 acres, the area is bounded by Randolph Street on the north and Florence Avenue on the south (Figure 4.11). Centered on Pacific Boulevard, the downtown specific plan of Huntington Park is bounded by Rugby Avenue on the west and is generally bounded by Seville Avenue on the east, except for an extension along Zoe Avenue to Miles Avenue. The downtown specific plan is comprised of four districts:

District A-Gateway, District B-Festival, District C-Neighborhood, and District D-Zoe. The Downtown Specific Plan of Huntington Park has specific regulations and guidelines for its various districts in addition to the regulations and guidelines that are applicable to the plan as a whole.

Group Low-Low: Low in creative class and low in urban form index

In this study, group low-low consists of cities that rank low in the size of the creative class and the urban form index and have downtown specific plans adopted after January, 2008. Group low-low consists of the cities of Baldwin Park and Desert Hot Springs. Located in Los Angeles County, the City of Baldwin Park has a population of 74,738 and a median household income of $53,036. The median age for residents of Baldwin Park is 32.3 years, as compared to the SCAG region which is 36 years. Hispanics comprise 80% of the total population in Baldwin Park (SCAG, 2017).

The City of Desert Hot Springs, located in Riverside County, has a total population of 29,048 and a household median income of $32,675 (SCAG, 2017). The median age for residents of Desert Hot Springs is 32.1 years, as compared to the SCAG region which is 36 years. Hispanics comprise 59.5% of the total population in Desert Hot Springs.

Baldwin Park Downtown Transit Oriented Development (TOD) Specific Plan. The Downtown TOD specific plan of Baldwin Park was adopted in 2016. Anchored by the Ramona Boulevard/Maine Avenue intersection, the boundary for the Downtown TOD Specific Plan focuses on the commercial area within one-quarter to one-half mile of the Metrolink Station (Figure 4.12). The Downtown TOD specific plan of Baldwin Park is comprised of six zones: mixed use, neighborhood commercial, general commercial, industrial commercial, garden multifamily residential, and open space. In addition, the specific plan identifies several

opportunity sites that are currently underutilized, as catalytic sites for new development. The Downtown TOD specific plan of Baldwin Park has specific regulations and guidelines for its various zones in addition to the regulations and guidelines that are applicable to the plan as a whole.

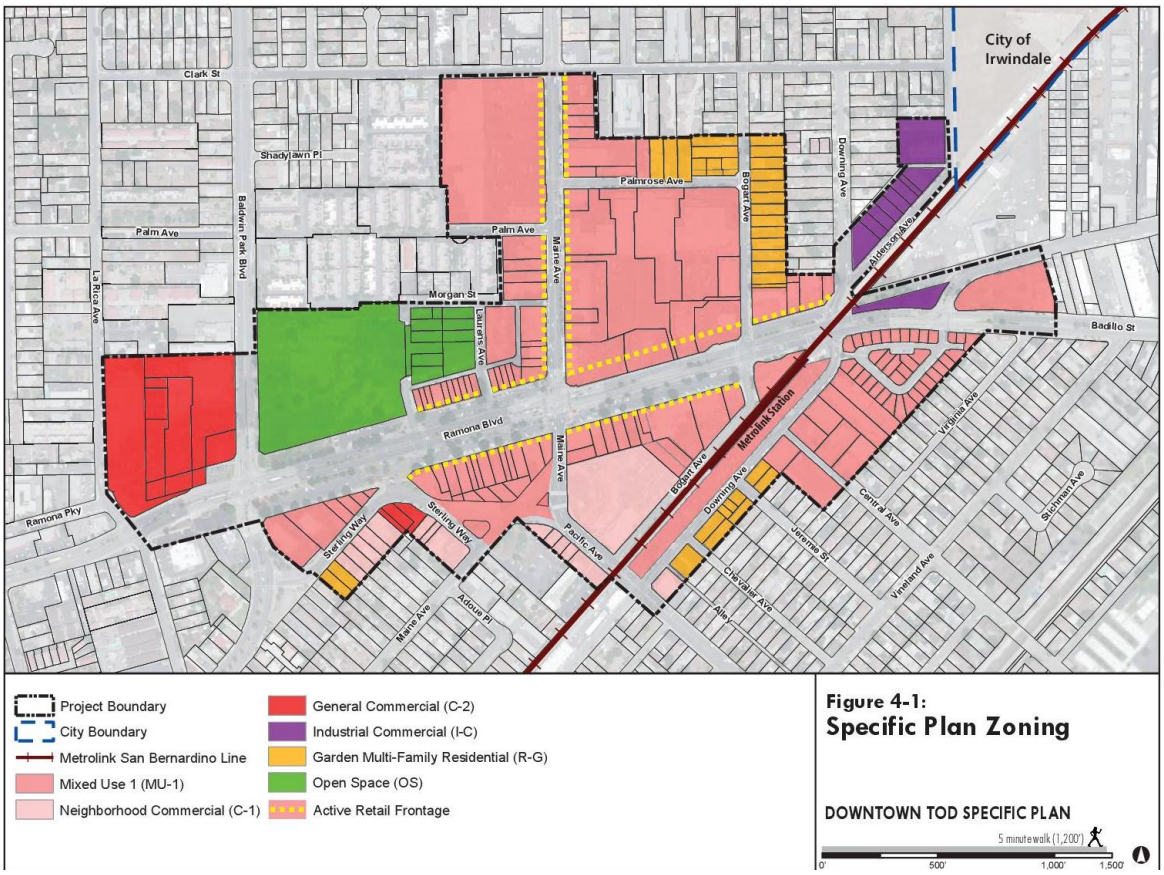


Figure 4.12. Zoning map of Baldwin Park downtown specific plan area .Source: City of Baldwin Park, 2016

Desert Hot Springs: Vortex Downtown Specific Plan. The Vortex Downtown Specific Plan of Desert Hot Springs was adopted in 2010 (Figure 4.13), and is called the Vortex because downtown Desert Hot Springs is located where five natural energy sources converge: 1) seismic energy fault lines; 2) geothermal underground water acquifer; 3) mountain thrust lines and peaks; 4) solar energy; and 5) wind energy. Encompassing an area of 151.6 acres, the downtown area is bounded by Second Street on the north, Buena Vista Avenue on the south, Mesquite Avenue on

the east, and Cholla Drive on the west. The downtown specific plan is comprised of five zones: mixed use, community retail and services, high density residential, private institutional, and public facilities. The downtown plan has specific regulations and guidelines for the various districts in addition to the regulations and guidelines that are applicable to the plan as a whole.

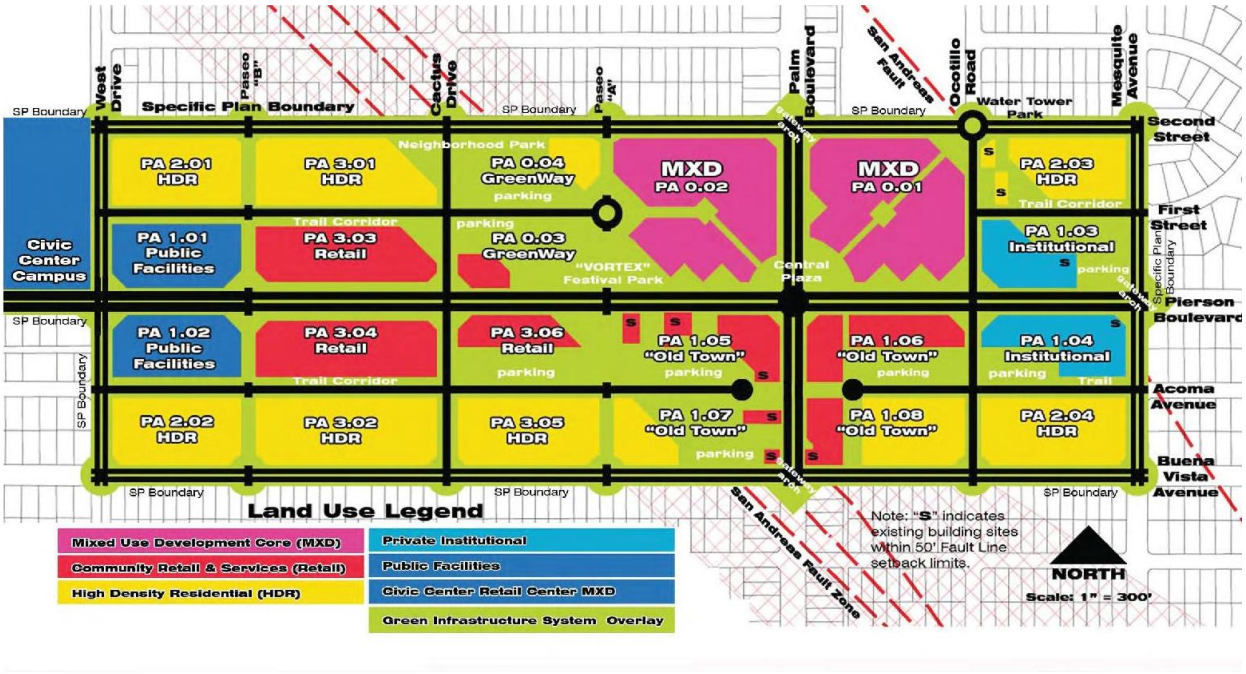


Figure 4.13. Land use map of Desert Hot Springs downtown specific plan area. Source: City of Desert Hot Springs, 2010

In the following chapter, I evaluate the downtown specific plans of the shortlisted eight cities using LEED-ND rating as an evaluative framework to examine the extent to which the presence of the creative class is associated with sustainability principles, reflected in the downtown development regulations of these cities.

CHAPTER 5: Results of Phase II

In this chapter, I present the results of Phase II, the in-depth analysis of the downtown specific plans for eight selected cities, and examine the association between certain sustainable design principles reflected in these downtown specific plans and the size of the creative class in these cities. In section one, I discuss how sustainable design principles in downtown specific plan regulations vary across the four groups of cities: 1) high-high, 2) high-low, 3) low-high, and 4) low-low. The second section presents how sustainable design principles in downtown specific plan regulations vary within each of the four groups. Finally, the third section provides insights from the interviews conducted with planning staff of the selected cities.

As described previously, the high-high group of cities includes those that rank high in both the size of the creative class and on the urban form index (Santa Monica and El Segundo). The high-low group consists of cities that rank high in the size of the creative class and low on the urban form index (Yorba Linda and Redlands). The low-high group consists of cities that rank low in size of the creative class and high on the urban form index (Huntington Park and Hawthorne). The low-low group includes cities that rank low both in size of the creative class and on the urban form index (Desert Hot Springs and Baldwin Park).

Variation in the reflection of sustainability principles across groups

In general, the high-high group received the highest total score, 52.29, in integration of all 41 LEED-ND criteria, while group low-high received the lowest, 37.78 (Figure 5.1). Group high-high scored the highest in integration of the Smart Location and Linkage (SLL) criteria, and group high-low scored the lowest. In integrating the Neighborhood Pattern and Design (NPD) criteria, the high-high group scored the highest, and group high-low scored the lowest. Group

high-high scored the highest in integrating the LEED-ND criteria for Green Infrastructure Buildings (GIB), and group low-high scored the lowest.

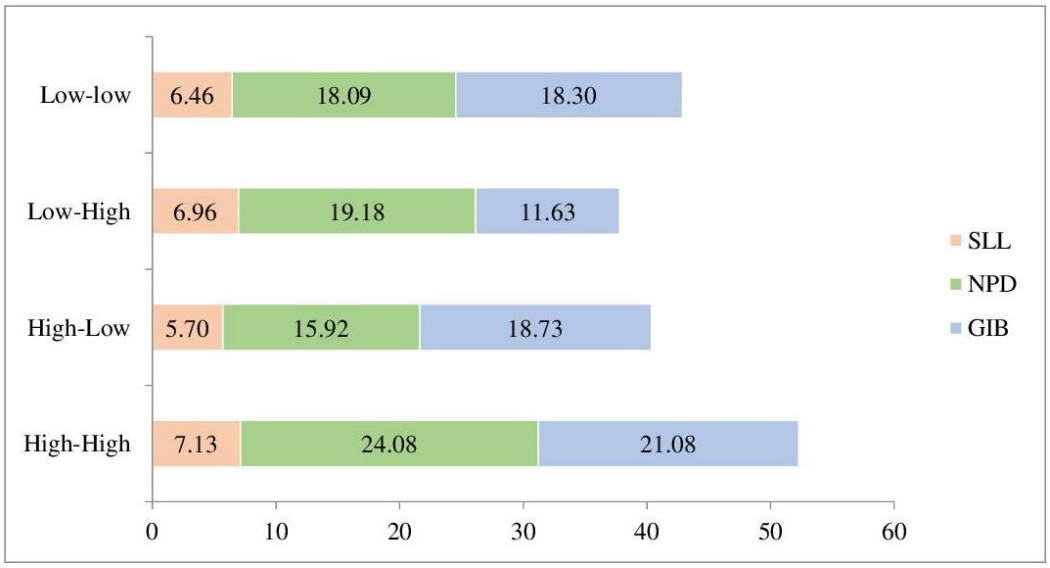


Figure 5.1 Sum of group-mean scores for each LEED-ND category for the four groups

Although downtown development regulations in group high-high received the highest total LEED-ND group-mean score, there was considerable variation across the groups and within groups for each LEED-ND criterion. Table 6.1 presents the sum of group-mean scores (GMS) for each LEED-ND category for the four groups of cities. The group-mean score represents the mean of the average weighted concordance score (AW) of each 41 LEED-ND criteria received by the cities in each group. Overall, downtown specific plan regulations in group high-high addressed most of the LEED-ND criteria relatively more strongly than group low-low. Second, group low-low addressed most of the LEED-ND criteria relatively more strongly than the other two groups. The variations across the three categories for specific LEED-ND criteria are discussed in detail below.

Table 5.1.

Group-mean scores (GMS) of 41 LEED-ND criteria for the four groups

Leadership in Energy and Environmental Design-Neighborhood Development (LEED-ND) criteria	High-high	High-low	Low-high	Low-low
Smart Location and Linkage (SLL)				
Preferred locations (10)	1.84	1.92	1.94	1.76
Brownfield redevelopment (2)	0.08	0.13	0.00	0.00
Locations with reduced auto dependence (7)	1.35	1.00	1.66	1.14
Bike network and storage (1)	**2.52**	1.66	**2.24**	**2.30**
Housing and jobs proximity (3)	1.33	0.86	1.13	1.27
Steep slope protection (1)	0.00	0.00	0.00	0.00
Site design for habitat or wetland and water body conservation (1)	0.00	0.12	0.00	0.00
Restoration of habitat or wetlands and water bodies (1)	0.00	0.00	0.00	0.00
Long-term conservation management of habitat or wetlands and water bodies (1)	0.00	0.00	0.00	0.00
Smart Location and Linkage (SLL) Total	**7.13**	**5.70**	**6.96**	**6.46**
Neighborhood Pattern and Design (NPD)				
Walkable streets (12)	**3.08**	**2.60**	**2.91**	**2.79**
Compact development (6)	**2.79**	1.31	**2.24**	1.54
Mixed-use neighborhood centers (4)	1.46	0.91	1.02	1.13
Mixed-income diverse communities (7)	1.32	0.57	1.40	0.61
Reduced parking footprint (1)	**2.10**	1.54	1.26	1.48
Street network (2)	1.90	1.73	1.87	1.47
Transit facilities (1)	0.97	0.63	1.30	0.63
Transportation demand management (2)	1.77	0.59	0.15	0.73
Access to civic and public space (1)	1.58	1.63	1.71	1.77
Access to recreation facilities (1)	1.08	0.31	1.06	1.54
Visitability and universal design (1)	1.21	1.11	0.90	1.55
Community outreach and involvement (2)	0.60	0.39	0.35	0.25
Local food production (1)	1.17	0.25	0.60	0.30
Tree-lined and shaded streets (2)	**2.17**	1.90	1.76	1.96
Neighborhood schools (1)	0.88	0.44	0.65	0.35
Neighborhood Pattern and Design (NPD) Total	**24.08**	**15.92**	**19.18**	**18.09**

Note. Cities in group high-high are Santa Monica and El Segundo. Cities in group high-low are Yorba Linda and Redlands. Cities in group low-high are Huntington Park and Hawthorne. Cities in group low-low are Desert Hot Springs and Baldwin Park. GMS = Group mean score. Dark shading indicates GMS>2 (strongly reflected).

Table continues

Table 5.1. (continued)
Group-mean scores (GMS) of 41 LEED-ND criteria for the four city groups

Leadership in Energy and Environmental Design-Neighborhood Development (LEED-ND) criteria	High-high	High-low	Low-high	Low-low
Green Infrastructure and Buildings (GIB)				
Certified green building (5)	0.50	0.40	0.00	0.42
Building energy efficiency (2)	0.50	0.38	0.11	0.67
Building water efficiency (1)	1.00	0.53	0.17	0.38
Water-efficient landscaping (1)	**2.13**	1.71	1.27	**2.58**
Existing building reuse (1)	**2.27**	**2.21**	1.60	1.19
Historic resource preservation and adaptive reuse (1)	**2.58**	**2.84**	1.30	1.17
Minimized site disturbance in design and construction (1)	0.58	1.12	0.84	0.85
Storm-water management (4)	**3.00**	**2.28**	1.20	**2.08**
Heat island reduction (1)	1.10	1.58	1.07	1.58
Solar orientation (1)	0.00	0.95	0.00	0.73
On-site renewable energy sources (3)	1.00	0.60	0.92	0.88
District heating and cooling (2)	0.25	0.00	0.00	0.00
Infrastructure energy efficiency (1)	0.75	0.80	0.00	0.25
Wastewater management (2)	1.92	0.10	0.50	1.50
Recycled content in infrastructure (1)	1.00	0.75	0.00	1.04
Solid waste management infrastructure (1)	2.00	1.70	**2.43**	**2.23**
Light pollution reduction (1)	0.50	0.80	0.23	0.77
Green Infrastructure and Buildings (GIB) Total	**21.08**	**18.73**	**11.63**	**18.30**
TOTAL	**52.29**	**40.35**	**37.78**	**42.85**

Note. Cities in group high-high are Santa Monica and El Segundo. Cities in group high-low are Yorba Linda and Redlands. Cities in group low-high are Huntington Park and Hawthorne. Cities in group low-low are Desert Hot Springs and Baldwin Park. GMS = Group mean score. Dark shading indicates GMS>2 (strongly reflected).

In the SLL category, group high-high received the highest score and addressed more criteria to a stronger extent than the other three groups. Group low-high received the second highest score, followed by group low-low and then group high-low. The intent of the SLL criterion "bike network and storage" was strongly reflected in all groups, except for group high-low, which is likely due to the weak reflection of this criterion in Redlands' downtown development regulation.

In the NPD category, group high-high received the highest score and addressed most of the LEED-ND criteria to a stronger extent than the other three groups. Group low-high received the second highest score, followed by group low-low and then group high-low. Although the

LEED-ND criterion of walkable streets was strongly reflected in all four groups' development regulations, group high-high more strongly addressed walkable features. Furthermore, group high-high strongly addressed compact development, reduced parking footprint, and tree-lined and shaded streets. All groups moderately addressed the criteria of mixed-income diverse communities and transit facilities; however, group low-high addressed them to a stronger extent than group high-high, which was likely because of the weak reflection of these criteria in El Segundo's downtown development regulations. Group high-high and low-high strongly reflected compact development, whereas group high-low and low-low moderately reflected that criterion.

In the GIB category, group high-high received the highest score and addressed more criteria and to a stronger extent than the other three groups. Group high-low received the second highest score, followed by group low-low and then group low-high. Cities in the two groups with a higher proportion of the creative class strongly addressed the criteria of "existing building reuse" and "historic resource preservation and adaptive reuse"; whereas cities with a lower proportion of the creative class addressed these criteria to a moderate extent. The GIB criterion of 'storm-water management' was strongly reflected in all except the low-high group.

Variation in the reflection of sustainability principles across eight cities. Table 5.2 provides the total scores of the average weighted concordance scores of the 41 LEED-ND criteria for the three categories and additional characteristics of the selected eight cities. (For a complete list of the average weighted concordance scores of each LEED-ND criteria for the eight cities, see Appendix 4.4.) Among cities with a smaller proportion of the creative class, those with more recent downtown specific plans received higher LEED-ND scores, except for Hawthorne, likely because Hawthorne's regulations were not strictly mandated. The city's

planning staff noted, “The failure of the downtown specific plan is that it’s a big suggestion, versus do this!” (City staff, personal communication, 2018).

Certain cities with a higher proportion of the creative class received higher LEED-ND scores than those with a lower proportion of the creative class. In particular, cities of Santa Monica and Yorba Linda integrated more LEED-ND criteria and to a stronger extent than the other six cities. However, there was considerable variation in the extent to which the downtown specific plan regulations reflected the 41 LEED-ND criteria. For instance, among the cities with a higher proportion of the creative class, Santa Monica’s plan scored the highest total score in integration of all 41 LEED-ND criteria, and Redland’s plan scored the lowest. The only coastal city among the eight, Santa Monica received exceptionally higher scores than the others. Among the cities with a lower proportion of the creative class, Baldwin Park’s downtown specific plan received the highest total score in integration of all 41 LEED-ND criteria, and Huntington Park the lowest.

Variation in the reflection of sustainability principles within groups

The results of my analysis also reveal considerable variation within each of the four groups of cities regarding the 41 LEED-ND criteria. In this section, I discuss the variations in how the downtown development regulations for the two cities in each group reflect the LEED-ND criteria in the three main categories: Smart Location and Linkage (SLL), Neighborhood Pattern and Design (NPD); and Green Infrastructure and Building (GIB). Under each category, I focus mainly on either the LEED-ND criteria that are strongly addressed in the regulations or those that call for further attention. Next, I focus on each city’s additional efforts to promote sustainability that are not addressed in the three categories of the LEED-ND evaluative framework.

Table 5.2.

LEED-ND total average concordance scores and city characteristics for each of the selected eight cities

	Higher proportion of the creative class				Lower proportion of the creative class			
	High-high		High-low		Low-high		Low-low	
	Santa Monica	El Segundo	Redlands	Yorba Linda	Hawthorne	Huntington Park	Baldwin Park	Desert Hot Springs
SLL	8.44	5.83	3.98	7.42	8.25	5.68	8.33	4.58
NPD	30.40	17.76	12.57	19.27	19.70	18.67	19.40	16.78
GIB	27.75	14.40	13.75	23.71	13.74	9.53	22.11	14.49
LEED-ND Total	66.59	37.99	30.30	50.40	41.69	33.87	49.84	35.86
Year: Specific Plan	2017	2017	2017	2011	2016	2008	2016	2010
Size of creative class	27.14	21.57	18.11	17.04	7.83	4.15	6.49	6.37
Urban form index (city)	8.40	5.54	-4.43	-4.83	7.43	7.47	-0.90	-4.70
Population	93,640	16,646	68,368	67,637	88,003	59,718	74,738	29,048
Population per square mile	11,130	3,047	1,893	3,473	14,479	19,820	11,286	1,230
% pop. growth (2000–16)	0.11	3.80	7.50	14.80	4.60	-2.70	-1.40	75.20
Median income	74,120	86,721	66,767	114,058	45,955	36,317	53,036	32,675
Percent Hispanic	12.80	17.20	32.60	15.60	9.10	97.30	80.00	59.50
Coastal city	1	0	0	0	0	0	0	0
Percent owner occupied	71.9	43	60.6	83.8	26.9	26.8	61	50

Note. SLL = Smart Location and Linkage. NPD = Neighborhood Pattern and Design. GIB = Green Infrastructure and Buildings. Source: SCAG, Local Profiles, 2017

Group high-high. In this study, group high-high consists of cities that rank high both in size of the creative class and on the urban form index and that have downtown specific plans adopted after 2008. Table 5.3 presents the weighted concordance scores of the two cities in this group, Santa Monica and El Segundo.

In general, Santa Monica's downtown specific plan regulations received a higher score reflecting all 41 LEED-ND criteria than El Segundo's; Santa Monica's regulations addressed more LEED-ND criteria and reflected these criteria more strongly, with the greatest difference in the NPD and GIB categories. One reasons for these differences may be that Santa Monica takes pride in promoting sustainable development. One city staff member stated that Santa Monica was "the first city to develop a sustainability plan in 1992" (City staff, personal communication, 2018). Santa Monica also has an Office of Sustainability responsible for "developing and implementing policies that promote local environmental, economic and social sustainability" (Santa Monica Office of Sustainability, 2018), and has an urban designer position in its planning department, suggesting an investment in the design of its built environment.

Smart Location and Linkage (SLL). In this category, Santa Monica's downtown development regulations addresses more LEED-ND criteria and to a stronger extent than those of El Segundo. Although both cities strongly address "bike network and storage," Santa Monica's regulations address this criterion more strongly. El Segundo's regulations promote expansion of existing commercial and residential uses and street connectivity to encourage walking, for instance, through a requirement for bike and pedestrian lanes in new development projects. However, Santa Monica's regulations promote alternate modes of transportation to a much greater extent, beyond the provision of well-connected pedestrian and bike routes. Downtown Santa Monica has a bike center for commuters which includes bike storage, repair services, bike

valet, and shower facilities (Figure 5.2). Biking is further promoted through the electronic displays of the number of bike rides and commutes along the streets in the downtown area.

Table 5.3.
Weighted concordance scores for cities in group high-high

LEED-ND criteria	Santa Monica		El Segundo	
	W_A	W_Z	W_A	W_Z
Smart Location and Linkage (SLL)				
Preferred locations (10)	**3.08**	1.22	1.92	1.15
Brownfield redevelopment (2)	0.33	0.00	0.00	0.00
Locations with reduced auto dependence (7)	2.00	1.17	1.50	0.75
Bike network and storage (1)	**4.00**	1.92	**3.50**	0.67
Housing and jobs proximity (3)	1.83	1.33	1.33	0.83
Steep slope protection (1)	0.00	0.00	0.00	0.00
Site design for habitat or wetland and water body conservation (1)	0.00	0.00	0.00	0.00
Restoration of habitat or wetlands and water bodies (1)	0.00	0.00	0.00	0.00
Long-term conservation management of habitat or wetlands and water bodies (1)	0.00	0.00	0.00	0.00
Smart Location and Linkage (SLL) Total	**11.24**	**5.63**	**8.26**	**3.40**
Neighborhood Pattern and Design (NPD)				
Walkable streets (12)	**4.00**	**2.17**	**3.00**	**3.17**
Compact development (6)	**4.00**	**4.00**	2.00	1.17
Mixed-use neighborhood centers (4)	2.00	1.83	1.00	1.00
Mixed-income diverse communities (7)	**3.57**	1.57	0.00	0.14
Reduced parking footprint (1)	**3.75**	0.75	**3.00**	0.92
Street network (2)	**3.50**	1.08	1.50	1.50
Transit facilities (1)	**3.00**	0.00	0.67	0.22
Transportation demand management (2)	**3.40**	0.13	**2.60**	0.93
Access to civic and public space (1)	2.00	1.67	1.00	1.67
Access to recreation facilities (1)	2.00	**2.33**	0.00	0.00
Visitability and universal design (1)	**3.00**	0.00	1.50	0.33
Community outreach and involvement (2)	1.80	0.00	0.60	0.00
Local food production (1)	**2.50**	0.96	1.00	0.21
Tree-lined and shaded streets (2)	**2.67**	1.11	**2.67**	**2.22**
Neighborhood schools (1)	1.50	0.50	0.50	1.00
Neighborhood Pattern and Design (NPD) Total	**42.69**	**18.11**	**21.03**	**14.48**

Note. W_A = weighted concordance scores for the plan as a whole; W_z = mean of weighted concordance scores of the specific zones. Dark shading indicates W>2 (strongly reflected), medium shading indicates .5< W≥2 (moderately reflected), no shading indicate W≥.5 (weakly reflected), W=0 (not reflected)

Table continues

Table 5.3 (continued)

Weighted concordance scores (W) for cities in group high-high

LEED-ND criteria	Santa Monica		El Segundo	
	W_A	W_Z	W_A	W_Z
Green Infrastructure and Buildings (GIB)				
Certified green building (5)	2.00	0.00	0.00	0.00
Building energy efficiency (2)	2.00	0.00	0.00	0.00
Building water efficiency (1)	**4.00**	0.00	0.00	0.00
Water-efficient landscaping (1)	**3.00**	0.00	**4.00**	1.50
Existing building reuse (1)	**3.50**	0.83	**3.50**	1.25
Historic resource preservation and adaptive reuse (1)	**4.00**	1.00	**4.00**	1.33
Minimized site disturbance in design and construction (1)	2.00	0.33	0.00	0.00
Storm-water management (4)	**4.00**	**4.00**	**4.00**	0.00
Heat island reduction (1)	2.00	0.17	1.33	0.89
Solar orientation (1)	0.00	0.00	0.00	0.00
On-site renewable energy sources (3)	**4.00**	0.00	0.00	0.00
District heating and cooling (2)	1.00	0.00	0.00	0.00
Infrastructure energy efficiency (1)	**3.00**	0.00	0.00	0.00
Wastewater management (2)	**4.00**	1.67	2.00	0.00
Recycled content in infrastructure (1)	**4.00**	0.00	0.00	0.00
Solid waste management infrastructure (1)	**4.00**	0.00	**3.00**	1.00
Light pollution reduction (1)	1.00	0.00	0.75	0.25
Green Infrastructure and Buildings (GIB) Total	**47.50**	**8.00**	**22.58**	**6.22**
TOTAL	**101.43**	**31.74**	**51.87**	**24.11**

Note. W_A = weighted concordance scores for the plan as a whole; W_z = mean of weighted concordance scores of the specific zones. Dark shading indicates W>2 (strongly reflected), medium shading indicates .5< W≥2 (moderately reflected), no shading indicate W≥.5 (weakly reflected), W=0 (not reflected)

Figure 5.2. Downtown Santa Monica's bike center, with services such as bike valet, bike repair and shower facilities, is located within this parking structure. Source: Author

Both cities moderately address the criterion of "locations with auto reduced dependence," but Santa Monica's response is stronger in the plan, and the criterion is further emphasized in the city's specific downtown zones. To ensure new development is transit- and pedestrian-oriented, Santa Monica's plan strongly emphasizes bike share, car share, car pool and van pool, shared rides, shuttle, and transit services in visible, identifiable downtown locations. The plan also strongly prioritizes public transit by pursuing specific operational improvements that make public transit convenient and competitive in cost and time with single ridership. In comparison, El Segundo addresses this criterion more generally. El Segundo's downtown development regulations are aimed to reduce automobile dependence through integration of transit planning. For instance, the regulations address the implementation of a feeder bus that could potentially take residents from the eastern portion of the city to the industrial and commercial areas in the west.

Both cities moderately address the criterion of "housing and job proximity," although once again, Santa Monica's regulations address this criterion to a stronger extent. For instance, Santa Monica's downtown regulations offer opportunities for housing for people across the income spectrum and jobs, and the specific mixed-use plan anticipates building at least 2,500 residential units in downtown, creating more opportunities for downtown business owners and employees to find proximate housing. In comparison, El Segundo's plan seeks to maintain a small town atmosphere while providing an attractive place to live and work. A maximum of 276 dwelling units are allowed in the plan area, with the majority as neighborhood service commercial uses, such as beauty shops, drug stores, jewelries, antique stores, restaurants, general offices, banks, and similar establishments.

Neighborhood Pattern and Design (NPD). Overall, the downtown development regulations of Santa Monica address more LEED-ND criteria in this category and to a stronger extent than those of El Segundo. Both cities strongly address the criteria of walkable streets, reduced parking footprint, transportation demand management, and tree-lined and shaded streets. Nevertheless, Santa Monica's downtown regulations address these criteria to a stronger extent than those of El Segundo, with the exception of "tree-lined and shaded streets," which is likely because it is emphasized in El Segundo's specific zones as well.

Santa Monica's regulations strongly address "compact development," while El Segundo's regulations address this criterion only moderately. The density standards for downtown Santa Monica are very high in comparison to the density standards of downtown El Segundo. Each of Santa Monica's six zones allows a density FAR of 2.25 and above, with a maximum of 3.5 in certain zones. Additionally, all affordable housing projects are allowed a minimum FAR of 2.75, with a maximum of 4. In comparison, El Segundo's existing development ranges between a FAR of 0.2 and 1.5, and the plan allows a maximum FAR of 1, with the exception of one site which allows an FAR of 1.5.

Figure 5.3. Third Street Promenade in downtown Santa Monica is designed to serve pedestrians only. Source: Author

Both cities strongly address the criterion of "walkable streets." In particular, the character of downtown Santa Monica is defined as a place where pedestrians have priority over vehicles, and the city is well known for its pedestrian-only Third Street Promenade (Figure 5.3). The city's plan notes, "The iconic Promenade is one of the most successful urban environments in Southern California. It is a central three block-long pedestrian open space … with active store fronts, restaurants, services and regular street entertainment (City of Santa Monica, 2016, p. 23)." The plan includes several measures to improve the pedestrian atmosphere and experience in downtown, such as implementing a "complete streets" policy and proposing various streetscape projects. One such improvement project, the "signature sidewalk" project, has been proposed in four downtown areas with the intent to complement and improve the existing circulation network and connections. The signature sidewalk project proposed for Wilshire Boulevard allows for expanded outdoor dining, public art, a double row of trees, a widened sidewalk, pedestrian scramble, curb extensions, enhancement of the roadway with transit stops, tour and local bus access, street vendors, protected bikeways, bike racks, bike share stations, and other outdoor activity. Pedestrian scrambles are "all-way crossings that stop all vehicular traffic and allow pedestrians to cross in any direction (City of Santa Monica, 2016, p. 151)." Among the eight selected cities, Santa Monica is the only one that provides pedestrian scrambles. In addition, the Santa Monica's downtown development regulations strongly encourage development of "parklets," small public spaces on sidewalks that provide visual interest and expand usable sidewalk area.

Santa Monica emphasizes downtown sidewalks scaled and designed to have enough room for pedestrian activity, amenities, and landscaping. Such pathways are considered a part of the public space, and each sidewalk may be divided into three zones: zone 1, adjacent to the

curb; zone 2, the traditional sidewalk or pedestrian path of travel, and zone 3, the space next to buildings or private property. To create visual interest and variations in zone 3, the development regulations require ground level retail entries to be spaced at a maximum of 100 feet. In addition, the plan specifically provides a frontage line map to accommodate the anticipated downtown pedestrian volume.

Similarly, El Segundo strongly addresses walkable features; however, the downtown development regulations reflect less elaborate and specific walkable features than Santa Monica's regulations. The El Segundo specific plan requires provision of adequate pedestrian access for new developments and encourages uses at the street level that promote active street fronts, such as retail uses and outdoor dining. In addition, the regulations seek to avoid blank facades by requiring all new and renovated structures to have at least 75 percentage of the façade as transparent windows and doors. For most zones, the setback between a building and property line ranges between 10 and15 feet, and in certain zones, the setback at the street level is prohibited, except for pedestrian-oriented plazas or architectural features in which 10 feet in depth may be provided between the building and the street. Finally, mid-block crossings are paved in a contrasting color and texture from the street and have blinking lights to slow traffic and encourage pedestrian circulation (Figure 5.4).

I found the greatest difference between these two high-high cities in the how they address the criteria of "mixed income diverse communities," and "access to recreation facilities." While Santa Monica's regulations strongly reflect both of these criteria, El Segundo's regulations address mixed income diverse communities only weakly and do not address access to recreation facilities in their downtown specific plan.

Figure 5.4. Blinking lights and different paving material in downtown El Segundo calm traffic provide and provide pedestrian safety. Source. Author

Specifically, Santa Monica strongly addresses the intent of mixed income diverse communities by encouraging housing for all income levels and for all household sizes and types, including families and seniors. In addition, the housing developments have an "average bedroom factor" requirement with the intent of having more diversity among units. The plan seeks to achieve a minimum of 30% affordable housing for residential development, and all affordable housing projects include additional FAR bonuses as incentives. The plan specifically addresses the need to provide affordable housing. For instance, for owner occupied homes, the specific plan regulations require 20% of the total units for moderate-income households at an affordable ownership cost for projects of at least four units, but not more than 15 units in multifamily residential districts.

In contrast, El Segundo weakly addresses this criterion because the downtown specific plan is mainly commercial in nature, with a "surrounding area generally residential, including single family (R-1), two family residential (R-2), and multifamily residential (R-3) units (City of El Segundo, 2017, p. 15)." Therefore, there are very few residential developments, and the city's downtown development standards do not address variation in housing types and sizes nor

housing for residents from wide range of income levels. The regulations only suggest converting non-core retail areas to a mix of office and multifamily residential if supported by market analysis. Overall, there is little to no reference to various types of residential units that may be allowed.

Finally, Santa Monica's downtown specific plan moderately reflects the criterion of community outreach. Although more project-level based, this criterion is important to address city efforts to engage the community. For instance, the "city staff of Santa Monica made several community outreach efforts to have the specific plan approved" (City staff, personal communication, 2018).

Green Infrastructure and Buildings (GIB). Overall, Santa Monica's downtown development regulations address more GIB criteria and to a stronger extent than those of El Segundo. Both cities strongly address the criteria of water efficient landscaping, existing building reuse, historic preservation and adaptive reuse, storm water management, and solid waste management infrastructure, with Santa Monica addressing storm water management and solid waste management infrastructure to a stronger extent. On the other hand, El Segundo addresses water efficient landscaping, existing building reuse, historic preservation and adaptive reuse more strongly than Santa Monica.

The two cities differ the greatest in the criteria of "building water efficiency," "on-site renewable energy sources," "recycled content in infrastructure," "infrastructure energy efficiency," "certified green building," "building energy efficiency." Santa Monica strongly addresses the first four criteria, and moderately addresses the last two criteria, while Segundo does not address any. El Segundo's plan requires every residential lot to have pervious surface to address percolation, drainage, runoff, and storm-water detention requirements (City of El

Segundo, 2017). Similarly, Santa Monica's downtown specific plan requires developers of parcels greater than 20,000 square feet to capture street runoff off site for infiltration or treatment and to capture non-potable use on site (City of Santa Monica, 2017).

Santa Monica's downtown regulations strongly address the criteria of building water efficiency, on-site renewable energy sources, and recycled content in infrastructure. In comparison, El Segundo does not address these criteria in its downtown specific plan. Santa Monica requires all downtown projects to incorporate Cal Green interior and exterior water usage standards. In addition, the developer should achieve a water conservation requirement, defined as 30% below the Cal Green (Title 24) baseline, for interior building water use (City of Santa Monica, 2017, p. 29). Regarding "on-site renewable energy sources," Santa Monica requires all new multifamily projects to install a solar electric photovoltaic system. The city strongly recommends that project developers install photovoltaic panels sufficient to generate energy to power the project's common areas, excluding elevator shafts, as a community benefit (City of Santa Monica, 2012). In addition, Santa Monica strongly addresses "recycled content in infrastructure" with a waste management plan that requires at least 70% of construction and demotion material be diverted via reuse or recycling unless an exemption is approved. (City of Santa Monica, 2012)

Finally, Santa Monica weakly addresses the GIB criterion of district heating and cooling, and El Segundo does not address this at all. In fact, none of the other seven cities in this study address this criterion. To create a low-carbon and low-energy district, Santa Monica recommends exploring the feasibility of district energy systems to serve building heating and cooling loads by developing a demonstration project and toolkit to promote micro grids.

Group high-low. Group high-low in this study, consists of cities of Yorba Linda and Redlands, which rank high in size of the creative class and low on the urban form index, and that have downtown specific plans adopted after 2008. Table 5.4 presents the weighted concordance scores for 41 LEED-ND criteria of these two cities.

Table 5.4.
Weighted concordance scores (W) for cities in group high-low

LEED-ND criteria	Yorba Linda		Redlands	
Smart Location and Linkage (SLL)	W_A	W_Z	W_A	W_Z
Preferred locations (10)	**2.31**	**2.31**	**2.31**	0.77
Brownfield redevelopment (2)	0.33	0.20	0.00	0.00
Locations with reduced auto dependence (7)	1.50	1.00	1.50	0.00
Bike network and storage (1)	**3.00**	**2.40**	1.00	0.25
Housing and jobs proximity (3)	1.00	0.67	1.50	0.29
Steep slope protection (1)	0.00	0.00	0.00	0.00
Site design for habitat or wetland and water body conservation (1)	0.00	0.13	0.33	0.00
Restoration of habitat or wetlands and water bodies (1)	0.00	0.00	0.00	0.00
Long-term conservation management of habitat or wetlands and water bodies (1)	0.00	0.00	0.00	0.00
Smart Location and Linkage (SLL) Total	**8.14**	**6.71**	**6.64**	**1.31**
Neighborhood Pattern and Design (NPD)				
Walkable streets (12)	**3.00**	**2.40**	**3.00**	2.00
Compact development (6)	1.00	1.00	1.00	**2.25**
Mixed-use neighborhood centers (4)	1.00	1.07	1.00	0.58
Mixed-income diverse communities (7)	1.71	0.43	0.14	0.00
Reduced parking footprint (1)	**2.25**	1.30	1.75	0.88
Street network (2)	2.00	**2.40**	1.50	1.00
Transit facilities (1)	1.67	0.87	0.00	0.00
Transportation demand management (2)	0.80	0.32	0.80	0.45
Access to civic and public space (1)	2.00	1.40	2.00	1.13
Access to recreation facilities (1)	1.00	0.00	0.00	0.25
Visitability and universal design (1)	1.50	1.20	1.50	0.25
Community outreach and involvement (2)	0.60	0.96	0.00	0.00
Local food production (1)	0.00	0.50	0.00	0.00
Tree-lined and shaded streets (2)	**2.33**	**2.33**	**2.33**	0.58
Neighborhood schools (1)	1.00	0.00	0.00	0.75
Neighborhood Pattern and Design (NPD) Total	**21.86**	**16.18**	**15.03**	**10.12**

Note. W_A = weighted concordance scores for the plan as a whole; W_z = mean of weighted concordance scores of the specific zones. Dark shading indicates W>2 (strongly reflected), medium shading indicates .5< W≥2 (moderately reflected), no shading indicate W≥.5 (weakly reflected), W=0 (not reflected)

Table continues

Table 5.4. (continued)
Weighted concordance scores (W) for cities in group high-low

LEED-ND criteria	Yorba Linda		Redlands	
Green Infrastructure and Buildings				
Certified green building (5)	1.00	0.60	0.00	0.00
Building energy efficiency (2)	1.00	0.50	0.00	0.00
Building water efficiency (1)	1.50	0.60	0.00	0.00
Water-efficient landscaping (1)	**3.00**	1.60	0.00	**2.25**
Existing building reuse (1)	2.00	1.10	**4.00**	1.75
Historic resource preservation and adaptive reuse (1)	**3.00**	1.60	**4.00**	**2.75**
Minimized site disturbance in design and construction (1)	1.33	1.13	2.00	0.00
Storm water management (4)	**3.00**	**2.60**	**3.00**	0.50
Heat island reduction (1)	**2.33**	1.47	2.00	0.50
Solar orientation (1)	2.00	0.30	1.50	0.00
On-site renewable energy sources (3)	1.00	0.40	1.00	0.00
District heating and cooling (2)	0.00	0.00	0.00	0.00
Infrastructure energy efficiency (1)	2.00	1.20	0.00	0.00
Wastewater management (2)	0.00	0.40	0.00	0.00
Recycled content in infrastructure (1)	**3.00**	0.00	0.00	0.00
Solid waste management infrastructure (1)	**4.00**	1.80	1.00	0.00
Light pollution reduction (1)	1.00	0.95	1.00	0.25
Green Infrastructure and Buildings (GIB) Total	**31.17**	**16.25**	**19.50**	**8.00**
TOTAL	**61.17**	**39.13**	**41.17**	**19.43**

Note. W_A = weighted concordance scores for the plan as a whole; W_z = mean of weighted concordance scores of the specific zones. Dark shading indicates W>2 (strongly reflected), medium shading indicates .5< W≥2 (moderately reflected), no shading indicate W≥.5 (weakly reflected), W=0 (not reflected)

In general, Yorba Linda's downtown development regulations address more LEED-ND criteria and to a stronger extent than Redlands' regulations. Although Yorba Linda's regulations address all three LEED-ND categories more strongly than Redlands', the greatest difference is in the NPD and GIB categories. Yorba Linda's scored higher likely because the city used the LEED-ND rating system as a tool to gauge the effectiveness of design principles for its specific plan.

Smart Location and Linkage (SLL). Overall, Yorba Linda's downtown development regulations address more LEED-ND criteria in this category, and to a stronger extent, than those

of Redlands. Both cities strongly address the criterion of preferred locations, but Yorba Linda addresses this criterion to a stronger extent, likely because of the further emphasis of this criterion in the specific zones of downtown Yorba Linda. Yorba Linda's specific plan focuses on building new development within and near existing communities to reduce multiple environmental impacts caused by sprawl. Specifically, the plan promotes physically connected neighborhoods and pedestrian connectivity. It also recommends comprehensive infill development and intensification of underutilized parcels. Similarly, Redlands strongly emphasizes the redevelopment of vacant and underused properties for new retail, office, and restaurant-entertainment activities and promotes the physical linkage of adjacent properties for pedestrians and automobiles.

Yorba Linda's downtown specific plan regulations strongly reflect the criterion of bike network and storage, while Redlands' plan moderately reflects this criterion. Yorba Linda's plan strongly emphasizes better connections for bicyclists and pedestrians and provides for bicycle racks near transit stops, commercial areas, parking lots, and private properties. For instance, the plan requires at least two bicycle spaces per two dwelling units for multifamily uses. In contrast, Redlands' plan emphasizes bike paths in certain zones only as opposed to the plan's entire area.

In addition to "preferred locations," LEED-ND rating system assigns highest weights in this category to "locations with reduced auto dependence," "housing and jobs proximity," and "brownfield redevelopment." Both cities moderately address "reduced auto dependence," but Yorba Linda more strongly than Redlands. Transit services such as Orange County Transportation Authority (OTCA) bus stops are located in the immediate vicinity of downtown Yorba Linda. In addition, Yorba Linda's downtown specific plan includes design guidelines for specific zones to encourage development within and near existing neighborhoods or public

transportation infrastructure in order to reduce vehicle trips. However, these guidelines are not mandated, but are intended to assist developers, applicants, and city staff to produce high-quality development. Similarly, Redlands' downtown specific plan encourages new developments to provide pedestrian access to public transit facilities on or adjacent to the site, but does not provide specific details for the various public transit facilities within the downtown area.

Both city's downtown regulations moderately address the criterion of housing and jobs proximity, but Redlands addresses this criterion more strongly than Yorba Linda. Specifically, Yorba Linda allows new developments to locate apartments and offices above or behind ground level retail and permits live-work units only in certain zones rather than plan area as a whole. Although residential uses are suggested for higher floors, the majority of the regulations include the word "may," indicating they are optional. In contrast, Redlands promotes land uses throughout downtown that create local employment opportunities for residents and reduce the need to commute to jobs outside the city.

Neighborhood Pattern and Design (NPD). Again, Yorba Linda's downtown development regulations address more criteria in this category, and to a stronger extent, than those of Redlands. Both cities strongly address "walkable features" and "tree-lined and shaded streets," although Yorba Linda addresses these criteria to a stronger extent than Redlands. Yorba Linda's downtown specific plan strongly addresses the criterion of walkable features with an emphasis on pedestrian-oriented design that regulates building form, facades, setbacks, uses along sidewalks, and sidewalk design. With the intent to activate streets, the regulations promote wide sidewalks, ground-level uses such as retail, cafes and outdoor dining for most of the area, as well as zero setbacks in certain zones. The plan includes on-street diagonal parking and brick paving at intersections as traffic calming measures. For visual appeal, the plan provides that no

building façade may extend more than 50 feet in length without variations in the wall surface, such as setbacks or changes in the wall plane. In addition, the development standards require a minimum of 40% of first-floor building façades facing certain streets to be comprised of transparent wall surfaces (storefront windows, display areas, or doorways that allow views of indoor space or product displays).

Similarly, Redlands strongly addresses "walkable features" with regulations for wide and continuous sidewalks and mainly ground-level retail uses with little or no setbacks. For visual appeal, the plan emphasizes that buildings more than 50 feet wide divide their elevations and mass with recessions and projections.

Redlands' downtown development regulations strongly address the criterion of "compact development" while Yorba Linda's regulations address this criterion to a moderate extent. Yorba Linda's development standards regulate density standards ranging between 3 and 10 dwelling units per acre in most specific zones; in the multifamily residential zone, density may increase to a maximum of 20 dwelling units per acre only if the housing element is adopted and voters approve Measure B. The ordinance, Measure B also known as the Yorba Linda Right-to-vote amendment, passed in 2006, requires voter approval for a major amendment to a General Plan or zoning code. For instance, one major amendment include increase in the number of permitted dwelling units on a residential lot. Residents of Yorba Linda use this Measure B ordinance with the intent to discourage growth (Yorba Linda city staff member, personal communication, 2018). In comparison, Redlands' development standards regulate higher densities wherein density standards for certain zones allow a maximum FAR of 2.

Yorba Linda's downtown development regulations moderately address "mixed-income diverse communities," while Redlands' regulations weakly address this criterion. Downtown

Yorba Linda is located within the redevelopment project area, and therefore, a share of the property tax is set aside to develop affordable housing[10]. Yorba Linda encourages affordable housing and envisions a variety of housing types (attached and detached) to cater to a variety of demographics. In addition, Yorba Linda's design guidelines for multifamily housing encourage a mix of one-, two-, and three-bedroom dwelling units throughout the development area. In contrast, Redlands' development standards suggest the likelihood of developing housing for low- and moderate-income housing through funds from the redevelopment agency, which is no longer active.

Green Infrastructure and Buildings (GIB). As with the other categories, Yorba Linda's downtown development regulations address more LEED-ND criteria overall in GIB, and to a stronger extent, than those of Redlands. One criterion in which Redlands surpasses Yorba Linda, however, is that of historic resource preservation and adaptation. For instance, in 2004, Yorba Linda established an historic combining zone to recognize, preserve, and protect historically significant structures, sites, and features. A total of 79 buildings were inventoried although none was registered under the National Register of Historic Places. In addition, 16 buildings were identified as potentially contributing to the historic district, but the specific plan indicates that no properties were designated under the historic combining zone. In contrast, the Redlands Santa Fe Depot District is listed as a historic district in the National Register of Historic Places, and the city's development standards require any historic building to be reviewed by the Historic and Scenic Preservation Commission for determination of its historic or architectural significance prior to demolition.

[10] The redevelopment agency in the state of California was officially dissolved in February 2012 (Department of Finance, State of California). Although the influence of this dissolution on Yorba Linda's downtown is beyond the scope of this study, it is an important point for future development.

Yorba Linda's regulations strongly address heat island reduction, while Redlands' regulations addresses this criterion only moderately. For instance, in downtown Yorba Linda, covered walkways and shade trees are encouraged, and regulations require a minimum of one evergreen tree per five parking spaces throughout. In addition, the intent of this criterion is emphasized further in specific zones. For example, the city's multifamily design guidelines emphasize provision of shade such as clusters of shade trees for sidewalks, driveways, parking lots, and exterior walls to reduce the heat island effect. In contrast, Redlands' development standards do not mandate reduction of heat island effects and are written with as "should" statements. Also, this criterion is not emphasized as much in Redlands' specific zones as in those of Yorba Linda.

Yorba Linda's downtown specific plan regulations strongly address "recycled content in infrastructure" and moderately address "building water efficiency," and "infrastructure energy efficiency," while Redlands' regulations do not address these criteria. For instance, Yorba Linda requires all public buildings in specific zones to achieve LEED credit 3.1 water efficiency, which is to exceed the baseline water projection by 20%. Regulations also encourage the use of recycled materials to reduce the environmental impact of processing new materials. In addition, residential design guidelines encourage the design and construction of green building practices and infrastructure energy efficiency. For instance, city's downtown development standards include multifamily design guidelines emphasizing use of renewable energy sources such as solar micro turbine for lighting.

Group low-high. In this study, group low-high consists of the cities of Huntington Park and Hawthorne, which rank low in the size of the creative class and high in the urban form index and have downtown specific plans adopted after 2008. Table 5.5 presents the weighted

concordance scores for 41 LEED-ND criterion of the two cities in this group. In general, Hawthorne's downtown development regulations scored higher in reflecting all 41 LEED-ND criteria compared with Huntington Park's. Hawthorne's regulations address more LEED-ND criteria and to a stronger extent than those of Huntington Park, with the greatest difference in the GIB category.

Table 5.5.
Weighted concordance scores for cities in group low-high

LEED-ND criteria	Hawthorne		Huntington Park	
Smart Location and Linkage (SLL)	W_A	W_Z	W_A	W_Z
Preferred locations (10)	**3.08**	1.54	1.92	1.23
Brownfield redevelopment (2)	0.00	0.00	0.00	0.00
Locations with reduced auto dependence (7)	2.00	1.72	1.50	1.40
Bike network and storage (1)	**3.50**	1.94	2.00	1.50
Housing and jobs proximity (3)	1.50	1.22	1.00	0.80
Steep slope protection (1)	0.00	0.00	0.00	0.00
Site design for habitat or wetland and water body conservation (1)	0.00	0.00	0.00	0.00
Restoration of habitat or wetlands and water bodies (1)	0.00	0.00	0.00	0.00
Long-term conservation management of habitat or wetlands and water bodies (1)	0.00	0.00	0.00	0.00
Smart Location and Linkage (SLL) Total	**10.08**	**6.43**	**6.42**	**4.93**
Neighborhood Pattern and Design (NPD)				
Walkable streets (12)	**3.00**	**2.44**	**3.00**	**3.20**
Compact development (6)	1.00	1.78	**3.00**	**3.20**
Mixed-use neighborhood centers (4)	1.00	0.89	1.00	1.20
Mixed-income diverse communities (7)	**2.57**	0.71	1.29	1.03
Reduced parking footprint (1)	1.50	0.39	1.75	1.40
Street network (2)	**3.00**	1.89	1.50	1.10
Transit facilities (1)	2.33	0.74	1.33	0.80
Transportation demand management (2)	0.00	0.00	0.60	0.00
Access to civic and public space (1)	2.00	1.33	2.00	1.50
Access to recreation facilities (1)	2.00	0.22	2.00	0.00
Visitability and universal design (1)	**2.50**	0.00	0.50	0.60
Community outreach and involvement (2)	0.80	0.00	0.60	0.00
Local food production (1)	1.75	0.33	0.00	0.30
Tree-lined and shaded streets (2)	**2.33**	1.78	0.67	**2.27**
Neighborhood schools (1)	1.00	0.11	1.50	0.00
Neighborhood Pattern and Design (NPD) Total	**26.79**	**12.62**	**20.74**	**16.60**

Note. W_A = weighted concordance scores for the plan as a whole; W_z = mean of weighted concordance scores of the specific zones. Dark shading indicates W>2 (strongly reflected), medium shading indicates .5< W≥2 (moderately reflected), no shading indicate W≥.5 (weakly reflected), W=0 (not reflected)

Table continues

Table 5.5. (continued)
Weighted concordance scores for cities in group low-high

LEED-ND criteria	Hawthorne		Huntington Park	
Green Infrastructure and Buildings (GIB)				
Certified green building (5)	0.00	0.00	0.00	0.00
Building energy efficiency (2)	0.00	0.44	0.00	0.00
Building water efficiency (1)	0.00	0.67	0.00	0.00
Water-efficient landscaping (1)	**4.00**	0.67	0.00	0.40
Existing building reuse (1)	**2.50**	0.89	**2.50**	0.50
Historic resource preservation and adaptive reuse (1)	2.00	0.00	**3.00**	0.20
Minimized site disturbance in design and construction (1)	1.33	0.89	0.67	0.47
Storm-water management (4)	**4.00**	0.00	0.00	0.80
Heat island reduction (1)	1.00	0.00	1.67	1.60
Solar orientation (1)	0.00	0.00	0.00	0.00
On-site renewable energy sources (3)	**3.00**	0.67	0.00	0.00
District heating and cooling (2)	0.00	0.00	0.00	0.00
Infrastructure energy efficiency (1)	0.00	0.00	0.00	0.00
Wastewater management (2)	2.00	0.00	0.00	0.00
Recycled content in infrastructure (1)	0.00	0.00	0.00	0.00
Solid waste management infrastructure (1)	**3.00**	0.33	**4.00**	**2.40**
Light pollution reduction (1)	0.00	0.08	0.75	0.10
Green Infrastructure and Buildings (GIB) Total	**22.83**	**4.64**	**12.59**	**6.47**
TOTAL	**59.70**	**23.69**	**39.75**	**27.99**

Note. W_A = weighted concordance scores for the plan as a whole; W_z = mean of weighted concordance scores of the specific zones. Dark shading indicates W>2 (strongly reflected), medium shading indicates .5< W≥2 (moderately reflected), no shading indicate W≥.5 (weakly reflected), W=0 (not reflected)

Smart Location and Linkage (SLL). Hawthorne's downtown development regulations strongly address more LEED-ND criteria in this category, than those of Huntington Park. In particular, Hawthorne strongly addresses "preferred locations" and "bike network and storage" whereas Huntington Park addresses these criteria only moderately. For example, Hawthorne strongly addresses the preferred locations criterion through the provision of strategic infill sites such as "mixed use development at South Bay Ford with the intent to create energy and excitement in the southern part of Hawthorn Boulevard" (City of Hawthorne, 2016, p. 57). In addition, the city's development standards strongly recommend integration of the transit system with alternate modes of transportation, specifically walking and biking. Hawthorne's downtown

specific plan also provides a mobility diagram that includes the addition and improvement of existing bike lanes and installation of end-of-trip bicycle facilities, such as bike racks, lockers, storage units, and shower facilities, at public buildings.

In contrast, Huntington Park addresses bike network and storage only moderately. Although bicycle riding in downtown Huntington Park is common, there are "no dedicated bike lanes in the area" (City of Huntington Park, 2008, p. 71), nor does the plan provide for them. Instead, the development regulations address the intent to increase bicycle usage by providing bike racks throughout as needed and allows bicycle repair shops through conditional use permits.

Both cities moderately address the criterion of housing and job proximity. Hawthorne's downtown development regulations strongly address integration of housing in close proximity to transit, but hardly address integration of affordable housing. Similarly, Huntington Park's downtown development regulations mainly emphasize housing projects, but not affordable housing.

Neighborhood Pattern and Design (NPD). Hawthorne surpasses Huntington Park overall in this category as well, addressing more LEED-ND criteria and to a stronger extent; however, Huntington Park addresses the criterion of walkable streets to a stronger extent with its additional emphasis in its specific zones. For example, in majority of the city's specific zones, development regulations strongly encourage zero setbacks, along with retail uses on the ground level to encourage street activity. In addition, the regulations require that ground floor wall areas in retail uses have a minimum of 65% openings/glazing to avoid blank facades and encourage pedestrian activity. To create visual interest, regulations strongly encourage incorporation of seeded glass pan-style tree grates in varied colors along streetscapes and colorful overhead shade sails. The regulations emphasize the use of basket-stack paving on sidewalks to reflect the city's

Hispanic culture. In addition, diagonal parking in specific zones and textured paving is strongly encouraged at crosswalks as traffic calming measures.

Similarly, Hawthorne strongly addresses this criterion with the recommendation for "complete streets." Downtown development regulations require strong and vibrant ground-level uses to promote retail uses and outdoor dining along the main boulevard. In addition, the regulations emphasize colored mid-block crossings with intersections that adhere to ADA compliant curb cuts and signals.

Another area in which Huntington Park strongly addresses a LEED-ND criterion, in comparison with Hawthorne's more moderate approach, is "compact development." Huntington Park's downtown development regulations promote higher density and a mix of uses. For instance, the density standards for most downtown zones allow for a maximum of 70 dwelling units per acre, along with an FAR ranging between 0.5 and 4, only when developed as a mixed-use project; however, in downtown Hawthorne, the minimum lot size for high density residential is 7,500 square feet, and high density is allowed only in specific zones, such as an FAR of 2.5 in commercial zones.

In contrast, Hawthorne's downtown development regulations surpass Huntington Park's in several other criteria, strongly addressing "mixed income diverse communities," "street network," "transit facilities," "visitability and universal design," and "tree-lined and shaded trees," whereas Huntington Park addresses these only moderately. For example, Hawthorne's regulations emphasize the need for diversity of housing type to cater to all ranges of income, need and preferences in the plan as a whole. In addition, Hawthorne's regulations address the improvement of transit facilities by building new transit shelters at existing stops to improve the riders' experience and encourage ridership (Figure 5.5). Development standards also require bus

station improvements such as new signage, seating, and shade structures. In addition, the downtown specific plan suggests working with Metro to design and install an attractive, functional bus stop as an example project.

Figure 5.5. Improvement to bus transit shelter in downtown Hawthorne; Source: City of Hawthorne, 2016

Green Infrastructure and Buildings (GIB). Overall, Hawthorne's downtown development regulations address more criteria in this category, and to a stronger extent, than those of Huntington Park. Although both cities strongly address the GIB criteria of "existing building reuse" and "solid waste management infrastructure," Hawthorne strongly addresses "storm water management" and "on-site renewable energy" while Huntington Park does not.

For example, Hawthorne's downtown development standards require preparation and adoption of "alternative standards for alleyways, streets, parking lots and landscaped areas enabling proven bio-filtration treatment features to be integrated in public thoroughfares and private development projects as approved by the Regional Water Quality Control Board, Los Angeles Region (City of Hawthorne, 2016, p. 75)." Also, Hawthorne strongly recommends the

addition of solar panels or smaller scale wind turbines to new public buildings and parking structures to reduce energy consumption, and the city plans to partner with local energy companies to provide economic or regulatory incentives for businesses that commit to 40% renewable energies in their operations.

Group low-low. In this study, group low-low consists of the cities of Desert Hot Springs and Baldwin Park, which rank low in size of the creative class and on the urban form index and have downtown specific plans adopted after 2008. Table 5.6 presents the weighted concordance scores of the 41 LEED-ND criteria of these two cities in this group.

In general, Baldwin Park's downtown development regulations scored higher in reflecting all 41 LEED-ND criteria compared with Desert Hot Springs's. Baldwin Parks downtown development regulations address more LEED-ND criteria and to a stronger extent than those of Desert Hot Springs in all three categories.

Smart Location and Linkage (SLL). Overall, Baldwin Park's downtown development regulations strongly address more LEED-ND criteria in this category, than those of Desert Hot Springs. Both cities downtown development regulations strongly address criterion "bike network and storage," however, Baldwin Park downtown development regulations address this criterion to a stronger extent. Baldwin Park downtown development regulations strongly address LEED-ND criterion "preferred locations" and "housing and job proximity," while Desert Hot Springs' regulations address these criteria to a moderate extent.

Both cities strongly address LEED-ND criterion "bike network and storage." Nevertheless, development regulations of the City of Baldwin Park addresses this criterion to a stronger extent than the development regulations of the City of Desert Hot Springs. For instance, downtown development specific plan of Baldwin Park provides a mobility map which depicts

the addition of class II and class III facilities bike lanes with the intent to provide a connected and integrated bicycle network in the downtown and to connect it to the adjacent neighborhoods. It also emphasizes upon the location of bicycle racks along downtown, specifically at major bus-stops, mid-block locations and at/ near major commercial destinations with the intent to increase bicycle use. While, downtown development regulations of the City of Desert Hot Springs requires bikeways and pedestrian streetscapes to be incorporated to connect to open space and various amenities. They also provide the minimum number of bike racks required. For instance, the plan requires at least one bike rack for two bicycles for developments that requires 40-80 nonresidential parking spaces. However, the bike storage requirements do not meet the maximum standards of LEED-ND rating system.

Baldwin Park's downtown development regulations also more strongly address the criterion of preferred locations, compared with Desert Hot Springs' regulations, which address this criterion to a moderate extent. Baldwin Park's downtown specific plan is a transit-oriented development that emphasizes incorporation of new infill mixed-use and retail development. The plan promotes increased connectivity through a detailed pedestrian circulation network that identifies pedestrian pathways throughout downtown along with connections to adjoining commercial and residential areas. The plan also emphasizes a network of alleys and off-street walkways to supplement the sidewalks and enhance pedestrian connectivity.

Baldwin Park's downtown development regulations also excel in addressing housing and job proximity. The majority of the city's downtown area is a mixed-use zone in close proximity to public transit. Phase I of Baldwin Park Transit Apartments, located near the Metrolink station, includes approximately 70 affordable housing units and 6,000 square feet of retail space. In comparison, Desert Hot Springs' regulations recommend new housing concepts that promote

high-density residential units with the intent to increase job housing proximity; however, the regulations do not provide specific requirements of the criterion, determined by the residential or nonresidential composition of the buildings' total square footage.

Table 5.6

Weighted concordance scores (W) for cities in group low-low

LEED-ND criteria	Baldwin Park		Desert Hot Springs	
Smart Location and Linkage (SLL)	W_A	W_Z	W_A	W_Z
Preferred locations (10)	**2.69**	1.79	1.92	0.62
Brownfield redevelopment (2)	0.00	0.00	0.00	0.00
Locations with reduced auto dependence (7)	2.00	0.75	1.50	0.30
Bike network and storage (1)	**3.50**	**2.58**	**2.50**	0.60
Housing and jobs proximity (3)	**3.00**	0.33	1.00	0.73
Steep slope protection (1)	0.00	0.00	0.00	0.00
Site design for habitat or wetland and water body conservation (1)	0.00	0.00	0.00	0.00
Restoration of habitat or wetlands and water bodies (1)	0.00	0.00	0.00	0.00
Long-term conservation management of habitat or wetlands and water bodies (1)	0.00	0.00	0.00	0.00
Smart Location and Linkage (SLL) Total	**11.19**	**5.46**	**6.92**	**2.25**
Neighborhood Pattern and Design (NPD)				
Walkable streets (12)	2.00	**3.17**	**3.00**	3.00
Compact development (6)	1.00	1.17	2.00	2.00
Mixed-use neighborhood centers (4)	1.33	0.83	1.33	1.00
Mixed-income diverse communities (7)	0.86	0.71	0.86	0.00
Reduced parking footprint (1)	**2.75**	1.63	1.25	0.30
Street network (2)	2.00	1.58	1.50	0.80
Transit facilities (1)	2.00	0.50	0.00	0.00
Transportation demand management (2)	1.20	0.17	1.00	0.56
Access to civic and public space (1)	2.00	1.58	2.00	1.50
Access to recreation facilities (1)	2.00	1.17	**3.00**	0.00
Visitability and universal design (1)	2.00	1.00	2.00	1.20
Community outreach and involvement (2)	0.60	0.00	0.40	0.00
Local food production (1)	0.00	0.00	1.00	0.20
Tree-lined and shaded streets (2)	2.00	**2.56**	1.67	1.60
Neighborhood schools (1)	0.00	1.00	0.00	0.40
Neighborhood Pattern and Design (NPD) Total	**23.74**	**17.06**	**21.01**	**12.56**

Note. W_A = weighted concordance scores for the plan as a whole; W_z = mean of weighted concordance scores of the specific zones. Dark shading indicates W>2 (strongly reflected), medium shading indicates .5< W≥2 (moderately reflected), no shading indicate W≥.5 (weakly reflected), W=0 (not reflected)

Table continues

Table 5.6 (continued)

Weighted concordance scores (W) for cities in group low-low

LEED-ND criteria	Baldwin Park		Desert Hot Springs	
Green Infrastructure and Buildings (GIB)				
Certified green building (5)	0.00	0.17	1.50	0.00
Building energy efficiency (2)	1.00	0.17	1.50	0.00
Building water efficiency (1)	0.00	0.00	1.50	0.00
Water-efficient landscaping (1)	**4.00**	**3.33**	**3.00**	0.00
Existing building reuse (1)	**3.00**	0.75	1.00	0.00
Historic resource preservation and adaptive reuse (1)	**4.00**	0.67	0.00	0.00
Minimized site disturbance in design and construction (1)	2.00	0.72	0.67	0.00
Storm-water management (4)	**4.00**	**2.33**	2.00	0.00
Heat island reduction (1)	1.00	1.67	**2.33**	1.33
Solar orientation (1)	0.00	0.92	2.00	0.00
On-site renewable energy sources (3)	0.00	0.50	**3.00**	0.00
District heating and cooling (2)	0.00	0.00	0.00	0.00
Infrastructure energy efficiency (1)	0.00	1.00	0.00	0.00
Wastewater management (2)	**3.00**	0.00	**3.00**	0.00
Recycled content in infrastructure (1)	0.00	**2.17**	2.00	0.00
Solid waste management infrastructure (1)	**3.00**	**2.50**	**3.00**	0.40
Light pollution reduction (1)	1.00	1.33	0.75	0.00
Green Infrastructure and Buildings (GIB) Total	**26.00**	**18.22**	**27.25**	**1.73**
TOTAL	**60.93**	**40.75**	**55.18**	**16.54**

Note. W_A = weighted concordance scores for the plan as a whole; W_z = mean of weighted concordance scores of the specific zones. Dark shading indicates W>2 (strongly reflected), medium shading indicates .5< W≥2 (moderately reflected), no shading indicate W≥.5 (weakly reflected), W=0 (not reflected)

Neighborhood Pattern and Design (NPD). Overall in this category, Baldwin Park's downtown development regulations strongly address more LEED-ND criteria than those of Desert Hot Springs. Specifically, Baldwin Park strongly addresses "reduced parking footprint," and "tree-lined and shaded trees," compared with Desert Hot Springs' more moderate response. However, Desert Hot Springs addresses the criterion of compact development to a stronger extent than Baldwin Park, and both cities strongly reflect the criterion of walkable streets.

Regarding walkable streets, Baldwin Park has adopted a "complete streets" policy to provide comfortable street environments and promote walking. The mixed-use zone encompasses the majority of the downtown specific plan and strongly addresses walkable

features, such as zero-setback wherever feasible and pedestrian-scaled uses and pedestrian-oriented business activity to activate streets. To enhance visual appeal, the city suggests entries should be located no more than 60 feet apart. In addition 75% of "active retail frontage" must have windows and openings. Regulations emphasize street angled parking, specifically on the city's anchor street, Ramona Boulevard. The plan promotes accent paving on widened crosswalks, pedestrian signals, and wider bike lanes to calm traffic and enhance safety.

Similarly, Desert Hot Springs's downtown development regulations encourage well-connected sidewalks and ground-level retail uses to activate streets. The development standards regulate setbacks up to 14 feet for local streets and require long, flat expanses of walls exceeding 50 feet to include changes in color, materials, texture, and/or plane. In addition, the development standards regulate special paving treatments to enhance intersection and pedestrian crossings and to encourage diagonal parking in specific zones as traffic calming measures.

Although both cities moderately address compact development, Desert Hot Springs addresses this criterion to a stronger extent. The density standards for downtown Desert Hot Springs range between 12 and 25 dwelling units per acre and 0.15 to 0.65 FAR across its specific zones. In addition, the regulations allow for higher density with the inclusion of affordable housing. In contrast, downtown Baldwin Park's specific zones have low density requirements, except for the mixed-use zone. For instance, the density requirements for residential zones is 12 dwelling units per acre, whereas the density standards of the mixed-use zone allow an FAR of 2 and 30 residential dwelling units per acre. However, the majority of the land is zoned mixed use in Baldwin Park's downtown specific plan.[11]

[11] Although mixed used zone comprises majority of the plan, while coding, it was considered as a specific zone, rather than "zone all", which affects the overall concordance score.

The LEED-ND rating system weights "mixed income diverse communities" the highest, after walkable streets and compact development, and both cities address this criterion to a moderate extent. Baldwin Park's downtown specific plan moderately addresses this criterion, except for its mixed-use specific zone, which has an affordable housing project that includes approximately 70 affordable housing units. Desert Hot Springs' downtown development regulations broadly address this criterion, but do not mandate the intent.

Green Infrastructure and Buildings (GIB). Overall, Baldwin Park's downtown development regulations address more LEED-ND criteria in this category, and to a stronger extent, than those of Desert Hot Springs. Although, the total scores of Desert Hot Springs for regulations that apply to the plan as a whole is higher than Baldwin Park, the average concordance scores for Baldwin Park is higher in this category. The average concordance score for Baldwin Park is higher because the regulations strongly address LEED-ND category in its specific zones, in addition to the plan as a whole. Specifically, both cities strongly address water-efficient landscaping, wastewater management, and solid waste management infrastructure, but Baldwin Park addresses these criteria more strongly than Desert Hot Springs. However, Desert Hot Springs' response to the criteria of heat island reduction and on-site renewable energy sources surpasses that of Baldwin Park.

Baldwin Park's downtown development regulations strongly address storm water management, while development regulations of Desert Hot Springs addresses this criterion to a moderate extent. Baldwin Park's downtown development regulations strongly address storm water management with a requirement that every new development provide a hydrology study demonstrating that the building site is free from flooding hazard. Every new development must mimic the site's pre-development runoff by choosing the appropriate low impact development

practice most suitable for the site[12]. Desert Hot Springs moderately addresses this criterion with standards that encourage permeable pavers and recognizes the need for natural drains; however the standards are very broadly specified and not mandated.

Regarding heat island reduction, Desert Hot Springs' downtown regulations require canopy trees, with approximately one tree per four parking spaces in short-term parking areas. In addition, Desert Hot Springs strongly encourages "green roofs," which are planted with a variety of vegetation that can withstand hot, dry conditions and act as a heat-reflecting mechanism for buildings. In addition, the regulations strongly recommend covered walkways and fabric shade structures. Lastly, the guidelines promote building designs that use integral sun control and shading devices. Baldwin Park's more moderate response to this criterion requires exterior and interior shading devices to reduce solar gain and reduce energy consumption for majority of its specific zones. In addition, the downtown development regulations require one tree with a broad canopy for every 10 parking spaces.

Desert Hot Spring's downtown development regulations strongly addresses LEED-ND criterion "on-site renewable energy sources," whereas Baldwin Park's regulations weakly address this criterion in its specific zones. Desert Hot Springs recommends the facilitation and accommodation of photovoltaic cells for solar power in building design, and regulations strongly encourage solar electric (efficiency rating of at least 0.92) or lower nitrogen oxide gas fired water heaters as an efficient way to reduce household energy needs. Although Desert Hot Springs' strongly encourages this criterion, the regulations do not mandate the intent of this criterion.

[12] Low impact development practices, adopted by the Water Resource Board of California aims to mimic a site's pre-development hydrology by using design techniques that infiltrate, filter, store, evaporate, and detain runoff close to the source of rainfall, such as bio retention and rain gardens.

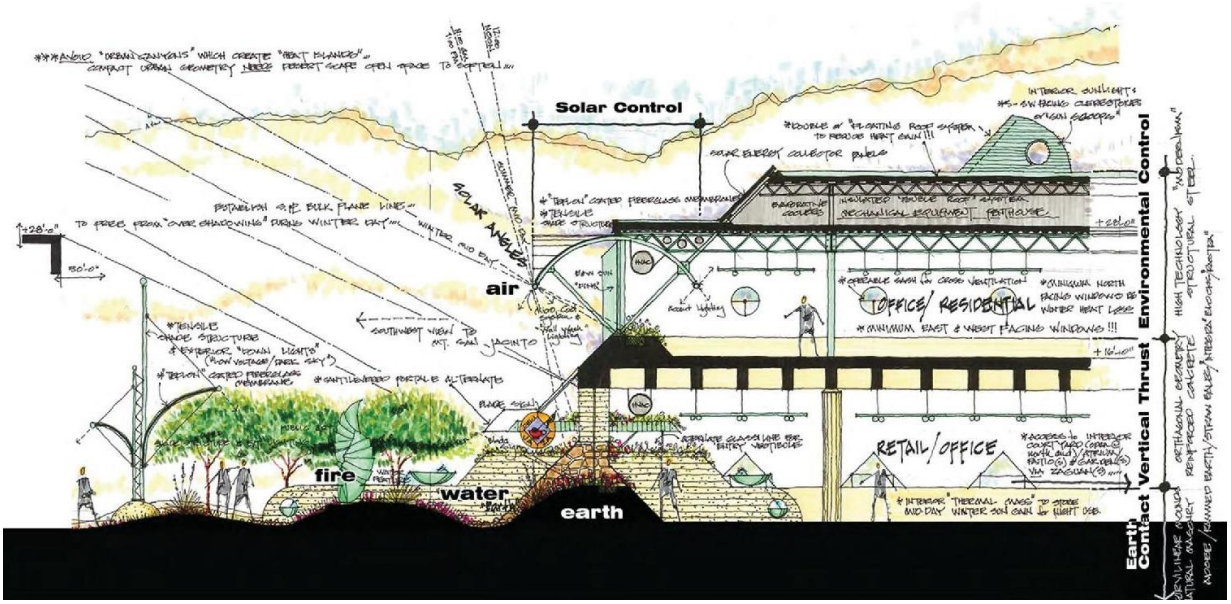


Figure 5.6. Bio-climatic design principles for buildings promoted by Downtown Desert Hot Springs. Source: City of Desert Hot Springs, 2010.

Desert Hot Springs' downtown development regulations moderately reflect the criteria of "certified green buildings," "building energy efficiency," and "building water efficiency," Baldwin Park's regulations do not address "building water efficiency" and weakly address the other two. Desert Hot Springs strongly encourages the use of "established sustainable best management practices, such as LEED (Leadership in Energy and Environmental Design) certification, Comfort Wise, and EnergyStar Home" (Desert Hot Springs, 2010, p. 50). In addition, the regulations strongly promote the California Green Builder Program as California Green Builder homes exceed strict California Energy codes by 15%.

Similarly, both cities moderately address "solar orientation" but Desert Hot Springs addresses these criteria in its plan as a whole while Baldwin Park addresses them only in specific zones. Desert Hot Springs' downtown development regulations strongly encourages "onsite renewable energy sources," while Baldwin Park weakly addresses this criterion. Desert Hot Springs' downtown development regulations strongly encourages solar power and bioclimatic

design principles in response to the desert climate, however these design principles are not mandated (Figure 5.6).

Finally in this category, Baldwin Park's downtown specific plan regulations strongly reflect the criterion for recycled content in infrastructure in certain zones, while Desert Hot Springs' downtown development regulations moderately address this criterion. The plan makes references to the design guidelines for multifamily and commercial uses in which the guidelines strongly recommend the use of sustainable building materials that have a long life span, material that are not energy intensive to manufacture, and products that are made from recycled materials. The guidelines also recommend using materials found on-site for landscaping purposes.

Innovation in design process category

Certain cities have made innovative efforts to promote sustainability in ways that are not addressed in the three main categories of the LEED-ND rating system. For example, Santa Monica's downtown development regulations promote reduction of greenhouse gas emissions by establishing a challenge program to encourage property owners of buildings greater than 25,000 square feet to benchmark and disclose their energy use and to reduce consumption. The city staff members are encouraged to produce marketing materials aimed at reducing water demand through small behavioral changes in building water efficiency. The development regulations also seek to make alternate modes of transportation faster and more convenient through dedicated lanes for transit vehicles. In addition, the city provides Breeze rental bikes and bike valets for visitors to the farmers' market and supports adoption and use of electric vehicles. Breeze is a public bike share program provided by the city of Santa Monica to encourage biking for resident and visitors. In 2015, the city provided 500 bikes at 75 convenient locations throughout the city (Breeze Bike Share, 2018). The plan recommends exploring automated transit vehicles and the

use of electric or low-emission fleets to reduce carbon emissions. In addition to Santa Monica, the downtown development regulations of Yorba Linda, Hawthorne, and Desert Hot Springs encourage electric vehicle charging stations.

Next, downtown development regulations of Santa Monica, Hawthorne, and Baldwin Park promote the use of flexible spaces, also known as flex spaces/creative offices. Santa Monica promotes the development of creative offices—non-traditional office environments in which where people work outside normal office hours to reduce trip generations (City staff, personal communication, 2018). Hawthorne's regulations encourage office space buildings with a flexible internal format, such as large, open layouts that can be reconfigured easily to allow multiple individuals or companies to co-locate. Baldwin Park's regulations recommend inclusion of flex spaces that can serve as retail, office, or even live-work space to allow property owners to maximize the value of their projects.

Insights from interviews

The data obtained from interviews yielded important insights that reinforced the findings of my analysis using LEED-ND as the evaluative framework. Key insights were: 1) most city residents tend to oppose higher density standards for various reasons; mixed-use also meets opposition because it is perceived to increase density; 2) resident participation is higher in cities with a larger proportion of the creative class and lower in cities with a smaller proportion of the creative class; and 3) cities with a larger proportion of the creative class tend to make more outreach efforts than those with a smaller creative class.

Increase in density standards. Findings from the interviews suggest that an increase in density standards for all of the city groups were likely to meet opposition from city residents.

Cities with a larger proportion of the creative class found that higher density standards faced severe opposition or outright rejection.

City staff in Santa Monica, where downtown density standards are relatively high, described the challenges of promoting compact vertical mixed-use living and the necessity for community outreach:

> This notion of compact vertical mixed-use living and the inherent challenges of trying to sell that to a community that really sees itself as a collection of one-story 1920 Spanish colonial houses. It is an uphill battle we have been fighting it for the entire time.
>
> In 2016 alone, we did 50 presentations to community groups on the downtown plan. We did 22 planning commission meetings and those are all four- to five-hours each, and we did three to six city council meetings. So it's like infinite amount of time talking about details related to sustainability.

Despite the city council's desire, the plan was approved at a lower density because of community politics. The staff member noted:

> In the early meetings, the council had a desire to increase the FAR [floor area ratio] across the board in the downtown area. The council during the CEQA [California Environment Quality Act] scoping, the council asked us to analyze, I don't think it was 8.0, but I do think it was 5.0 or 6.0 in their transit district and even [city] staff [discussed among themselves that the FAR numbers] were like that's crazy. It's not crazy that the building would be that tall, but it's crazy in this town that the [city] council would propose that [high FAR ratios] knowing the community, knowing the politics. So, we ran the council's analysis. We also ran our own at a lower height and a lower FAR and that's what's in the [downtown specific] plan now … we didn't get any benefits out of being higher [higher FAR] and all we would get would be to send it back to the drawing board by the community. So all this is a negotiation.

Planning staff in Yorba Linda also reported that the residents tend to oppose compact development, and therefore, the city does not anticipate increasing density standards without a state mandate. Residents rejected a previous mixed-use plan, according to a staff member:

> There was a referendum in 2007 and the mixed-use component was taken out. Now there are only commercial projects in the specific plan, and there are existing bungalows which provide some amount of mixed use, but it not like the mixed we … think it should be … residents in fact also … actually voted to prohibit growth.

Hawthorne's planning staff indicated that residents fear increased density will bring increased traffic. One planner described opposition to a proposed residential development across the street from Space X, one of the city's largest employers:

> We fought all the way for a 230-unit development … A lot of people came out and said, "No! It's going to bring traffic!" You know, traffic is already here; this isn't going to create [traffic]; so the hardest thing about … dealing with residents and trying to change, is the change aspect.

Similarly, a planner in Baldwin Park said that residents prefer single-family lots, and equate density with more traffic.

Level of citizen participation. According to my interviews, cities with a larger proportion of the creative class tend to have residents who are more active and more engaged in the development of the built environment. Planning staff in Yorba Linda (group high-high) indicated that their residents are very active and launched a major pushback against a mass-transit, mixed-use corridor project. A metro link station proposed on east side was "flat out opposed." A group of residents attended city council meetings, hired an attorney, and threatened to sue the city. The project failed. Planning staff said, "Any mass transit projects are denied."

Cities with a smaller proportion of the creative class tend to have residents who are less engaged, perhaps because they do not have time to participate in meetings, city staff members said. A Baldwin Park planning staff member said:

> Not a lot of community members are there at the public meeting—no big turnout—mainly because the city is composed of working class. People are working two or more jobs to keep them at bay and to pay the mortgage. Also, if it does not directly impact them then why attend the meetings.

Similarly, a planning staff member in Desert Hot Springs said:

> [We are] probably one of the lowest income cities here in the Coachella Valley, so maybe that explains why the population does not really attend public hearing meetings too much. The city council meetings are different though but … unless [they] have an interest in the project … maybe one or two or maybe three regular people that always show up to planning commission meetings.

Outreach efforts. Cities with a larger proportion of the creative class tended to emphasize outreach efforts to educate city residents more than cities with a smaller creative class. For example, in Santa Monica (group high-high) planning staff described efforts to inform residents about a recent land use change to allow an existing downtown Denny's restaurant to be replaced by a 100-unit apartment building. The city staff employed a sustainability consultant and provided evidence that the new project would consume less water daily than the existing Denny's restaurant. The planning staff noted:

> We have done a lot of work in the communications department in terms of trying to educate the community about how this notion of compact mixed use living is actually more efficient … It is a little theoretical, … but the efficiencies we are seeing in the building design through that are better conforming to our green building code … which I think is an important message to convey to this … older generation that is still stuck in the Baby Boom mind frame that everybody has to

> live in a single-family house and have a yard and drive two cars and have two kids … the stuff that has ruined the planet over the past 50–60 years. So [a] lot of our communications are at myth busting and dispelling most of the misconceptions about density.

Similarly, planning staff of Yorba Linda (group low-low) noted that their outreach efforts on behalf of a housing project have been important in winning resident approval, as the city will not try to promote an ordinance that the residents or the council are likely to oppose. In one case, the planning staff said, they hired a public outreach firm for a year-long effort to educate residents about the additional housing in certain parcels (10 to 30 dwelling units per acre), and the proposal passed narrowly. The planner noted, "Had there been no outreach, it most likely would not have passed."

CHAPTER 6: Discussion of Results and Conclusion

The main objective of this study was to examine the extent to which the presence of the creative class is associated with the promotion of sustainability. In particular, I examined the extent to which the presence of the creative class is associated with sustainability principles, reflected in development regulations adopted by cities, focusing on 167 incorporated cities within the five-county Southern California region.

Using a mixed-methods approach, I conducted the data collection and analyses for this study in two phases. First, I examined the association between the presence of the creative class and sustainability-related urban form characteristics for incorporated cities in the five-county Southern California region with a population greater than 10,000 and less than 500,000. Specifically, I examined the association between the size of the creative class and six sustainable design-related urban form characteristics: compactness, mixed use, diversity of housing types, street intersection density, access to commercial uses, and access to open space. More importantly, using four different combinations of the two variables—the size of the creative class and the level of the urban form index (the composite index of the six urban form characteristics)—I purposefully selected eight cities for an in-depth analysis, two cities from each combination (high-high, high-low, low-high and low-low). The analytic conclusions derived from the varying cases provided more robust findings and thereby offered a more expansive discussion.

In the second phase, I used the LEED-ND rating system as an evaluative framework to examine the most recent downtown specific plans of the selected eight cities to determine the association between the presence of the creative class and sustainability principles, reflected in

these cities' downtown specific plan regulations. In addition, I conducted interviews with planners in the selected eight cities to provide additional insights.

In this chapter, I discuss the results of the two phases along with my overall conclusions derived from this dissertation. First, I use the findings from both phases of this study to discuss the variation of certain LEED-ND criteria in the NPD category, and I draw upon the findings in the study's second phase to discuss the variation of LEED-ND criteria in the GIB and SLL categories. Second, I discuss this study's theoretical and policy implications and its limitations. Finally, I conclude with a summary of the findings and discuss this study's contributions and suggestions for future research.

Promotion of neighborhood pattern and design based on the presence of the creative class

The six sustainability-related urban form characteristics. Findings from both phases of this study suggest that not all cities that have a higher proportion of the creative class are likely to encourage compact, mixed-use developments that include a diverse range of housing types. The intent of the six sustainable design-related urban form characteristics which I used in this study's first phase is also captured in certain NPD-related LEED-ND criterion in the evaluative framework used in the second phase; however, findings in the first phase reflect existing urban form conditions, and those in the second phase measure the extent to which the city's development regulations integrate these sustainability principles, and in turn, are likely to affect the resultant urban form.

Findings from both phases of this study suggest that cities with a higher proportion of the creative class are not likely to encourage compact, mixed-use developments that include a diverse range of housing types. In contrast, prior studies indicated that the members of the creative class are attracted to places with dense urban environments (Florida, 2012), a higher mix

of uses (Florida, 2012; Spencer, 2015), and income diversity (Bereitschaft & Cammack, 2015). Although these previous studies measured the creative class either at the metropolitan or tract level (Bereitschaft & Cammack, 2015; Florida, 2012; Spencer, 2015) rather than at the city level as in my study, their conclusions lead one to expect that the proportion of the creative class in a city's population should be positively correlated with net residential density, mixed use developments, diversity of land uses, and diversity of housing types. However, findings from my study's first phase do not show any statistically significant relationship between the proportion of the creative class and the urban form characteristics (net residential density, mix of uses, and diversity of housing types), except for access to open space. These insignificant correlation coefficients imply that the relationship between the creative class and urban form is more complex than it may appear.

In addition, these findings were borne out in the study's second phase, suggesting no similar pattern in the urban form among cities with a higher proportion of the creative class, except for "access to open space." Not all cities with a higher percentage of the creative class were likely to encourage well connected, compact, mixed-use developments with diverse housing types. For instance, cities with a larger proportion of the creative class moderately addressed the LEED-ND criterion of compact development, except for the city of Santa Monica. Santa Monica's differences may have to do with its being the only coastal city in the study and having the geographical advantage that the other cities do not. City size or age of a city (date of incorporation) also may play a role in the differences in the existing urban form characteristics (Banerjee & Verma, 2005; Garde, 2012). Historically, development in Southern California occurred in coastal areas, while inland areas remained largely agricultural and undeveloped (Forsyth, 2005). Stock of developable land available could also lead to differences in the existing

built form and in development regulations for the resultant built form (Garde, 2012; Kim, Hipp, Basolo, & Dillon, 2018). Among the cities with a larger proportion of the creative class, the city of Santa Monica is the oldest city and has less developable land in comparison to the other three cities, and therefore, is likely to promote more compact development.

Also in contrast to expectations based on previous research, findings from this study's second phase show that the cities with a smaller proportion of the creative class addressed the LEED-ND criterion "compact development" to a stronger extent than those with a larger proportion of the creative class. In other words, cities with a smaller proportion of the creative class had development regulations allowing a higher number of residential units and higher FARs, either in their entire plan or their specific zones. Among cities with a lower proportion of the creative class, Huntington Park is the oldest city and has the highest existing net residential density standards. In comparison, Desert Hot Springs, the youngest city and relatively the most inland city in this group, has the lowest net residential density standards in the existing urban form; however, the city's development regulations promote relatively higher standards, likely because these regulations are for the downtown area.

Supporting findings in previous studies (Bereitschaft & Cammock, 2015; Frenkel et al. 2013a, 2013b; Lawton et al., 2013; Mansury et al., 2012), this study's first phase determined "access to open space" is positively and significantly correlated with the proportion of the creative class; that is, cities with a higher presence of the creative class had a higher percentage of housing units with access to open space within a quarter-mile radius. In the second phase, however, I found that all cities moderately promoted the LEED-ND criterion "access to public and open space," but those with a smaller proportion of the creative class promoted the criterion relatively more strongly than those with a larger proportion of the creative class. This finding

may be explained by the fact that this criterion was addressed in the recent downtown specific plan regulations since the existing standards for "access to open space" for these cities that was measured in the first phase were lower than the average of 167 cities within the study area.

Walkability and the presence of the creative class. Findings from this study's second phase show that the intent of the LEED-ND criterion "walkability" in the NPD category was strongly promoted across all cities; however, there were variations. This criterion's intent is to promote walking through the provision of "safe appealing, and comfortable street environments that support public health by reducing vehicular injury and encouraging daily physical activities" (USGBC, 2013, p. 48). Most cities studied had either implemented or recommended a "complete streets policy" and promote "active streets" along with more stringent regulations that align with this criterion. Similarly, Garde (2018) found evidence for continued emphasis on pedestrianization in downtown areas in the Southern California region.

Resident participation and the presence of the creative class. Based on interviews with city planners, I found that residents of cities with a larger proportion of the creative class were more active and more engaged in the development of the city's built environment. These residents were more vocal about changes that might occur in the existing built environment and strongly voiced their opinions regarding proposed development regulations. For instance, residents of Yorba Linda passed Measure B to discourage further growth in their city.

In contrast, there was minimal or no resident participation in cities with a smaller proportion of the creative class. Planners from Baldwin Park stated that hearings drew "no big turnout—mainly because the city is composed of working class. People are working two or more jobs to keep them at bay and to pay the mortgage." Similarly, a Desert Hot Springs planner

stated, “We are one of the lowest income cities here in the Coachella Valley, so maybe that explains why the population does not really attend public hearing meetings.”

The higher level of resident participation also was reflected in the greater extent that cities with a larger proportion of the creative class conducted outreach, compared with those with a smaller proportion. City planners in Santa Monica and Yorba Linda indicated that the active participation of residents required city staff to increase outreach efforts in order to win residents’ approval. Cities with a larger proportion of the creative class tend to be more affluent, and are more likely to participate in public meetings.

Findings from interviews tended to support the “homevoters” hypothesis (Fischel 2001, 2015). Fischel (2001) claimed that homeowners will embrace local policies that improve their net worth and resist those that do not. He stated that home voters are very well aware of the effect of factors such as the quality of their neighborhoods and available community services on their home values. Therefore, homeowners are likely to resist those services that are likely to negatively affect their home values and are likely to promote those that cater to their preferences. Fischel (2015) argued that areas with greater proportions of homeowners are more likely to be downzoned or protected from nonconfirming apartment developers. Among the eight cities studied, Yorba Linda had the highest percentage of owner-occupied homes and also the most vocal residents. Yorba Linda’s residents passed ordinance Measure B to discourage further growth, and the city’s downtown development regulations moderately addressed compact and mixed used development. However, this area requires further study.

Promotion of green infrastructure and buildings (GIB) criterion based on the presence of the creative class

In the study's second phase, I found that the downtown specific plans of cities with a larger proportion of the creative class strongly addressed more GIB-related LEED-ND criteria than those with a smaller proportion of the creative class; however, the extent to which cities' downtown specific plans reflected LEED-ND criteria in this category varied considerably. In particular, cities' of Santa Monica and Yorba Linda addressed more GIB related LEED-ND criteria and to a stronger extent than the other six cities. These findings are similar to those of Portney (2013a, 2013b), who found evidence that cities with a larger proportion of the creative classes pursue more sustainability policies; however, Portney used a single composite index of sustainability to examine efforts toward sustainable development among 55 of the largest cities across the United States. He developed this index for each city based on whether the city had adopted or engaged in 38 specific sustainability related policies, programs, and activities. Thus, his study did not examine development regulations, such as zoning or specific plan regulations which are enforceable laws used by local governments to implement policies included in general plans (Garde, 2018; Jepson & Haines, 2014). In contrast, I examined specific plan regulations and used the coding approach in Garde et al. (2015) which captures variations in the extent to which a sustainability principle may be integrated into development regulations. Also, Portney used Florida's (2012) measurement of the creative class, which was applied at the metropolitan level, whereas I measured the creative class at the *city* level.

The integration of GIB-related LEED-ND criteria, including certification of green buildings, building energy efficiency, building water efficiency, and onsite renewable energy, requires more financial resources than SLL- and NPD-related LEED-ND criteria (Garde, 2009).

Cities with a larger proportion of the creative class tend to promote economic growth (Florida, 2012; Portney, 2013a, 2013b) and to have more affluent residents, and therefore, may have more financial resources to promote GIB criteria. Specifically, the city of Santa Monica integrates more GIB-related LEED ND criteria and strongly addresses them in comparison to the other downtown specific plans. In fact, this city integrates most LEED-ND criteria in all three categories, and to a stronger extent, than the others, and is well known for its strong commitment to sustainability principles (Portney, 2013b). Santa Monica's sustainability efforts were developed and operate wholly within the city government itself (Brugmann, 1997). The city's task force on the environment developed a sustainability plan in 1992, which was adopted officially as a policy guide in 1994 (Brugmann, 1997).

Among cities with a smaller proportion of the creative class, those with more recent specific plans were more likely to address GIB-related LEED-ND criteria, and to a stronger extent, than those with relatively older plans. Similarly, Jepson and Haines (2014) also found that older zoning codes included fewer sustainability principles. For example in my study, Baldwin Park's downtown specific plan, adopted in 2016, reflects more green building and infrastructure related principles, and to a stronger extent, than Huntington Park's downtown specific plan, adopted in 2008.

Promotion of smart location and linkage (SLL) based on the presence of the creative class

In my study's second phase, I found that all groups of cities promoted SLL-related criteria relatively similarly in this category; even though there were variations within groups. However, cities with a larger proportion of the creative class and a higher urban form index received the highest total LEED-ND score in the SLL category, while those with a larger proportion of the creative class and a lower urban form index received the lowest total score.

According to Garde (2018), based on the operational definition of the criteria in the SLL category, downtowns are more likely to satisfy LEED-ND criteria in the SLL category than other locations in cities. Majority of the criteria in this category prioritize locations close to existing development, infill sites, and previously developed sites. Furthermore, these criteria encourage mixed-use development closer to alternate modes of transportation in order to increase job housing proximity and reduce automobile dependence. In my study's second phase, I found all groups strongly address the promotion of bike network and storage, except for cities with a larger proportion of the creative class and lower urban form index. Additionally, all groups moderately addressed "preferred locations" mainly for locating projects on an infill site and for strong street connectivity. Also, all groups moderately addressed "locations with reduced auto dependence."

Santa Monica which has a larger proportion of the creative class and urban form index scored higher due to the presence of the light rail station in its downtown specific plan and because the regulations strongly address alternate modes of transportation such as bike networks and storage for bikes throughout the plan. Among the cities with a smaller proportion of the creative class, Baldwin Park's downtown specific plan is a transit oriented development and Hawthorne's downtown specific plan is in close proximity to the metro green line station. Additionally, these cities also strongly address the promotion of bike network and storage.

Efforts beyond the LEED-ND rating system based on the presence of the creative class

Some cities' sustainability efforts may go beyond the LEED-ND framework, and therefore, the LEED-ND rating system includes an innovation and design category that is undefined, allowing an opportunity to include measures not addressed in the SLL, NPD, and GIB categories. For instance, Santa Monica's downtown development regulations promote reduction of greenhouse gas emissions through a challenge program to encourage property owners of

buildings greater than 25,000 square feet to benchmark and disclose their energy use and to reduce consumption. In addition, the cities of Santa Monica, Yorba Linda, Hawthorne, and Desert Hot Springs encourage the provision of electric vehicle charging stations.

Theoretical and policy contributions

This study contributes to empirical research on the association between the presence of the creative class and promotion of sustainability, reflected in *development regulations* and the existing *urban form* in cities. Multiple studies have examined the built environment that attract the creative class (Brown & Mecyzynski, 2009; Florida, 2012, Frenkel et al., 2013a, 2013b; Lawton et al., 2013; Mansury et al., 2012), but not from the perspective of sustainability principles reflected in the built environment. In addition, although a few researchers have examined the association between the proportion of the creative class and the adoption of sustainability principles (Portney, 2013a, 2013b), they have examined these principles broadly, as discussed previously.

According to Tiebout's sorting theory, individuals choose or move to a community which provides services that satisfy their preferences. Local governments understand this process, and therefore, offer convenient policy levers such as zoning and other land use controls to attract high-income residents. This process reinforces the distinctive physical attributes of the urban form that delineate one city from another (Hiekkila, 1996; Petersen, 1981). According to Florida (2012), quality of place is important to the creative class, suggesting that members of this class prefer a certain set of qualities of the urban form, and will move to places with those appealing qualities.

Municipalities in the Southern California region compete with each other to attract developments that will increase their tax base (Wolch, Pastor, & Dreier, 2004), and as Florida

(2012) maintained that the creative class promotes economic growth, local governments are also likely to compete to attract the creative class. However, Florida (2012) measured the size of the creative class at the metropolitan level, while I measured the size of the creative class at the city level and thus, provides a finer grain of analysis. Therefore, the findings of this study allow for further exploration of the variations within a metropolitan region.

Based on Florida's premise of quality of place, we can expect members of the creative class to sort into places that match their preferences in the urban form—places that are well connected, compact, and provide a higher mix of uses and diversity of housing types. Findings from both phases of this study provide mixed evidence, however, overall suggesting heterogeneous characteristics of the urban form among Southern California cities with a higher proportion of the creative class. From this study I found, in general, cities that have a higher proportion of the creative class are likely to strongly promote more green infrastructure and building (GIB)-related principles than cities with a lower proportion of the creative class, even though there is variability across cities. In particular, cities of Santa Monica and Yorba Linda address more GIB related LEED-ND criteria and to a stronger extent than the remaining six cities. However, findings are mixed, specifically with neighborhood pattern and design related sustainability principles, except for access to open space. First, the findings of the first phase were not statistically significant with the size of the creative class, implying that there is no clear pattern between the two variables. Second, the findings of the second phase, specifically for neighborhood pattern and design related principles are mixed, suggesting variations in the preferences of urban form characteristics among cities that have a higher proportion of the creative class.

Despite this heterogeneity of the existing urban form characteristics in cities in with a larger proportion of the creative class, these cities' residents tend to be more vocal in stating their preferences for development regulations than residents in cities with a smaller proportion of the creative class. In turn, these vocal residents' preferences are more likely to be reflected in development regulations and ultimately in the future built environment. Thus, preferences of residents in cities with a higher proportion of the creative class will likely influence the policy levers (zoning and other land use control) which reinforce the distinctive attributes that delineate cities. These findings are likely to support the "homevoter" hypothesis (Fischel, 2001); as residents vote for their preferred urban form characteristics, they create sorting based on these preferences. Nevertheless, we must acknowledge other factors that may be at work and may provide a better explanation of variations in the urban form, such as age of the city and the residents' age, political affiliation, and racial diversity of cities.

Study limitations

Several limitations associated with this research should be considered in interpreting the results. First, I measured the creative class based on the percentage of people employed in occupations related to the super creative core, although Florida (2012a) defined members of the creative class as those employed either in the super creative core or the creative professionals category (see Chapter 3,Table 3.1). I used the super creative core related occupations as a measure because I assumed that these occupations would require more creativity than those classified under creative professionals. A measure of the creative class that includes the professional categories may provide different results; however, different findings are unlikely since the two categories area highly positively correlated (Bereitschaft &Cammack, 2015)

Second, in the study's first phase, I measured the urban form characteristics of "accessibility to commercial uses" and "access to open space" using estimates of housing units for multifamily housing. Because SCAG did not have data on the number of residential units in multifamily housing, I calculated estimates for the entire region. Information for residential units for multifamily housing was available for each county, but for different years, making it inconsistent for the entire region. It is important to acknowledge that the measures used in this study are estimates, and studies focusing on a particular county can use the actual data as deemed necessary.

Third, the structure of the specific plan documents also had its own limitations. I examined only the cities' downtown specific plan documents, and reviewed additional documents (such as specific sections in the zoning ordinance or design guidelines for certain land uses) only if the specific plans made references to them. Therefore, a city may have addressed LEED-ND criteria in the zoning code that were not specifically addressed or indicated in the specific plan I examined. Each specific plan document included a section stating that information unavailable in the specific plan could be collected from the zoning ordinance; however, zoning codes and design guidelines were beyond the scope of this study, unless specific references were made to them. Specific plan documents can be more effective if they include references to required additional documents.

Lastly, I collected data for this study between 2016 and 2018, and performed iterative analysis of the primary data between November 2017 and May 2018. All interviews were conducted at city offices between February 2018 and April 2018. Therefore, these findings are applicable to the period preceding the data collection effort. For instance, city of Redlands is

currently in the process of completely revising its downtown specific plan document, and such changes are not reflected in this study.

Summary of Key Findings

This study's analysis of (1) downtown specific plan development regulations using the LEED-ND rating system as an evaluative framework and (2) existing urban form characteristics using literature related to sustainable urban form in cities that have a higher (or lower) proportion of the creative class provides insights into how the presence of the creative class is associated with sustainability principles reflected in cities' development regulations. The major findings include:

- There was considerable variation in the extent to which cities with a larger proportion of the creative class integrated LEED-ND criteria in the Neighborhood Pattern and Design category. Not all cities with a larger proportion of the creative class were likely to promote development that is well connected, compact and includes a mix of uses and diversity of housing types, except for "access to open space."
- Findings of the study's first phase indicate a positive correlation between proportion of the creative class and "access to open space." Among the studied cities, those with a larger proportion of the creative class had a higher number of housing units with access to open space within a quarter mile radius than those with a lower proportion of the creative class.
- The intent of the LEED-ND criterion "walkability" was strongly promoted across all cities; however there were variations.

- Residents of cities with a larger proportion of the creative class were more active and engaged in the development of the city's built environment than those with a smaller proportion of the creative class.
- The downtown specific plans of cities with a larger proportion of the creative class, strongly addressed more LEED-ND criteria in the GIB category compared with cities with a smaller proportion of the creative class. In particular, cities of Santa Monica and Yorba Linda address more GIB related LEED-ND criteria and to a stronger extent than the remaining six cities.
- All groups addressed smart location and linkage category relatively, similarly, with a little variation in the cities' total scores in this category.
- Some cities' sustainability efforts go beyond the LEED-ND framework that deserve recognition. In particular, Santa Monica has undertaken several measures to promote sustainability. Besides Santa Monica, cities' of Yorba Linda, Hawthorne, Baldwin Park, and Desert Hot Springs have also encouraged efforts beyond LEED-ND to promote sustainability.

Conclusion

Until now, studies have not looked at the association between the presence of the creative class in cities and the promotion of sustainability, particularly through development regulations in the Southern California region. Using the theory of Tiebout Sorting and the creative class as a frame of reference, I have attempted to provide an improved understanding on the extent to which the presence of the creative class in cities is associated with the promotion of sustainability.

I found considerable variation in the promotion of sustainability and the presence of the creative class in cities. In general, cities with a higher proportion of the creative class tended to integrate LEED-ND principles to a greater extent than those with a lower proportion of the creative class, but with considerable variation. Not all cities with a larger proportion of the creative class integrated all 41 LEED-ND criteria, or to a stronger extent, than those with a lower proportion. In general, cities with a larger proportion of the creative class strongly promoted more green infrastructure and buildings-related sustainability principles, although again with considerable variation. In particular, cities of Santa Monica and Yorba Linda address more GIB related LEED-ND criteria and to a stronger extent than the remaining six cities. Cities with a higher proportion of the creative class were more likely to have affluent residents; therefore, these cities were more likely to promote GIB-related LEED-ND criteria which requires more financial resources than the other two LEED-ND categories (NPD and SLL). However, I found mixed evidence regarding neighborhood pattern and design related sustainability principles. Not all cities with a larger proportion of the creative class were likely to promote mix-used and compact development that encourage diversity of housing types.

Regardless of the size of the creative class, findings of this study suggest that cities' downtowns promoted sustainability in various ways, and certain cities were making more efforts than others. For instance, the City of Santa Monica (high in the proportion of the creative class and urban form index) promoted more sustainability principles (LEED-ND criteria) to a stronger extent than the rest of the cities. Yorba Linda downtown regulations (high in the proportion of the creative class and low in urban form index) integrated more LEED-ND criteria, but there was variation in the extent to which they were promoted. In other words, although the plan addressed more sustainability principles, not all principles were promoted to a stronger extent. On the

contrary, the downtown development regulations of Baldwin Park, which ranked low in the proportion of the creative class and low in urban form index, integrated more sustainability principles and to a stronger extent than El Segundo and Redlands, which had a larger proportion of the creative class.

At the same time, findings of this study highlight several areas for improvement. Missed opportunities to promote sustainability lie within those LEED-ND criteria that cities' plans either did not address at all or only weakly addressed. Also, sustainability principles that were moderately addressed imply room for improvement. For instance, most downtown development regulations of the eight cities either weakly or moderately addressed a mix of diverse housing types, which promotes inclusion of affordable housing. With the exception of Santa Monica, El Segundo, Redlands, and Desert Hot Springs weakly integrated the LEED-ND criterion of mixed income diverse communities, while others integrated this criterion to a moderate extent.

Development regulations must strongly address the inclusion of affordable housing as affordability continues to be a major concern for many local governments nationwide, and particularly in California. The dissolution of California's state redevelopment funding in 2012 has made the affordable housing issue more difficult. California state law has had some success in adopting inclusionary housing policies (Basolo & Scally, 2008), but also places limitations on local governments (see Garde, 2016). Additionally, the five county Southern California region is expected to grow by 3.8 million in the next 25 years (SCAG, 2016), further exacerbating the shortage of affordable housing.

In California, local governments offer a combination of financial and regulatory incentives to promote the inclusion of affordable housing. These incentives include but are not limited to density bonuses, fast-track processing of proposed projects, fee reductions, fee

waivers, fee deferrals, and subsidies (Garde, 2016). Local governments that are not able to offer subsidies, should consider offering compensatory benefits, such as design flexibility and fast-track processing, to facilitate affordable housing construction (Garde, 2016). For instance, among other community benefits, the City of Santa Monica provides special incentives to 100% affordable housing projects, including 1) administrative approval for all projects regardless of number of units and 2) height and FAR bonuses. To facilitate affordable housing projects, local governments should offer a combination of financial and regulatory incentives that best fit their cities.

Another missed opportunity is the promotion of building energy efficiency, water energy efficiency, and the promotion of certified green buildings. Cities with a smaller proportion of the creative class could promote more green infrastructure and building-related criteria. For instance, Hawthorne and Huntington Park did not address certified green buildings in their downtown specific plans, while Baldwin Park weakly addressed the promotion of certified green buildings. Additionally, the cities of Redlands and El Segundo, which had a larger proportion of the creative class, also did not address the promotion of certified green buildings. However, this finding should be considered in light of the CALGreen Code, 2017, as discussed below.

The California Buildings Standards Commission (CBSC) adopted the California Green Buildings Standards code, effective in January 2011, in an effort to meet the goals of AB32, which mandated reduction of greenhouse gases (GHG) to 1990 levels by 2020. One of the first statewide mandatory green building standards code, the CALGreen code has been revised and expanded, effective January 2017, to include additions that include water efficiency, clean air vehicles, and electric vehicles charging infrastructure. There is overlap between the CALGreen Code and LEED-ND rating system, although they are not comparable, as they focus on different

scales. The CALGreen code focuses primarily on a building level, whereas the LEED-ND rating system focuses on the neighborhood level, beyond the building scale.

As the CALGreen code is mandatory, developers will be required to improve the sustainability of buildings by implementing measures to improve energy and water efficiency of buildings even though these requirements may not be specifically mentioned in cities' downtown specific plans. Although mandatory, the CALGreen code defines only a minimum standard for sustainability measures (Garde, 2016); therefore, cities should go beyond these base measures and set the bar higher in integrating sustainability principles. For instance, City of Santa Monica encourages builders to achieve a water conservation requirement, defined as 30% below the CALGreen (Title 24) baseline, for interior building water use (City of Santa Monica, 2016). Thus, Santa Monica will always be performing better than the state's base standards.

Additionally, cities should not limit themselves to the sustainability principles of the LEED-ND rating system, regardless of the proportion of the creative class they may have. As described, the findings of this study indicate that certain cities have gone beyond the LEED-ND rating system to promote sustainability. Planners can learn from these best practices and encourage projects that contribute positively to sustainability, based on their own assessments of local conditions (Garde, 2009). In addition, members of the US Green Building Council can glean these best practices and incorporate them into updates of the LEED-ND rating system.

Apart from the integration of the LEED-ND criteria in development regulations, cities can also pay attention to how other cities implement sustainability programs. Cities may vary in how they assign responsibility for implementation of sustainability efforts. Some cities may create a separate department for sustainability; others may add sustainability to the responsibilities of existing departments. For instance, in the City of Santa Monica

implementation of the plan was initially given to the Division of Environmental Programs in the city's Department of Environmental and Public Works Management. But in the mid-2000s, the city recognized that a higher level of accountability was needed and established the separate Office of Sustainability (Portney, 2013). However, this area deserves further study.

Planners can use this study's findings to improve or adopt better versions of development regulations to promote sustainable development. Cities in the process of updating their downtown specific plans can use the strongest examples in this study as best practices. Simultaneously, my research illustrates how some cities have missed important opportunities to strongly promote sustainability principles with regulations more suggestive in nature; the downtown specific plans of Desert Hot Springs and Hawthorne are cases in point.

To expand this work, future research can analyze the variation in the extent to which cities promote sustainability principles reflected in the existing urban form and development regulations of cities based on the variations in the major occupational groups that define the creative class. In this study, I measured the creative class based on the percentage of people employed in occupations related to the super creative core, although Florida (2012a) defined members of the creative class as those employed either in the super creative core or the creative professionals category. Future research can examine the association between the urban form and development regulations and the creative class defined to include both the super creative core and creative professionals. Furthermore, future studies can examine the variations in the existing urban form and development regulations of cities based on the presence of certain set of occupations. For instance, an interesting study could be one that examines the built environment of cities that have a higher proportion of residents in the arts, design, entertainment, sports, and media occupations.

Future research also can analyze other factors, such as the age and racial make-up of cities' populations and their political affiliations, which might explain variations in the promotion of sustainability. For instance, findings from the second phase of this study shed light on the racial makeup of cities, which calls for further examination. Cities with a lower proportion of the creative class, such as Desert Hot Springs and Huntington Park, had a higher percentage of Hispanic population compared with cities with a higher proportion of the creative class. Additionally, the political makeup of cities also calls for further attention. Prior research suggests that political affiliation of cities may influence city decisions on sustainability (Budd, Lovrich, Pierce, & Chamberlain, 2008). Cities that are most likely to vote Democratic pursue sustainability more aggressively (Portney, 2013a). Further studies can examine how the political affiliation of cities could explain variations in the promotion of sustainability.

As cities are trying various measures to promote sustainability, future research can employ an advanced sustainability framework, which includes but is not limited to the recently updated 2018 LEED-ND rating system. Lastly, future studies can examine the influence of statewide regulations on the cities' promotion of sustainability.

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APPENDIX 4.1

11 Land Use Categories

No.	LAND USE CATEGORY	First three digits of SCAG Land Use Code
1	Single family residential	111*
2	Multifamily residential	112*
3	Other types of residential	110*, 113*, 114*, 115*
4	Commercial & Services	120*, 122*, 123*
5	Industrial	130*, 131*, 132*, 133*, 134*
6	TCU Facilities: Transportation, Communication, and Utilities	140*, 141*, 142*, 143*, 144*, 145*, 146*
7	Public Facilities (Government Offices and Schools)	124*, 125*, 126*
8	Mixed Developed	150*, 160*
9	Open space and recreational	180*, 181*, 182*, 183*, 184*, 185*, 186*, 187*, 188*
10	Offices	121*
0	Military	127*
0	Urban vacant and under construction	170*, 190*
0	Agricultural	200*, 210*, 211*, 212*, 220*, 230*, 240*, 250*, 260*, 270*
0	Non-urban Vacant	310*, 320*, 330*, 340*
0	Water and Water Facilities	400*, 410*, 420*, 430*, 440*, 450*
0	Undetermined	0,128*,129*,888*,999*

Note. * = fourth digit of SCAG land use code ranging between 0 -9. SCAG = Southern California Association of Governments. Source: Hipp, J. R., Kim, J. H., & Kane, K. (2017) ; Hipp, J. R., Kim, J. H., & Basolo, V. (2014)

APPENDIX 4.2

List of LEED-ND sustainable design criteria used for coding

Smart location and linkage

SLL C1: Preferred locations

01. Infill, adjacent, or previously developed site

02. Connectivity

03. Designated high-priority affordable location

SLL C2: Brownfield redevelopment

01. Brownfield site

02. Designated high-priority redevelopment area

SLL C3: Locations with reduced auto dependence

01. Transit-served location

02. MPO TAZ w/ low VMT

SLL C4: Bike network and storage

A. Bike network

B. Bike parking/storage

SLL C5: Housing and jobs proximity

01. Include affordable residential component in non-residential

02. Include residential component in non-residential

03. Infill and include non-residential component in residential

SLL C6: Steep slope protection

01. Site w/o slopes or no disturbance

02. Site w/ slopes: previously developed and restore

03. Site w/ slopes: other

SLL C7: Site design for habitat or wetland and water body conservation

01. Site w/o habitat, wetlands, or water bodies

02. Site w/ habitat: survey and no disturbance

03. Site w/ wetlands or water bodies: survey and no disturbance

SLL C8: Restoration of habitat or wetlands and water bodies

A. Restore site to predevelopment conditions

SLL C9: Long-term conservation management of habitat or wetlands and water bodies

A. Long-term conservation plan w/ funding

Neighborhood Pattern and Design Category of LEED-ND

NPD C1: Walkable Street features

A. Minimize setbacks

B. Frequent and proximal functional entries

C. Glass façades for ground-level retail

D. Minimize blank façades

E. Night visibility for ground-level retail

F. On-street parking

G. Wide and continuous sidewalks

H. Elevated ground level residential

I. Active ground level use and direct access

J. 1:3 ratio of building height to street width

K. Reduce street speeds

NPD C2: Compact development

A. Increased density

NPD C3: Mixed-use neighborhood centers

01. Walk distance to diverse uses

02. Clustered diverse uses

03. Regional-serving retail

NPD C4: Mixed-income diverse communities

01. Diverse housing types

02. Affordable housing

03. Mixed-income housing

NPD C5: Reduced parking footprint

A. No new off-street parking lots or locate at rear

B. Minimize footprint for off-street parking

C. Bike parking/storage

D. Include carpool or car-share spaces

NPD C6: Street network

A. Intersections

B. Connectivity

NPD C7: Transit facilities

A. Install transit shelters

B. Survey for future transit stops

C. Display transit information at stops

NPD C8: Transportation demand management

01. Transportation demand management program

02. Transit passes

03. Developer-sponsored transit

04. Walk distance to car-share

05. Unbundled parking

NPD C9: Access to civic and public spaces

A. Walk distance to open space

B. Min open space in large projects

NPD C10: Access to recreation facilities

A. Walk distance to recreation facilities

NPD C11: Visitability and universal design

01. Design residential for diverse abilities

02. Retrofit non-compliant access routes for diverse abilities

NPD C12: Community outreach and involvement

01. Community outreach

02. Charette

03. Local endorsement

NPD C13: Local food production

A. Covenant for growing produce

01. Neighborhood farms and gardens

02. Community-supported agriculture

03. Walk distance to farmers' market

NPD C14: Tree-lined and shaded streets

A. Certify planting details for tree health

01. Tree-lined streets

02. Shaded streets

NPD C15: Neighborhood schools

A. Walk distance to schools

B. School campus size

Green Infrastructure and Buildings Category

GIB C1: Certified green building

01. Max 10 habitable buildings: additional LEED-certified building

02. Projects of all sizes: additional LEED-certified building

GIB C2: Building energy efficiency

A. Min 18-26% energy efficiency: nonresidential and multiunit residential ≥4 stories

B. Min 18-26% energy efficiency: nonresidential and multiunit residential ≤3 stories

GIB C3: Building water efficiency

A. Min 40% water efficiency: nonresidential and multiunit residential ≥4 stories

B. Min 40% water efficiency: nonresidential and multiunit residential ≤3 stories

GIB C4: Water-efficient landscaping

A. Min 50% outdoor water efficiency

GIB C5: Existing building reuse

A. Reuse existing buildings

B. Preserve historic buildings

GIB C6: Historic resource preservation and adaptive reuse

A. Preserve historic buildings

GIB C7: Minimized site disturbance in design and construction

A. Survey for on-site trees and preserve

01. Previously developed site

02. Undeveloped land: no disturbance

GIB C8: Stormwater management

A. Retain on-site rainfall

GIB C9: Heat island reduction

01. Nonroof

02. Roof

03. Mixed nonroof and roof

GIB C10: Solar orientation

01. Min 75% block orientation

02. Min 75% building orientation

GIB C11: On-site renewable energy sources

A. On-site nonpolluting energy generation

GIB C12: District heating and cooling

A. Min 80% energy from district plant

GIB C13: Infrastructure energy efficiency

A. Install new infrastructure for min 15% energy efficiency

GIB C14: Wastewater management

A. Retain and reuse min 25-50% on-site wastewater

GIB C15: Recycled content in infrastructure

A. Use 50% recycled and reclaimed materials

GIB C16: Solid waste management infrastructure

A. Solid waste management and recycling

GIB C17: Light pollution reduction

A. Min 50% motion sensored lights

B. Dusk/dawn sensored exterior lights

C. Minimize light pollution

D. CCR for light pollution

APPENDIX 4.3

University of California, Irvine
Interview Questionnaire
Link between Sustainable Urban Form and the Creative Class: Insights from Southern California
Lead Researcher

Asiya Natekal, Ph.D. Candidate
Planning, Policy and Design
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I thank you in advance for participating in this interview. Are you ready to begin with the interview?

1) What is your role in the department?
2) How long have you been working for this city?

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3) What design principles in your city contribute towards sustainability?
4) Can you describe any examples of how this city is or is not promoting sustainable urban design (e.g. compact development, walkable neighborhoods, multimodal transit, etc.)?
5) Can you describe examples of any other design principles that are promoted or not by the city?
6) What role do residents, if any, play in the promotion of sustainable design principles?
7) Are there any other key actors promoting sustainable design principles for your city?
8) Are there specific sustainable design principles that are prioritized by the residents and why?
9) Can you describe the residents of the community who prioritize these sustainable design principles?
10) Similarly, are there specific sustainable design principles that are opposed by the residents and why?
11) How does the Specific Plan deal with sustainable design if at all? Does the promotion of sustainable design vary across the city?
12) What are the challenges faced while trying to promote sustainable design principles?
13) What recommendations would you have for future specific plans- such as downtown specific plans for promoting or implementing sustainable design principles?

Thank you for your time.

APPENDIX 4.4

Table. 4.1
Average Weighted concordance (AW) scores for eight cities

LEED ND Criteria	SM	ES	YL	RL	HT	HP	BP	DHS
Smart Location and Linkage (SLL)	AW	AW	AW	AW	AW	AW	AW	AW
Preferred locations (10)	**2.15**	1.54	**2.31**	1.54	**2.31**	1.58	**2.24**	1.27
Brownfield redevelopment (2)	0.17	0.00	0.27	0.00	0.00	0.00	0.00	0.00
Locations with reduced auto dependence (7)	1.58	1.13	1.25	0.75	1.86	1.45	1.38	0.90
Bike network and storage (1)	**2.96**	**2.08**	**2.70**	0.63	**2.72**	1.75	**3.04**	1.55
Housing and jobs proximity (3)	1.58	1.08	0.83	0.90	1.36	0.90	1.67	0.87
Steep slope protection (1)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Site design for habitat or wetland and water body conservation (1)	0.00	0.00	0.07	0.17	0.00	0.00	0.00	0.00
Restoration of habitat or wetlands and water bodies (1)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Long-term conservation management of habitat or wetlands and water bodies (1)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Smart Location and Linkage (SLL) Total	**8.44**	**5.83**	**7.42**	**3.98**	**8.25**	**5.68**	**8.33**	**4.58**

Note. AW= average weighted concordance scores. Dark shading indicates AW>2 (strongly reflected); SM = Santa Monica, ES = El Segundo, YL=Yorba Linda, RL = Redlands, HT=Hawthorne, HP=Huntington Park, BP= Baldwin Park, DHS = Desert Hot Springs

Table continues

Table. 4.1 (continued)

Average Weighted concordance (AW) scores for eight cities

LEED ND Criteria	SM	ES	YL	RL	HT	HP	BP	DHS
Neighborhood Pattern and Design (NPD)	AW	AW	AW	AW	AW	AW	AW	AW
Walkable streets (12)	**3.08**	**3.08**	**2.70**	**2.50**	**2.72**	**3.10**	**2.58**	**3.00**
Compact development (6)	**4.00**	1.58	1.00	1.63	1.39	**3.10**	1.08	2.00
Mixed-use neighborhood centers (4)	1.92	1.00	1.03	0.79	0.94	1.10	1.08	1.17
Mixed-income diverse communities (7)	**2.57**	0.07	1.07	0.07	1.64	1.16	0.79	0.43
Reduced parking footprint (1)	**2.25**	1.96	1.78	1.31	0.94	1.58	**2.19**	0.78
Street network (2)	**2.29**	1.50	**2.20**	1.25	**2.44**	1.30	1.79	1.15
Transit facilities (1)	1.50	0.44	1.27	0.00	1.54	1.07	1.25	0.00
Transportation demand management (2)	1.77	1.77	0.56	0.63	0.00	0.30	0.68	0.78
Access to civic and public space (1)	1.83	1.33	1.70	1.56	1.67	1.75	1.79	1.75
Access to recreation facilities (1)	**2.17**	0.00	0.50	0.13	1.11	1.00	1.58	1.50
Visitability and universal design (1)	1.50	0.92	1.35	0.88	1.25	0.55	1.50	1.60
Community outreach and involvement (2)	0.90	0.30	0.78	0.00	0.40	0.30	0.30	0.20
Local food production (1)	1.73	0.60	0.50	0.00	1.04	0.15	0.00	0.60
Tree-lined and shaded streets (2)	1.89	**2.44**	**2.33**	1.46	**2.06**	1.47	**2.28**	1.63
Neighborhood schools (1)	1.00	0.75	0.50	0.38	0.56	0.75	0.50	0.20
Neighborhood Pattern and Design (NPD) Total	**30.40**	**17.76**	**19.27**	**12.57**	**19.70**	**18.67**	**19.40**	**16.78**

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Table continues

Table. 4.1 (continued)
Average Weighted concordance (AW) scores for eight cities

LEED ND Criteria	SM	ES	YL	RL	HT	HP	BP	DHS
Green Infrastructure and Buildings (GIB)	AW	AW	AW	AW	AW	AW	AW	AW
Certified green building (5)	1.00	0.00	0.80	0.00	0.00	0.00	0.08	0.75
Building energy efficiency (2)	1.00	0.00	0.75	0.00	0.22	0.00	0.58	0.75
Building water efficiency (1)	2.00	0.00	1.05	0.00	0.33	0.00	0.00	0.75
Water-efficient landscaping (1)	1.50	**2.75**	**2.30**	1.13	**2.33**	0.20	**3.67**	1.50
Existing building reuse (1)	**2.17**	**2.38**	1.55	**2.88**	1.69	1.50	1.88	0.50
Historic resource preservation and adaptive reuse (1)	**2.50**	**2.67**	**2.30**	**3.38**	1.00	1.60	**2.33**	0.00
Minimized site disturbance in design and construction (1)	1.17	0.00	1.23	1.00	1.11	0.57	1.36	0.34
Storm water management (4)	**4.00**	2.00	**2.80**	1.75	2.00	0.40	**3.17**	1.00
Heat island reduction (1)	1.08	1.11	1.90	1.25	0.50	1.64	1.33	1.83
Solar orientation (1)	0.00	0.00	1.15	0.75	0.00	0.00	0.46	1.00
On-site renewable energy sources (3)	2.00	0.00	0.70	0.50	1.83	0.00	0.25	1.50
District heating and cooling (2)	0.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Infrastructure energy efficiency (1)	1.50	0.00	1.60	0.00	0.00	0.00	0.50	0.00
Wastewater management (2)	**2.83**	1.00	0.20	0.00	1.00	0.00	1.50	1.50
Recycled content in infrastructure (1)	2.00	0.00	1.50	0.00	0.00	0.00	1.08	1.00
Solid waste management infrastructure (1)	2.00	2.00	**2.90**	0.50	1.67	**3.20**	**2.75**	1.70
Light pollution reduction (1)	0.50	0.50	0.98	0.63	0.04	0.43	1.17	0.38
Green Infrastructure and Buildings (GIB) Total	**27.75**	**14.40**	**23.71**	**13.75**	**13.74**	**9.53**	**22.11**	**14.49**
TOTAL	**66.59**	**37.99**	**50.40**	**30.30**	**41.69**	**33.87**	**49.84**	**35.86**

Note. AW= average weighted concordance scores. Dark shading indicates AW>2 (strongly reflected); SM = Santa Monica, ES = El Segundo, YL=Yorba Linda, RL = Redlands, HT=Hawthorne, HP=Huntington Park, BP= Baldwin Park, DHS = Desert Hot Springs