The Rules That Shape Urban Form

Donald L. Elliott, FAICP, Matthew Goebel, AICP, and Chad Meadows, AICP

Donald L. Elliott, FAICP, is a senior consultant in Clarion Associates' Denver office. He is a land-use lawyer and city planner with 25 years of related experience. He has served as project director for major zoning and development code revisions in Detroit; Philadelphia; Winnipeg, Manitoba; Duluth, Minnesota; Kalamazoo, Michigan; and Cedar Rapids, Iowa, as well as in numerous smaller cities and counties throughout the country. He has drafted award-winning land-use regulations for Denver and Aurora, Colorado; Routt County, Colorado; and Pima County, Arizona. Elliott is the author of *A Better Way to Zone* (2008), coauthor of *The Citizen's Guide to Planning* (2009), and the editor of *Colorado Land Planning and Development Law*. Prior to joining Clarion Associates, Elliott served as project director for the Denver Planning and Community Development Office. He holds a master's degree in city and regional planning from the John F. Kennedy School of Government at Harvard University, a law degree from Harvard Law School, and a B.S. in urban and regional planning from Yale University. Elliott is a past president of the Colorado Chapter of APA and a member of the American, Colorado, and Denver bar associations.

Matthew Goebel, AICP, is partner and vice president of Clarion Associates. He works principally in the areas of planning and zoning, growth management, and historic preservation. His projects have included development codes and growth management plans for jurisdictions including Anchorage, Alaska; Buckeye and Oro Valley, Arizona; Pasadena and Sacramento County, California; Englewood, Erie, Lake County, Mesa County, and Pagosa Springs, Colorado; Boise, Idaho; Detroit; Henderson, Nevada; Santa Fe and Silver City, New Mexico; Apex, Cary, Morrisville, and Wake County, North Carolina; Broken Arrow, Oklahoma; Jackson County, Oregon; Beaufort County and Greenville, South Carolina; Arlington, Austin, Irving, and Rowlett, Texas; and Dodge County, Wisconsin. He also has prepared studies of the economic impacts of historic preservation for Michigan and Colorado. Goebel is a coauthor of PAS Report no. 489/490, *Aesthetics, Community Character, and the Law*.

Chad Meadows, AICP, a senior associate in Clarion Associates' office in Chapel Hill, North Carolina, is a planner with over 10 years' experience in public- and private-sector planning. Prior to joining Clarion Associates, Meadows oversaw the land development ordinance update in Cary, North Carolina, worked on growth management issues in Monroe County, Florida, and worked in the telecommunications industry. Meadows holds a master's degree in urban and regional planning from Portland State University and a B.A. in geography from the University of North Carolina–Greensboro. Meadows chairs the Raleigh, North Carolina, Appearance Commission.

Cover design by Lisa Barton; this report is printed on recyclable paper.

Cover image: In downtown Denver, offices, shops, and restaurants are close to home.
Image by Jesse Goff

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Introduction

Ever since New York City adopted its pioneering zoning ordinance in 1916, the field of land-use regulation has been evolving and affecting the physical form of urban development in a variety of ways. Before World War II, the pace of change was relatively slow. As cities gained experience in separating uses and managing densities, they found ways to better tailor zoning to neighborhood character. A single commercial district became several to accommodate different sizes and intensities of commercial activities. Residential districts proliferated to match different types and scales of homes and apartments. While early zoning systems were fundamentally grounded in separation of uses, most ordinances also addressed the form of new buildings in very general ways. Often, the starting point was 19th-century "light and air" requirements that prevented buildings from being built up to each lot line.

Most early zoning districts implicitly defined an "invisible box" through a combination of front, side, and rear setbacks and maximum heights within which buildings had to be located. In addition, many ordinances established different minimum lot sizes or lot widths that determined the permitted pattern of development in that area. As residential, commercial, and industrial districts proliferated, the combinations of invisible boxes and their closeness or separation grew more complex. The system only worked to control maximum sizes; you could always build a much narrower, shorter, or smaller building than you were allowed to, or one that was much farther from the street than you had to, even if it appeared out of place beside neighboring buildings. You could also buy a bigger lot (or two lots) so that there was more space between you and your neighbors, even if that spacing was not consistent with its surroundings.

These setback and height rules were designed to prevent a perceived evil—overcrowding your neighbors—rather than to create consistency. But they often did create consistency along the way, because (at least in residential subdivisions) many buyers or builders did size and site their houses similarly. (Just at look at any prewar suburb.) These regulations, with their predominant focus on the separation of land uses and invisible box designations, came to be called "Euclidean" zoning after they were upheld by the U.S. Supreme Court in the landmark 1926 case *Village of Euclid v. Ambler Realty* (272 U.S. 365).

As auto ownership grew more prevalent in the latter half of the 20th century, planners added parking standards to zoning codes. This often resulted in further separation of buildings and increased distances from streets because the unbuilt portions of each lot now had to accommodate parking spaces and driveways as well as building setbacks. Minimum off-street parking standards were adopted to avoid street congestion, but they also had a powerful effect on the form of development, as many critics have noted. In *Edge City*, a 1991 analysis of peripheral business centers, Joel Garreau noted that suburban developers often determined building forms only after laying out sites to accommodate required parking areas and auto circulation lanes. The land left over was where they put the buildings (Garreau 1991).

PLANNED UNIT DEVELOPMENTS AND PERFORMANCE ZONING

The dominance of the automobile after World War II and its effect on urban form has been well documented. There were also several important zoning innovations between 1950 and 2000 that influenced urban form.

The first innovation was the increasing prevalence of planned unit developments (PUDs) beginning in the late 1950s. PUDs made it legal to disregard the invisible boxes and the minimum lot sizes assigned to the land and instead negotiate zoning parameters that met the needs of the building(s) you wanted to build. Minimum setbacks might be reduced, building heights increased, and minimum lot sizes decreased. In return for this added flexibility, the local government could require a better design or more public amenities, and many of them asked for more open space (at private expense). Although the main effect of PUDs was to reduce the predictability of urban form—if your neighbor negotiated a PUD almost anything could happen on the lot next to yours—they also often tended to create collective open spaces where they might not otherwise occur. Private open space was achieved not by increasing setbacks on each lot but by requiring applicants to set aside large open spaces, separating PUD sites into clusters of buildings on part of the site and open space on the rest.

Today, one of the largest PUDs in the country is Highlands Ranch on the southern edge of the Denver metropolitan area, which combines 36,000 dwelling units on 16,000 acres at the north end of the site and 8,200 acres

of preserved open space on the south. This is dramatically distinct from the "boxes on lots" that the developer could have built under traditional zoning. Not all PUDs have talented master planners, however. While good developers tend to site open space to protect habitat or natural resources or views, less-skilled developers site it to include floodplains or bad soils or to act as a thin band around the development perimeter separating the site from its neighbors. Careful jurisdictions require the more conscientious practice, helping to better integrate the PUD within the larger development context.

A second zoning innovation in the latter half of the century that had a significant impact on urban form was performance zoning, which allowed an applicant to disregard the invisible box if an alternative building location or site configuration would mitigate any adverse impacts (noise, odor, vibration, traffic, glare, etc.) on its neighbors. If large building setbacks were required in a heavy industrial area because of fears that noise and glare would affect neighboring properties, an applicant could demonstrate that a proposed plant would not use technologies that produced noise or glare, and the setbacks could be reduced without requiring a rezoning or a variance. The same approach was sometimes used in small-scale commercial and residential development, but less often. Performance zoning required a community to have planners trained to measure the listed impacts (such as glare or vibration) and to buy and maintain the equipment necessary to measure compliance.

As with PUDs, the impact of performance zoning was to make the physical forms of development more varied and less predictable. The building setbacks and height limits written in the zoning code for a particular district could be altered (and in some cases the code did not contain numbers at all), so the sizes and locations of future buildings could not be predicted and often depended on who bought the land and for what specific purpose. Performance zoning could also allow landowners to construct more building mass (which meant less open space) on a parcel of land. Importantly, most local governments that adopted PUDs or performance zoning tools did not abandon old-style Euclidean zoning; they just made the new tools available as alternatives on a case-by-case basis, and many zoning codes still offer these alternatives today.

While Euclidean zoning was successful at separating uses, its control of urban form was imperfect and often unpredictable. Zoning codes were designed to prevent a specific outcome—the overcrowding of lots and streets—but they did not establish the maximum lot sizes, build-to-lines, or minimum heights that would have promoted more uniform and predictable design. Sometimes Euclidean zoning regulations were supplemented with design standards and guidelines that helped to address some aspects of urban form, but these often were structured as freestanding documents located outside the code itself, and typically addressed special areas like downtowns and historic districts rather than entire communities. After World War II, PUDs and performance zoning further eroded the predictability of urban form by making even the minimums and maximums in the code more easily adjustable. Little wonder that few think of more "traditional" zoning codes—Euclidean zoning, PUDs, or performance zoning—as having form controls. Nevertheless, these regulations had significant impacts on urban form, as nearly every critic of postwar auto-oriented development has pointed out.

FORM-BASED ZONING

The 1990s and 2000s brought another major round of innovation to zoning practice, this time intended specifically to address and improve urban form by making it more human-scaled and pedestrian-oriented and by better

establishing meaningful senses of place. Form-based zoning focused on how to create predictable development patterns and how to make permitted buildings "fit" better with their neighbors and with a community's plan for how an area should develop.

Unlike PUDs and performance zoning, which were promoted by property owners and development interests, the initial forces behind form-based zoning were primarily architects and urban designers who believed that planners failed to recognize the importance of tradition and design in creating attractive and sustainable urban places. The ideas behind form-based zoning are often traced to architect Christopher Alexander's influential book *A Pattern Language: Towns, Buildings, Construction* (Alexander et al. 1977). In the 1990s, early proponents of specific form-based zoning alternatives included Peter Calthorpe, Victor Dover, and the husband-and-wife team of Andres Duany and Elizabeth Plater-Zyberk—all architects. Architects and urban designers continue to play major roles in supporting organizations such as the Form-Based Codes Institute (www.formbased codes.org), which provides educational training and functions as an information clearinghouse for form-based zoning case studies and best-practices research.
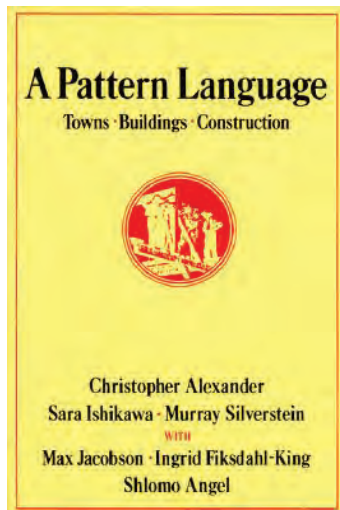
Key Elements of Form-Based Zoning

Under the auspices of form-based zoning, architects and urban designers found many opportunities to expand the universe of zoning controls in order to improve urban design and create more walkable, attractive communities. Issues ripe for regulation under the new zoning controls included:

- The relationship of buildings to the street, the sidewalk, and other public rights-of-way;
- The massing, shape, and orientation of buildings;
- Roof shape;
- Facade materials and details;
- The placements and shapes of windows and doors;
- Step-backs of upper floors from street frontages and step-downs of building height near lower-scale development; and
- The location of parking areas on the site.

The list grew longer as successive architects and planners experimented and learned what worked and what did not and as the first-generation form-based approaches were tested and followed by more finely tuned and detailed successors. In some cases, form-based zoning stayed very basic, setting limits on how much the invisible box could be shrunk or moved on a site, but in other cases it expanded into areas of control that were relatively new to zoning, such as building designs that avoid creating wind tunnels or tower shapes that limit and manage shadowing of adjacent properties. From the movement's inception, pedestrian-friendly building orientation and design has been a principal focus in all form-based codes.

The first step in developing form-based standards is to physically survey the area. Architects and designers measure "as-built" building dimensions, curb cuts, sidewalk widths, distances of buildings from the street or from opposing building facades, second-story step-backs, window heights, and other physical features. Often, the goal of new form-based standards is to replicate the successful features of "traditional" neighborhoods. New zoning standards are created to maintain and replicate those existing physical features considered most desirable for walkable urbanism or, if the current landscape does not fit the model of a healthy traditional neighborhood or Main Street, to establish new and better features and patterns.

The development standards for a particular area may also be codified in a regulating plan that links specific zoning standards to precise locations on a map, effectively tailoring standards on a parcel-by-parcel basis. For example, blocks or parcels designated on the regulating plan for higher-intensity mixed use development might be tied to standards with build-to lines and minimum height requirements, while areas intended for less-intensive development might require deeper front setbacks and more open space. Regulating plans are generally used when the ordinance is not sufficient on its own to create the intended urban environment and a map is needed to direct development to fulfill the intended vision.

Many form-based codes describe new requirements for appropriate building forms primarily through graphics rather than text. It is much simpler to illuminate the long list of building-shape elements regulated by form-based controls through pictures. Minimum and maximum setbacks and heights, areas where parking is allowed, window and door requirements, and facade articulation requirements are among those building elements that can be communicated to the public more easily through drawings. Indeed, form-based codes have had a breakthrough impact in their use of graphics to illustrate zoning standards. In earlier codes, images were typically included in zoning documents merely to serve as attractive illustrations. More recently, there has been a general belief that all form-based codes use graphic depictions of building types and requirements, and that any code that uses graphic depictions of building types and requirements is a form-based code. Neither is true, though illustrations have now become the preferred means of communicating zoning requirements to the public. Form-based zoning can take most of the credit for that step forward.

Emphasis on Predictability

The introduction of form-based zoning acted as a counterweight to the earlier trend toward site-specific flexibility embodied in PUDs and performance zoning, forcing zoning systems to become more predictable. To begin with, that meant setting minimum building heights and maximum building setbacks (and often maximum lot sizes) to better define the basic scale of the building. You could no longer build a single-story bungalow in a residential district of two-story homes, because the form-based code required a two-story structure. And you could not put your house on the back of the lot (at the rear setback line) when all your neighbors had built theirs at the front setback line.

At the same time, form-based zoning theory called for more flexible approaches to building *use* because it may change over time (many old factories are now residential lofts) and neighborhood vitality can be stifled by overly strict use controls. Often the most interesting areas of a city contain mixed use buildings, which contain both residential and nonresidential uses. By the 1990s and 2000s, many cities with more traditional zoning codes had also come to the conclusion that permitted uses were being micromanaged and more flexibility on uses was in order. Long lists of narrowly defined uses were replaced by shorter, more general lists, and many cities adopted mixed use zoning districts. The trend toward more flexible use controls appears to be an idea whose time has come, regardless of the type of zoning being used.

In practice, however, the implementation of more flexible use controls sometimes faces opposition from those who value predictability over flexibility. That often includes representatives of residential neighborhoods, where the idea of your neighbor's house being used for anything but household living can be threatening (no matter how well it may be designed). Most of the success in adopting more flexible use controls has therefore occurred in multifamily, commercial, industrial, and mixed use districts.

Form-Based Zoning Templates

Form-based zoning approaches soon became associated with several innovative templates that could be used to realize this new regulatory strategy of more predictable dimensional controls complemented by more flexible use controls. In 1989, Douglas Kelbaugh, Peter Calthorpe, and others collaborated on *The Pedestrian Pocket Book*, a specific design for a relatively dense, walkable neighborhood organized around a transit station (Kelbaugh 1989). The idea of creating templates for plans and regulations that would promote mixed use, walkable, urban development gained significant momentum with the founding of the Congress for the New Urbanism (CNU) in 1993. Cofounders included Peter Calthorpe, Andrés Duany, Elizabeth Moule, Elizabeth Plater-Zyberk, Stefanos Polyzoides, and Dan Solomon, along with first executive director Peter Katz. The CNU Charter states that "neighborhoods should be diverse in use and population; communities should be designed for the pedestrian and transit as well as the car; cities and towns should be shaped by physically defined and universally accessible public spaces and community institutions; urban places should be framed by architecture and landscape design that celebrate local history, climate, ecology, and building practice." In 2001, Brian Ohm, James LaGro Jr., and Chuck Strawser at the University of Wisconsin (together with Duany, Plater-Zyberk, and other professionals) released a model ordinance for a Traditional Neighborhood District (TND). TND is designed to allow small houses on small lots with consistent street frontages that mimic the feel and function of prewar urban neighborhoods rather than those of postwar suburbs.

In 2003, Duany, Plater-Zyberk, and their firm, DPZ, released the initial version of the SmartCode, a model form-based zoning code that can be tailored to address everything from rural areas and open space to very dense urban areas. At the urban end of the spectrum, it promotes the kind of mixed use, walkable urban development advocated by CNU.

The SmartCode is firmly grounded in the concept of the "urban-rural transect," a typology that characterizes land along a continuum of seven distinct categories (transects) based on the character of the land or its distance from an urban core (Figure 1.1). The progression of transects is as follows:

- Transect 1 (T1): Rural Preserve—land that is and should remain undeveloped;

- Transect 2 (T2): Rural Reserve—land to be used primarily for agriculture and very low-intensity rural uses;

T1 NATURAL ZONE   T2 RURAL ZONE   T3 SUB-URBAN ZONE   T4 GENE[RAL] ZONE
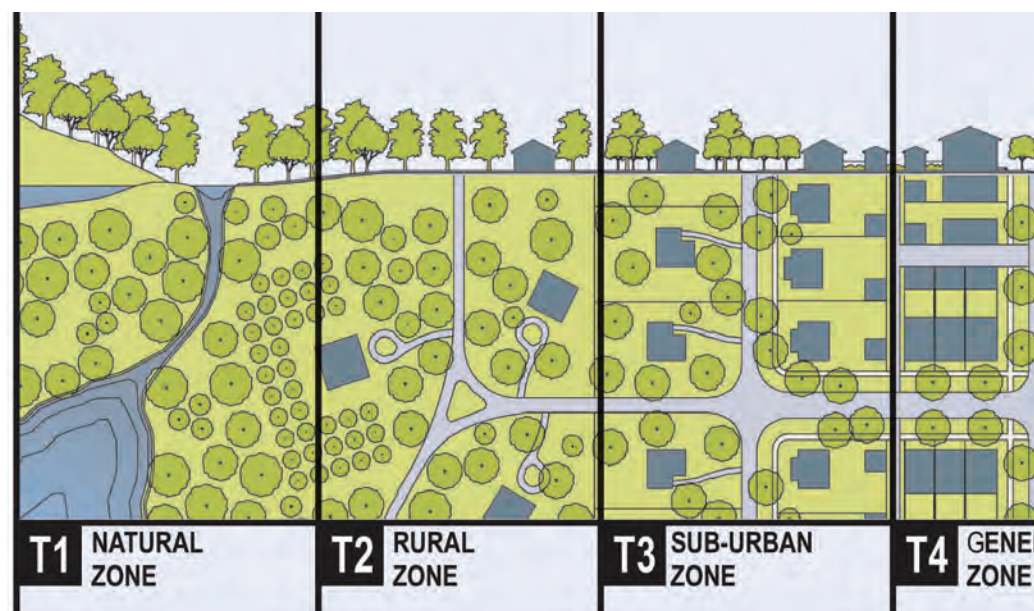
- Transect 3 (T3): Suburban—low- to medium-density residential areas, the predominant form of most postwar residential development in the United States;

- Transect 4 (T4): General Urban—characteristic of much prewar housing and related neighborhood uses;

- Transect 5 (T5): Urban Center—multifamily and mixed use areas of higher intensity;

- Transect 6 (T6): Urban Core—generally limited to the downtown area; and

- Special Districts: Airports, stadiums, and other hard-to-generalize areas deserving separate treatment not primarily based on intensity or form.

The urban-rural transect is discussed in more detail in Chapter 2 in connection with the Miami 21 zoning code.

Transect theory holds that, for each transect area, there are typologies reflecting preferred scales of development, types of buildings, and relationships among buildings and streets and that planning, subdivision, and zoning should be based on those typologies. In the Smart Code, residential, lodging, office, and retail uses are addressed as general categories that are allowed on an "open," "limited," or "restricted" basis in five of the six transects, without distinctions between different types of retail use. This reflects a prescriptive rather than a prohibitive approach to zoning; it articulates how development must be structured, rather than focusing on what may not be done. Instead of saying "You cannot build higher or wider than the invisible box," it says, "The building must fill the invisible box and contain these features."

The visual image of the transect has become instantly recognizable to planners and planning students, and has been the foundation of much work aimed at encouraging different levels of urbanization in different kinds of areas. Transect terminology has made its way into many plans and into some zoning ordinances (including the Livermore, California, and Miami examples discussed in Chapter 2), though transect-based thinking or planning is not explicitly reflected in all form-based zoning ordinances.

Some claim that only codes based on the transect, the SmartCode, or a similar visual template can truly be considered form-based zoning. But in reality, form-based controls have been enacted in a variety of ways, some of
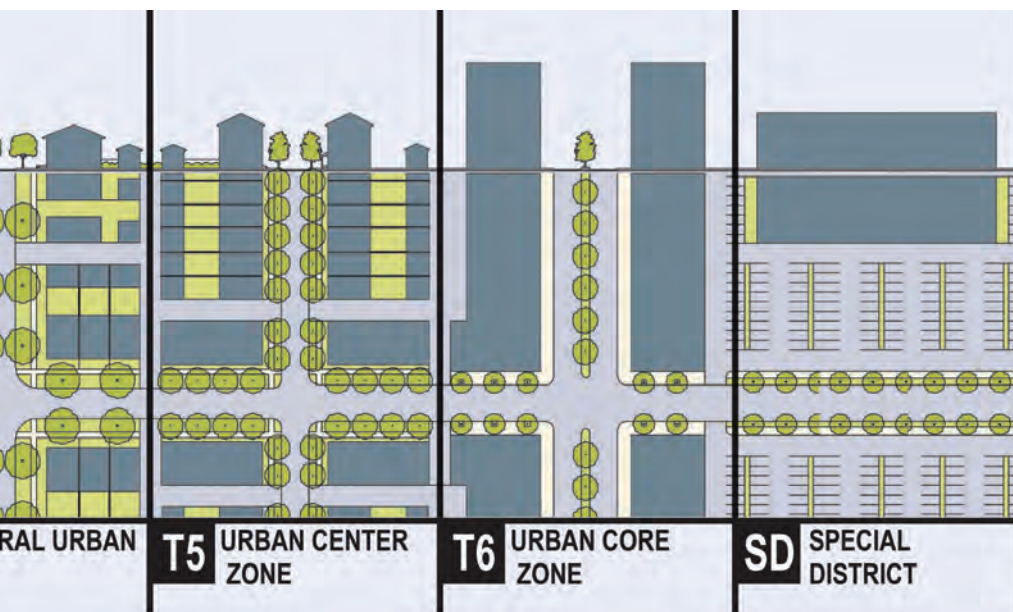
Figure 1.1. *The Transect*

Duany Plater-Zyberk and Company

them grounded in the transect and SmartCode templates and some not. For example, the same year that the SmartCode was published, Louisville and surrounding Jefferson County, Kentucky, adopted a series of 11 form-based overlay districts tailoring underlying zoning regulations to reflect six "traditional" and five "suburban" character contexts. Yet that ground-breaking effort was not based on either the urban transect or the SmartCode.

The way in which zoning controls are conceived and the ways that they are implemented continue to evolve, with effects on not only the form of individual buildings but on the urban fabric generally. While the basics of zoning tools changed only moderately between 1945 and 1990, they are changing more rapidly today—and the more visually engaging and nuanced templates of form-based zoning are part of that trend. Zoning has long influenced urban form, but we are just beginning to understand how deeply zoning's influence runs, and we are still only beginning to develop a range of new tools designed specifically to control urban form, especially when high-quality, walkable urbanism is the goal.

GOALS AND ORGANIZATION OF THIS REPORT

This report describes and explores a series of different ways in which zoning controls are being used to shape urban form. It also examines the effectiveness of form-based controls in addressing broader planning challenges facing communities in the 21st century.

Illustrating the Range of Form-Based Controls

The first purpose of this report is to review the many ways that form-based controls are being used today and the results of those different approaches both on the ground and in the planning office. In Chapter 2, we highlight six U.S. cities that have moved from pre-1990 codes to incorporate form-based controls; determine whether and how each approach has changed the urban form in that community; and review each city's experience in administering its form controls (did it make life easier, harder, or just change the details of zoning administration?).

Our intent is to illustrate points on a continuum of form-based approaches, from examples that rely primarily on traditional Euclidean, PUD, and performance-based models with only light applications of form-based theory, to the opposite extreme: examples that show a heavy reliance on form-based theory as illustrated by some of the most recent, cutting-edge, and comprehensive form-based approaches. The six cities reviewed are Austin, Texas; Mooresville, North Carolina; Denver; Arlington County, Virginia; Livermore, California; and Miami. Their approaches to form-based controls run the gamut from minor injections of specific building controls into an otherwise Euclidean code to a close approximation of the SmartCode.

Understanding Form-Based Zoning Controls in the Larger Planning Context

The second purpose of this report is to place the trend toward form-based zoning in the broader context of other important challenges facing planners. Plans and regulations are often developed to address a single issue or area—for example, a plan for revitalization of Main Street, a code amendment to accommodate wireless telecommunication towers, a neighborhood plan, or zoning for a light-rail station area. But the world is not so easily compartmentalized. Plans and regulations in one area have consequences for other areas and other types of facilities. Planners have to integrate recommendations on multiple topics or at least be aware of the unintended consequences of not doing so.

The movement toward creative use of form-based zoning controls is occurring while many other trends are challenging the planning profession. In Chapter 3, we examine the following four trends:

1. *Sustainability.* Communities throughout the nation are looking for ways to use zoning tools to reduce carbon emissions, conserve energy, conserve water, promote local food production, and create more resilient cities.

2. *Demographic Changes.* America is aging and becoming more diverse, which has implications for the types of housing and community facilities we will need in the future.

3. *Housing Affordability.* For several decades now, average housing prices have risen faster than average wages, and zoning needs to respond by allowing construction of housing that more of our population can afford to rent or buy.

4. *Historic Preservation.* There is a long tradition of preserving the historic character of areas with distinct histories through the use of additional development controls.

Form-based zoning must be evaluated not only by whether it is more efficient, effective, understandable, and administrable than the zoning controls it replaces but also by whether it helps or hinders planners in addressing each of these four trends. More specifically, we explore:

- What aspects of form-based zoning support creative planning and zoning solutions for addressing those trends;

- What aspects may make it harder to address those trends; and

- What aspects of form-based zoning have impacts no different than those of the more traditional zoning tools they replace.

One of the key premises of this report is that there are many different approaches to form-based zoning: not just different parameters (25-foot versus 35-foot step-backs) but significant philosophical differences regarding what elements of form need to be regulated at all. Depending on which source you consult, form-based zoning must include some elements and might include others—and the sources do not agree on what those elements are. To perform the analysis in Chapter 2 and to measure whether form-based controls help or hinder planners in addressing the four major planning trends discussed in Chapter 3, we have developed some common benchmarks. Rather than try to define form-based zoning, we focused on those elements of form-based theory and practice that most distinguish it from the more traditional zoning currently used in most communities. Each of these form-based elements could be integrated into an ordinance at varying levels of intensity, ranging from modest additions of form-based theory to all-encompassing attempts to impose major change from traditional zoning practices.

We selected six distinguishing elements of form-based theory and practice:

1. *Building Types.* These are drawings and standards that define different typical building types by name (e.g., "bungalow" or "corridor commercial building") or that include building requirements derived from a particular type of existing or desired building, rather than an invisible box. One basic approach to defining allowable building types in a community is to integrate a handful of allowed types into a traditional list of allowed uses, as is done in Mooresville, North Carolina. At the other end of the spectrum, a community might use building types as the central organizing principle behind a form-based code. Some communities do not identify and name specific types of buildings but impose standards

that force the shapes of the buildings to better fit their contexts in various ways. We acknowledge those efforts in the Chapter 2 case studies while distinguishing them from the formal building types supported by form-based theory.

2. *Frontage Types.* These are drawings and standards that address in detail the design of the front of a building and how it relates to the street. Just as in the case of building types, some communities define or name different frontage types (e.g., "arcade" or "shopfront"), while others instead impose standards that in practice force the building frontage to look and relate to the street in certain ways. While a frontage-type approach generally involves detailed measurements of sidewalk layouts, tree lawns, and requirements for stoops, porches, or arcades, a simpler approach might be a requirement that buildings in commercial zones have entrances facing the street and facades located no more than 10 feet from the street. Again, in Chapter 2 we acknowledge frontage standards while distinguishing them from the formal frontage types called for in template-driven form-based models.

3. *Public Space Standards.* These include drawings and standards that address in significant detail the possible or required designs and locations of sidewalks, streets, parks, squares, open spaces, and other public areas (topics that older forms of zoning often leave to public works regulations outside of the zoning ordinance). A simple approach to addressing public space standards in a form-based code is to require that multifamily or commercial buildings over a certain size include a plaza, patio, or sitting area of at least a minimum size. More complex examples included in some form-based templates include requirements that specifically defined types of open space (park, plaza, town green, or pocket park) be provided, along with a set of street cross sections with specific dimensions for driving lanes, medians, parking lanes, and bicycle lanes or tracks, as well as requirements for the siting of prominent or civic buildings adjacent to these areas.

4. *Block and Subdivision Standards.* While block and subdivision standards have long been addressed in traditional zoning or subdivision controls, form-based approaches emphasize their importance in creating a more walkable urban fabric by addressing the maximum size or dimensions of blocks and regular street frameworks. Simple form-based controls include a maximum block length, street spacing requirement, or requirements for midblock pedestrian connections on longer blocks; more complex examples include maximum block-perimeter requirements and graphic illustrations of permissible street and alley patterns. Since much urban land has already been platted and streets constructed, the application of block and subdivision standards to already developed areas could require that the land be resubdivided to meet these standards.

5. *Regulating Plans.* These are drawings and sometimes text that lay out the detailed arrangement of lots, blocks, and building types for a specific multilot or multiblock area or requirements that a property owner create that type of document as part of the form-based zoning approval process. A regulating plan might be somewhat flexible, taking a "generalized area" or "bubble" approach to assign general development characteristics to relatively large areas and allowing individual development decisions to be made by property owners within set parameters. Or it might be highly detailed, specifying development parameters on a lot-by-lot basis with little opportunity for deviations from the plan by individual property owners.

6. *By-Right Development.* These are procedures that allow development that complies with the form-based standards to proceed by right, without public hearings and discretionary approvals, in order to expedite the desired form of development. Some form-based codes sidestep the administration question and defer to the regular development procedures elsewhere in the code. On the other end of the spectrum, some form-based codes establish significantly streamlined procedures intended to accelerate the development of projects that comply with the form-based standards (e.g., by eliminating public meeting requirements and discretionary decisions). Most systems fall somewhere in the middle of this spectrum; even cities and counties that move most development to a by-right system require other types of development approvals to go through some type of hearing or discretionary review.

As the case studies in Chapter 2 demonstrate, not all form-based zoning systems include all six of these elements. Some systems have many more elements, and some cities adopted some of these elements before they moved to a form-based zoning system. For each of the six case studies in Chapter 2, we determine which of these distinguishing elements of form-based zoning were included and what impacts those controls have had on buildings and urban form. In Chapter 3 we evaluate how each of these elements helps or hinders planners' attempts to address other planning and zoning trends facing the country. In Chapter 4 we offer conclusions on the usefulness of the various form-based approaches discussed in this report and provide some suggestions for those considering use of form-based regulations.

The Wide Range of
Form Controls

This chapter highlights six case studies of how form controls have been incorporated into zoning ordinances, beginning with the simplest (those on the "light" end of the form-based theory continuum) and ending with the most complete form-based code (the "heavy" end of the spectrum). For each, we review the background of the community, the details of the regulations themselves, the community's experience adopting and administering (and sometimes amending) those controls, how much development has taken place under the regulations, how the form-based regulations influenced those developments, and the lessons learned to date. The six cities we examine in this chapter are Austin, Texas; Mooresville, North Carolina; Denver; Arlington County, Virginia; Livermore, California; and Miami.

► **FORM STANDARDS INSERTED INTO EUCLIDEAN DISTRICTS: NONRESIDENTIAL DESIGN AND MIXED USE STANDARDS IN AUSTIN, TEXAS**

Many communities find the urban design goals of form-based controls compelling but do not want to create specific zone districts or regulating plans to apply those controls. Or they may not have the resources or political will to undertake a comprehensive zoning revision to integrate an ambitious form-based approach. Instead, they adopt discrete form-based tools (often including build-to lines, contextual height and setback controls, parking lot location controls, or building massing controls) and apply them in existing Euclidean districts. One example of this approach is the new citywide nonresidential design standards and mixed use districts created by Austin, Texas, in 2006. The project involved layering form-based tools onto the city's Euclidean use-based districts to create standards that focus specifically on how buildings relate to their context.

Background

The capital of Texas and home to the 50,000-student flagship campus of the University of Texas, Austin has grown in recent decades from a college town into a thriving, high-tech urban center. In the early to mid-1990s, the city experienced a tremendous economic boom led by locally based Dell Computer and more than 800 other high-tech companies, including IBM, Motorola, and Apple. High-paying jobs—as well as the area's natural beauty, parks, laid-back lifestyle, and strong schools and universities—attracted new residents from across the country. Between 1990 and 2000, Austin's population grew from 465,000 to over 650,000. Much of the new growth and development spread into the rolling, rugged hills of west Austin and Travis County, home to several endangered species and a sensitive aquifer. In the late 1990s, growth abruptly stopped with the nationwide bust in the high-tech industry. A steady recovery began around 2005 and continues today, though slowed somewhat by the 2008 recession. Austin's 2010 population was 790,390 in a metropolitan area of over 1.7 million people.

Austin has for many years enjoyed a "progressive" reputation among planners, but the term is relative in Texas, which is known for its conservative land-use policies. The predecessor to Austin's new 2012 citywide comprehensive plan was written in the 1970s and had long been considered out of date by local officials, staff, and the public. The city did not undertake a complete revision because of budget limitations and the challenges of getting new land use policies adopted in a highly educated, vocal, and often polarized community. Instead, the city prepared multiple neighborhood plans. In 2010, recognizing that major planning policies needed updating and realizing that a citywide approach was necessary, the city changed course and embarked on the development of a new plan, Imagine Austin, which was adopted in the spring of 2012.

Similarly, the Austin zoning code had not been comprehensively updated or significantly revised for many years prior to the mid-2000s. Contentious local politics and sometimes-fierce debates over issues such as water quality, higher-density development, and growth on the suburban fringe made it difficult to update the code to keep pace with current planning trends and changing development conditions. Instead, as in many other big cities, the code evolved on a piecemeal basis as neighborhoods worked with city officials to craft tailored zoning policies for themselves.

For many years, the optional planned unit development process was used more frequently than the standard subdivision process for large developments. The flexibility of the PUD tool made it attractive to developers searching for creative site design and to city staff looking to impose stronger open space and natural-resource protection standards than were otherwise

available in the code. The code itself did not allow much tailoring to specific site attributes, which resulted in frequent variance requests.

The exploration of form-based tools in Austin evolved over time as local officials and residents recognized that the existing code did little to ensure that new development reflected and responded to its location within the city. For example, a commercial development in a suburban location should ideally look and function differently than a commercial development in downtown Austin, but the existing regulations often resulted in the two projects looking exactly the same—the same broad expanses of parking, the same wide landscape buffers, the same uniform corporate architecture set far back from the street. Generic (usually suburban) development patterns popping up in the urban core upset Austin residents, who pride themselves on their uniqueness. They wanted development in the central city to maintain the distinctive look and feel of existing urban neighborhoods rather than feel suburban or corporate.

Frustrated with the city's outdated regulations and the poor design of new buildings, Austin city council member Brewster McCracken initiated an effort in early 2004 to work with a broad array of business and citizen stakeholders to raise the bar for building design in Austin. The full city council endorsed the effort in February 2004, directing the city manager by resolution "to prepare recommendations for citywide design standards for commercial and retail development. These … standards shall constitute the best practices of the standards adopted by communities around the nation and shall require design standards that reflect Austin's unique historic, landscape and architectural character" (City of Austin Design Standards Task Force 2005).

McCracken and a task force met over several months to consider research and input from the public, various stakeholder groups, and individuals. The task force first sought to understand the preferences of Austin citizens and the design regulations of other cities. Following a public hearing in May 2005, the city council approved the task force's report, "Raising the Design Standards in Austin, Texas," and forwarded it to the city manager for implementation. The intent was to develop regulations that would foster a built environment of aesthetic and sustainable value, enhance economic development efforts, and promote Austin's special character and natural environment. The report identified nine topic areas, including development orientation and parking, where regulatory improvements were necessary, providing discussions of the issues and recommending general approaches for new standards. Some of these approaches (like mandatory build-to lines) would be new for Austin, while others would simply require amending existing standards in the city code.

Throughout 2005 and 2006, city staff worked with a consulting team to turn the task force report into a user-friendly, legally enforceable ordinance that would reference and complement the Austin code while being easier to use and understand. Staff and the consultants conducted a testing workshop to apply the proposed standards to several recently approved projects to understand what changes (if any) would be required to bring them into compliance with the new standards. After final revisions, the new standards were adopted in August 2006 and became effective in early 2007.

The Regulations

The key features of Austin's approach to form-based controls are summarized in Table 2.1. Rather than rewrite the existing code, staff prepared the new design standards as a freestanding ordinance, in part so it could be made more user-friendly than the existing regulations by incorporating illustrations, summary tables, and improved organization and formatting.

Also, because of the unusual complexity of the existing code, a separate document was thought to be the simplest and most effective way to introduce a new body of regulations. The adopted ordinance is officially known as Subchapter E of Chapter 25-2 of the City Code; an introductory section ("How to Use This Subchapter") summarizes the six articles of the document and provides assistance on how to find the relevant standards for a new project.

Table 2.1. *Austin, Texas, design standards*

Form-Based Tools	Design Standards
Building Types	Yes—for vertical mixed use buildings
Frontage Types	No—keyed according to adjacent street type
Public Space Standards	Yes—streetscape standards, and also private common open-space standards
Block and Subdivision Standards	Yes—connectivity standards for large sites of five acres or more
Regulating Plans	No
By-Right Development	No significant change

First and foremost, Austin officials wanted an ordinance that required site and building design for new development to be tailored by context—for example, a chain restaurant in a suburban greenfield development should be designed differently than that same restaurant placed on a dense urban-infill site. Since roads provide access to each site and also define the urban design framework of the city, roadway types were selected as the organizational framework for most of the new standards. This approach was intended to help establish a cohesive development pattern along Austin's streets and remove some of the inconsistency that arises from having a variety of zoning districts fronting a single roadway. (See Figure 2.1.) The following five different types of roadways are identified in the ordinance:

- Core Transit Corridors include roadways that have or will have a sufficient population density, mix of uses, and transit facilities to encourage and support transit use. Existing Core Transit Corridors are defined and shown on a map. Additional Core Transit Corridors may be designated in the future through neighborhood planning processes.

- Hill Country Roadways are major roads on the outskirts of the city, mostly in the "hilly" western areas. Standards that reference the Hill County Roadway designation apply to all properties within 1,000 feet of these roadways.

- Highways include all freeways, parkways, expressways, and frontage roads identified in the Austin Area Metropolitan Transportation Plan, except for Core Transit Corridors.

- Internal Circulation Routes are public streets or private drives edged by a curb within a development.

- Suburban Roadways are roads outside a central urban roadway boundary that are not Core Transit, Hill Country, or Highway Roadways.
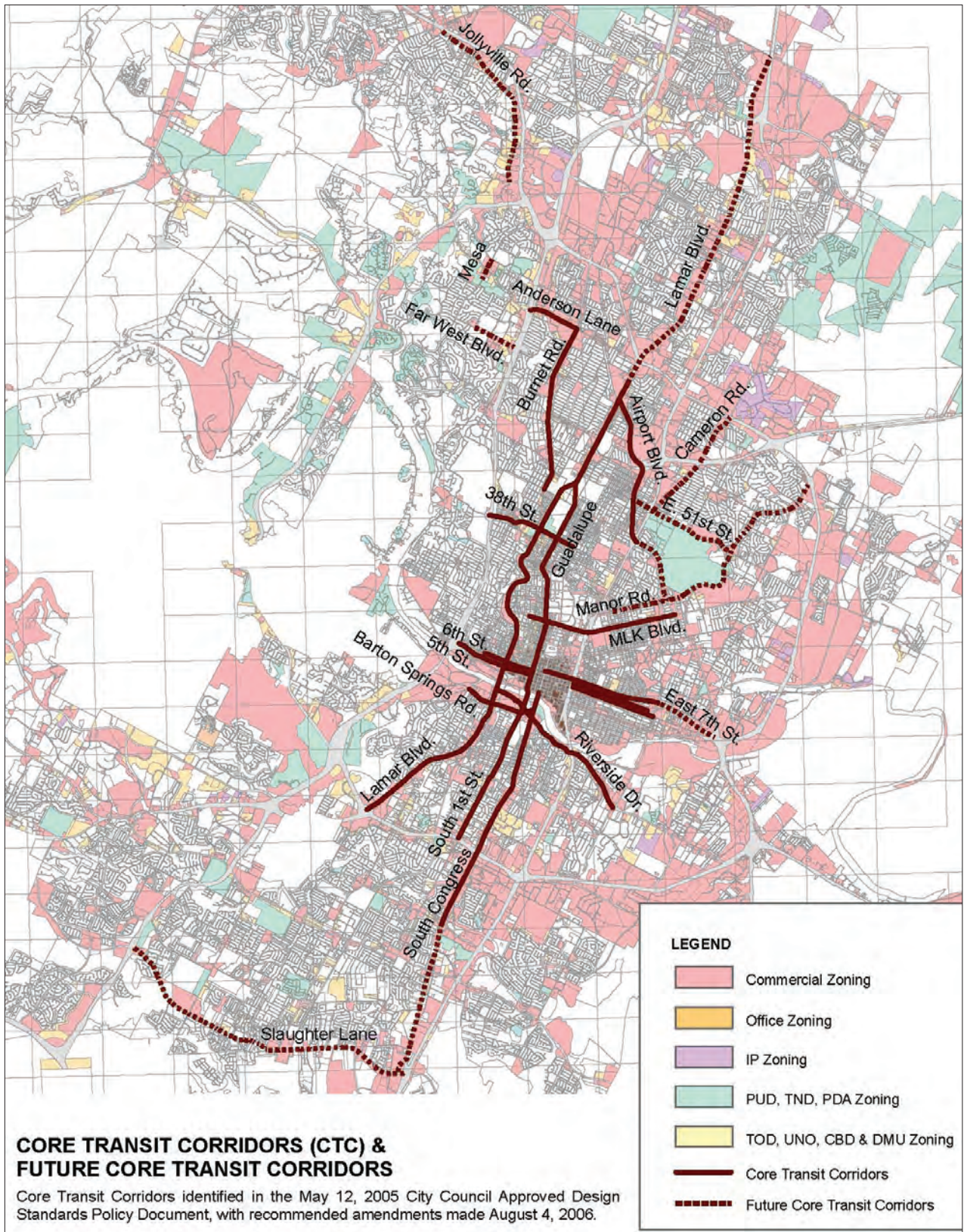
Figure 2.1. *Austin roadway-type map*

Determining Applicability. The first step in the development process is to determine the "principal roadway" and other roadway types that are adjacent to a site. The size of the site and the type of development also need to be considered. A master table at the beginning of the regulations summarizes the applicability of all the standards. A sample portion is shown in Table 2.2.

Table 2.2. Site development standards

Section	Standard	Applies if Principal Roadway is a:	Applies to the Following:
Relationship of Buildings to Streets and Walkways	2.2.2. Building Location Along Core Transit Corridors	Core Transit Corridor	• All zoning districts • Single-family residential uses are exempt, in addition to the general exemptions in Section 1.2.3.
	2.2.3. Building Location Along Urban Roadways	Urban Roadway	All nonresidential zoning districts
	2.2.4. Building Location Along Suburban Roadways	Suburban Roadway	All nonresidential zoning districts
	2.2.5. Building Location Along Internal Circulation Routes	Internal Circulation Route	All nonresidential zoning districts
	2.2.6. Building Entryways	Core Transit Corridor	All zoning districts

The applicability section also defines the types of development that must comply with the standards, including some redevelopment and major rehabilitation projects that meet objective standards related to increased traffic generation or impervious cover. Exemptions are provided for projects that do not require a site plan, industrial projects, interior remodels, and development in select zoning or overlay districts that already address form-related design issues.

Review Process. The design standards are reviewed as either part of the existing site plan–review process (for standards related to site layout) or the existing building permit–review process (for standards related to building design).

Minor Modification. To allow flexibility in administering the ordinance, local staff may approve small deviations from otherwise applicable standards in order to protect natural or historic features or to address unique site conditions. This flexibility may not be used to increase density on the site or to approve uses that would not otherwise be allowed.

Alternative Equivalent Compliance (AEC). An innovative section encourages creative design by allowing an applicant to propose alternative design approaches that meet the intent but not the strict letter of the standards. Two options are provided: an informal one that allows staff to make nonbinding comments on the proposed form of the AEC with no guarantee of ultimate approval, and a more formal one in which the applicant prepares an alternative plan, which can vest rights. The latter approach is more expensive to the applicant initially, but it can provide greater assurance that the alternative approach will be approved.

Site Development Standards. These standards are intended to ensure that buildings relate appropriately to surrounding developments and streets, promote efficient pedestrian and vehicle circulation, and provide adequate parking in safe and appropriate locations, while creating a unique and identifiable image for development in Austin. They function much like an overlay because existing site development standards continue to apply to development covered by the new ordinance, unless specifically precluded by one of the new standards. The standards address the following:

- Relationship of Buildings to Streets and Walkways. The ordinance requires new commercial development to address the adjacent roadways in a significantly more direct way than in the past, setting objective standards for sidewalk design, building location (including mandatory build-to lines), building entryways, and parking location based on the adjacent roadway type to reflect the differing function and desired character for different types of streets. For example, Core Transit Corridor standards are designed to create a more active and welcoming pedestrian environment—street trees, wider sidewalks, buildings brought up to the sidewalk, parking located to the side and rear of buildings—than those for Urban Roadways. To create a more uniform streetscape than is possible under current zoning, these standards generally apply along the entire roadway regardless of the underlying zoning districts. Standards in this section address the following issues:

  - Width of required sidewalks (which comprise a "street tree / furniture zone," a "clear zone," and a "supplemental zone");

  - Street tree requirements (mandatory on Core Transit Corridors and optional along other roadways);

  - Building frontage standards, which define a percentage of building frontage that must be built up to the sidewalk;

  - Location requirements for parking, with limitations on parking along the street or in front of buildings in some areas and with screening standards for parking areas when they are located adjacent to streets;

  - Building entryway standards, to ensure that entries are visible and accessible to pedestrians; and

  - Connectivity standards, which require new development sites of five acres or more to be integrated with adjacent development and designed to ensure walkability and pedestrian safety. Large sites must include internal circulation systems to avoid development in large "superblocks" and also must integrate additional connectivity improvements on the site.

8' min.
REQUIRED
street tree /
furniture zone

7' min
REQUIRED
clear zone

20 - 30' max.
OPTIONAL
supplemental
zone

Figure 2.2. Example of required and optional sidewalk design features for an urban roadway

City of Austin
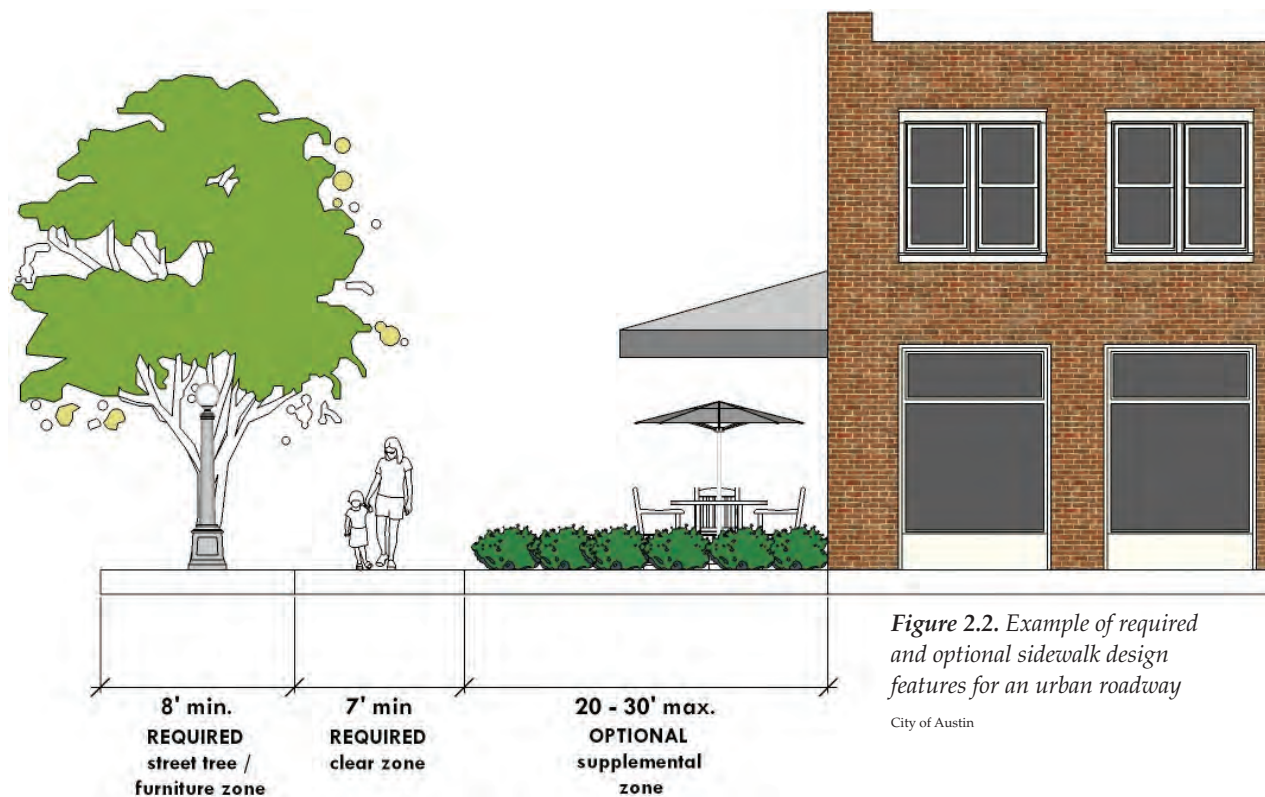
- *Parking.* These provisions authorize reductions in the generally applicable minimum off-street parking requirements for certain types of projects that are more likely to reduce auto usage. For example, on-street parking adjacent to a site may be counted toward minimum off-street parking requirements. Reductions in parking requirements are also available for programs or improvements that reduce auto use, such as providing car-sharing vehicles or shower facilities for employees who bike to work.

- *Exterior Lighting.* New standards are intended to ensure that lighting has a minimal impact on adjacent properties and the night sky through the use of fully shielded and full cutoff fixtures. Nonconforming lighting (i.e., lighting that was legal when it was installed but that does not meet these new standards) must be brought into conformance by 2015.

- *Private Common Open Space and Pedestrian Amenities.* Any development project five acres or larger must set aside 2 percent of the total site area as either private common open space or a public gathering area. Residential projects are encouraged to meet this requirement by setting aside private common open space, while commercial and mixed use projects are encouraged to set aside public gathering spaces, such as plazas. These standards are in addition to the existing public open space–dedication requirements and are intended to serve the residents or users of the site, as opposed to the general public. Maintenance of the open space or pedestrian area is the responsibility of the property owner.

Building Design Standards. In addition to site development, the Austin design standards also address the physical appearance of buildings to a limited extent, including encouraging human-scale architecture; limiting the impact of branded architecture (e.g., prototypical buildings associated with a chain restaurant or retailer); and increasing the quality, adaptability, and sustainability of Austin's building stock.

- *Pedestrian Frontages.* Mandatory standards are intended to ensure that buildings are designed in ways that encourage pedestrian activity, including providing windows on building facades, providing covered entryways, providing shaded sidewalks along building facades next to parking areas or streets, and providing shaded sidewalks between buildings in multi-building developments.

- *Options to Improve Building Design.* Commercial development of 10,000 square feet or more (or any development that includes trademarked features in the exterior design) must also comply with additional design requirements, which are organized in a point-based system with a menu of options to allow for flexibility. All buildings subject to the standards are required to earn a single base point. Some buildings—including buildings with trademarked design features and buildings with a single user occupying more than 100,000 square feet—are required to earn additional points. Design options available for meeting these point standards vary considerably. See Table 2.3 for a selection from the code outlining the point options.

Group A: Each option worth 1 point
Achieve star rating under the City of Austin Green Building program.
Provide for liner stores in building facade. (1 point for each liner store)
Provide facade articulation.
Provide primary entrance design.
Provide roof design.
Provide building materials meeting the standards of this section.
Improve storefronts to new regulatory standard of Section 3.2.2 for glazing type/size and shading.
Complies with neighborhood design guidelines, as prescribed in the Urban Design Criteria Manual.
Group B: Each option worth 2 points
Design building so that at least 75 percent of the facade facing the principal street consists of storefronts with at least two separate entrances facing the principal street.
Provide sustainable roof.
Integrate solar power generation into building design.
Achieve Green Building rating of 2 stars.
Group C: Each option worth 3 points
Develop vertical mixed use structure.

Table 2.3. Point options

Mixed Use

Because the task force and city officials saw the issues of corridor redevelopment, improved building design, and mixed use as all inextricably linked, the ordinance also includes standards and incentives for mixed use development, clarifying the locations in which it is allowed and also the types that may occur. Though mixed use development is allowed in a number of Austin's existing zoning districts, the 2006 ordinance established a new Vertical Mixed Use Overlay District that specifically allows for the develop-

ment of vertical mixed use (VMU) buildings in addition to any other uses allowed by the base zoning. The new overlay district applies to most sites adjacent to a Core Transit Corridor and to sites of three acres or more on other roadways (except where a neighborhood plan has established a different standard). The ordinance provides standards for three types of mixed use development: VMU buildings, neighborhood mixed use buildings, and horizontally integrated mixed use development.

Vertical Mixed Use (VMU) Buildings. This kind of development:

- Must include a mix of uses within the building, including some residential;
- Must provide pedestrian-oriented commercial spaces along the street-facing facade;
- Is not subject to most minimum site area and setback requirements of the underlying zoning district;
- May include provisions for a waiver of some dimensional standards when they include affordable housing units;
- Must meet the existing residential compatibility standards of the Austin code;
- Is eligible for a 40 percent reduction in the amount of required off-street parking; and
- Is eligible for development bonuses, including reductions in queuing requirements for drive-through uses; retention of existing impervious cover subject to some additional standards; reduced connectivity requirements; and modifications to the required building design standards.

Neighborhood Mixed Use Buildings. This kind of development:

- Is allowed only in Neighborhood Planning Areas as a special use;
- May incorporate dwelling units above the ground floor and in 50 percent or less of the ground floor area;
- Is subject to some modified dimensional standards, such as minimum and maximum front setbacks and minimum lot dimensions;
- Is subject to building facade standards addressing glazing, awnings or shade devices, and wall articulation;
- Is subject to modified parking and landscaping standards; and
- Must not include a drive-through facility.

Integrated Horizontal Mixed Use Development. This kind of development:

- Must include a mix of at least two uses or 20 percent of the total building footprint on the site must consist of VMU buildings; and
- Is eligible for development bonuses, including reductions in queuing requirements for drive-through uses; retention of existing impervious cover subject to some additional standards; parking reductions; reduced connectivity requirements; and modifications to the required building design standards.

Experience

In December 2011, Austin staff members who had been involved in the original development of the standards provided observations in an interview about the effectiveness of the ordinance some five years after its adoption. They noted that, at the "highest level, the standards are fundamentally sound. The ordinance has changed and influenced urban form in Austin." The standards have introduced more of a focus on pedestrian orientation than would otherwise have occurred. Positive design changes mandated by the ordinance have improved project quality. Dozens of new projects subject

to the ordinance have been completed or are under way. Nevertheless, a major ordinance revision is rarely perfect, and some aspects of the Austin standards currently are under review.

Redevelopment. City officials believe the ordinance's applicability to rehabilitation and renovation projects (which is based on impervious cover and traffic generation) needs to be fine-tuned and made more specific regarding how and when a rehab project (which could be anything from resurfacing the parking lot to a major new building addition) might trigger the design standards, particularly the ones for site lighting, which might be impossible or difficult to meet.

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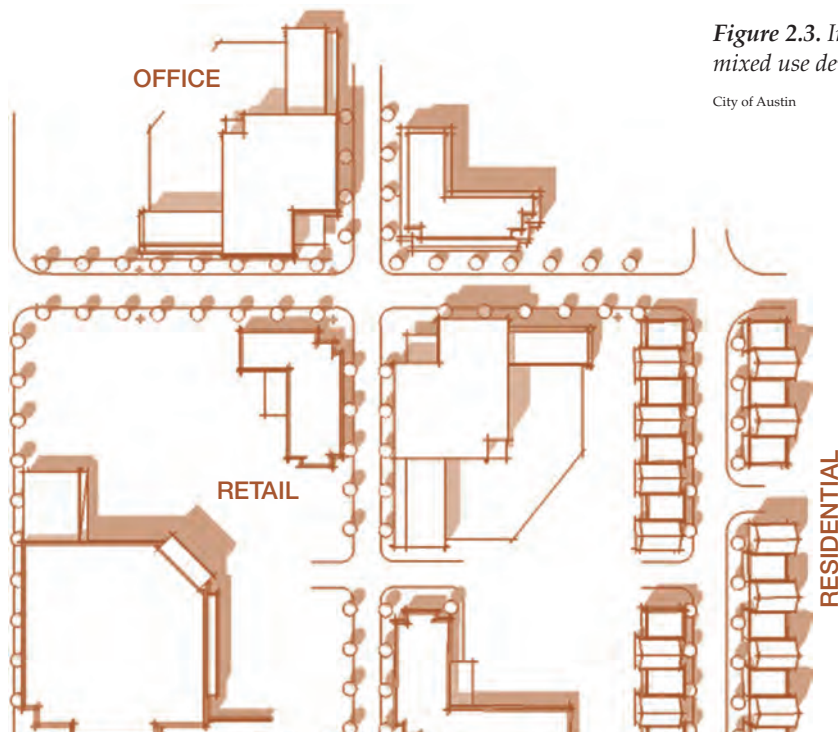
Figure 2.3. *Integrated mixed use development*

City of Austin

Similarly, if the design standards do apply to a redevelopment project, the ordinance does not always clearly identify an appropriate equivalent standard for redevelopment, since some of the base standards focus on new construction. For example, the ordinance may require a new building to be built right up to the sidewalk—but it may be unclear whether a new addition to an existing building is expected to do so. The ordinance should distinguish those standards that apply just to new construction from those that may also apply to redevelopment.

Street Designations. The general approach of categorizing road types and customizing development parameters for each type is sound and working well, but there were "some hiccups in the ways roads are classified." Given Austin's size, limiting the corridor classifications to five resulted in broad categories that tend to impose a general approach for a wide variety of circumstances. This is particularly true for the Core Transit Corridors. There is interest in revisiting the classifications and fine-tuning the list of Core Transit Corridors or breaking that category into subcategories.

Alternative Equivalent Compliance. The AEC provision was intended to provide some administrative flexibility, but in practice it has come to be seen by local developers as an "escape clause," and it is being requested more frequently than city officials would prefer. In 2010, close to half of all applications included some type of request for informal approval of

AEC. On the plus side, the frequent application of AEC means that staff is exercising discretion in administering the ordinance, which was the intent. However, having a single alternative-compliance clause for the entire ordinance sometimes makes it hard to determine the appropriate "equivalency" in a given circumstance. Staff hopes to revise the ordinance to weave in the AEC concept throughout the document, so that each substantive standard also contains rules on "equivalencies" that may be appropriate for unusual situations.

Site Design. Generally, the ordinance's targeted approach to site design (i.e., focusing only on key issues that are not already addressed in the rest of the code) is working well. However, some standards that are especially specific may be too limiting and are being reevaluated. As staff noted, the "specificity of standards is our Achilles' heel." Particularly detailed site standards have led to multiple requests for exceptions or alternative compliance. Again, more specific guidance on alternative approaches would have been helpful for each of the specific types of site development standards.

The detailed lighting standards developed by the task force and codified in the standards have provoked the most pushback. Interestingly, the code enforcement staff has aggressively interpreted a requirement for full cutoff lighting as a complete prohibition on uplighting, which has led to significant resistance from many applicants. In future revisions, the staff hopes to replace the existing lighting standards with a simple cross-reference to an industry-standard external document (such as the Illuminating Engineering Society of North America's model code or similar standards).

Vertical Mixed Use Customization. The design standards and mixed use ordinance included a highly unusual provision that honored Austin's long tradition and spirit of neighborhood-based decision making by allowing neighborhoods to vote on certain dimensional standards for VMU buildings in their area. In the months following the ordinance adoption, staff facilitated a series of neighborhood meetings to hold votes, and the customized standards then became a formal part of the ordinance. Staff notes that the logistical challenges of customizing a major ordinance neighborhood by neighborhood were tremendous and unlikely to be repeated.

Overhead Utilities. The potential problems relating to existing overhead utility lines were underappreciated when the design standards ordinance was adopted. The new ordinance calls for sidewalks, street trees, and building frontages to be located at the front of most properties, yet many of Austin's major roadways, especially the Core Transit Corridors, have overhead utility lines at the front of properties that potentially would prevent full implementation of the new standards. Large-scale relocation of the utility lines (either by undergrounding or moving to the rear of the properties) is not always an option on these sites. More flexibility in the ordinance is needed in these situations, specifically by identifying acceptable alternative standards in areas where overhead utility lines exist and are unlikely to be removed in the foreseeable future. In particular, staff hopes to develop a modified list of smaller street trees that could be compatible with the overhead lines.

Overall Observations. Staff believe that Austin would have benefited from a more focused, tailored approach that created specialized design standards (and possibly also new zoning districts) for each corridor. On the other hand, Austin did manage to get citywide form-based design standards passed relatively quickly and with little money, whereas a more tailored approach might have taken years and cost significantly more. In this instance,

a citywide approach of layering new form-based standards onto existing Euclidean districts was preferable to more fundamental changes to an existing code because it was the only politically feasible approach.

Staff also notes that the initial compromises involved in getting the ordinance through a broad-based task force were "painful." It was frustrating to planners that, to get the entire package passed, many exceptions were carved out to appease certain groups. For example, commercial developers on the task force secured an exception to the building placement rules for fast-food drive-through lanes. Yet staff officials appreciate that the political give-and-take on the task force is what ultimately secured an overall balanced approach that satisfied the city council.

An unexpected problem with the long-term implementation of the ordinance has been high staff turnover, especially in the code enforcement department. Staff training in 2006 was valuable, but many staffers who participated in that training did not stay with the City for long, and new staffers were not as familiar with the new ordinance or invested in its success. The ordinance is seen by some staffers as more of a task force product than a city staff product and thus is given lower enforcement priority.

Overall, Austin officials see the standards as a success and firmly believe that the ordinance has improved design quality and building-to-street relationships throughout the city. Modest improvements are being considered to clarify applicability, make the ordinance easier to administer, and define acceptable alternative approaches to some standards in unique circumstances. The project introduced form-based and design standards into a complex code in an unusual way that laid the groundwork for more ambitious approaches in the future. Indeed, the city is at work on a pilot project to develop more tailored, next-generation form-based standards for one of the Core Transit Corridors, based in part on the lessons learned from this initial approach.

Key Lessons

- The Austin citywide design standards introduced form-based regulations into an established, built-up community by focusing on redevelopment along the main transportation corridors. The standards promote street- and pedestrian-oriented building forms along very diverse commercial strips.

- Structuring the new formlike standards as a freestanding subchapter to the code with a new, illustrated format—rather than trying to integrate the form standards into the existing old-school document—enabled stakeholders to better understand the design paradigm introduced by the new standards.

- The Austin standards accommodate piecemeal development over time in that they apply to property-by-property reinvestment and do not presume a major redevelopment project funded by a large property owner or the city. This is a more realistic approach given the city's design template and the current economic conditions.

- The adoption of the new standards was a major step forward in a city where local politics make comprehensive zoning revisions especially challenging. Establishing a broad-based task force and empowering that group to discuss major policy issues and make compromises before the actual ordinance drafting began proved to be politically effective.

- It was crucial to have the support of a champion on the city council, who took responsibility for managing policy discussions and securing consensus from a large and politically fragmented task force.

FORM-BASED / FORMLIKE REGULATIONS

Other communities that have embedded form-based or formlike regulations into a traditional code in ways similar to Austin, Texas, include:

- Cape Coral, Florida: Downtown Core, Gateway, and Edge Districts

- Fort Worth, Texas: Uptown Urban Design District

- Memphis–Shelby County, Tennessee: frontage requirements in the Unified Development Ordinance

**LINKING BUILDING TYPES TO PERMITTED USES:
THE USE / FORM TABLE OF MOORESVILLE, NORTH CAROLINA**

Most conventional zoning codes focus first on the uses permitted in each zone district and then move on to the size, location, and design of permitted buildings. Form-based codes, on the other hand, contemplate the form of buildings first and address uses within a building secondarily. One early pioneer in the joining of traditional zoning and form-based controls is Mooresville, North Carolina. In 2008, town leaders decided to blend those two approaches in order to focus attention on a few relatively simple controls and take advantage of the community's institutional knowledge, understanding, and comfort with zoning, rather than adopting an entirely new system.

Background

Mooresville is a town of 30,000 people just north of Charlotte, North Carolina, and just off the tip of Lake Norman. The community is often referred to as Race City, USA, due to the numerous NASCAR stock car–racing teams that make it their home, as well as the North Carolina Auto Racing Hall of Fame, which is the official visitor center for Mooresville. The community is also the global headquarters of the Lowe's home improvement company.

Mooresville's roots are as a cotton-weighing station in the 1850s, and it became a prominent textile and furniture manufacturing center in the early 20th century. The rapid rise of Charlotte in the 1980s resulted in equally rapid conversion of the farms and forests in western portions of the town to residential suburbs and the concomitant decline of the traditional downtown to the east. Overseas outsourcing of textile and furniture manufacturing jobs during the 1990s further contributed to Mooresville's decline as a functioning town. By 2000, many residents associated more closely with Charlotte than with Mooresville, and town leaders were concerned that further growth pressures and greenfield suburban development would lead to further loss of character and decline of the downtown.

Similarly dramatic changes were happening in many neighboring communities, including Huntersville and Cornelius. These two towns had recently adopted form-based codes in the interest of fostering compact, walkable, pedestrian-oriented developments in areas already served by infrastructure. Mooresville's leaders saw form-based code principles as a means to address the loss of community resulting from rapid suburbanization. Town leaders were looking for a way to ensure good design, but they wanted to be sure that residents could understand the requirements and that the town could defend its interpretation of the requirements (in court if necessary). In short, they wanted an ordinance that incorporated building type standards without some of the other design elements of the form-based approaches in Cornelius and Huntersville. In 2008, Mooresville adopted a new zoning ordinance that features a set of building form standards applied to almost all types of development in the town, including single-family dwellings.

The Regulations

The key features of Mooresville's approach to form-based controls are summarized in Table 2.4. The building form standards apply to all forms of development except for historic structures, utilities, or agricultural uses. Redevelopment and changes in use of an existing building are also exempted, unless the change involves construction exceeding 50 percent of the structure's assessed value.

Form-Based Tools	Zoning Ordinance
Building Types	Yes—nine building types
Frontage Types	Yes—integrated into building types
Public Space Standards	No
Block and Subdivision Standards	Nothing form-related
Regulating Plans	No
By-Right Development	No separate procedures; administrative modifications of building form standards available

Table 2.4. Mooresville, North Carolina

What makes the Mooresville ordinance special is that it blends form-based building standards with the regulation of uses through zone districts. Nine different sets of building form standards (e.g., detached house, civic building, shopfront building, etc.) are applied based on the type of use proposed and the zone district where it is proposed—in other words, the type of building form depends upon its zone district classification. Instead of use regulations leading and form following or vice versa, Mooresville links them in a combined use/form table.

Chapter 6 of the Mooresville Zoning Ordinance contains the building form standards, which are intended to encourage high-quality development, emphasize existing community character and aesthetics, enhance residents' quality of life, and foster a pedestrian-oriented environment. They comprise three main parts:

- A set of general form standards that are applied to all development;

- A set of specific building-form standards that are applied to each of nine different building forms; and

- A summary use table that sets out the type of specific building-form standards that apply based upon the type of use proposed and the zoning district where it is proposed.

General Form Standards. The foundation of the Mooresville regulations is a set of six general form standards that are applied to all development (with a few exceptions), in addition to specific building-form requirements. One of the town's guiding principles was the need for simplicity, so it focused the regulations on the most basic elements of good building design. The first three general standards—building frontage, building orientation, and architectural front—concern a building's relationship to the street; they require a primary entrance to face a street (not a parking lot), the building to be oriented parallel to the street it faces (instead of at unconventional angles, unless that is the norm for other buildings on the same street), and the side of the building with the primary entrance to incorporate distinctive architectural elements. The fourth general standard addresses window and door orientation and alignment. The fifth standard establishes basic rules for exterior material placement and prohibits those such as corrugated siding or smooth-finish concrete block. Finally, compatibility standards require that buildings adjacent to or across the street from one another use the same building form to the maximum extent practicable.

In preparing these regulations, town staff felt that if new development met these six basic design requirements, the town had "a good shot at 'get-

Table 2.5. Building form summary

Building Form	Standards Applicable to That Building Form
Detached House	Orientation, Materials, Porches, Roofs, Foundations, Facades, Garages, Architectural Variability
Mansion Apartment	Compliance with Detached House Standards, Maximum Unit Count, Maximum Length, Architectural Front, Facade Design, Garages, Equipment Placement, Parking/Driveways, Multibuilding Developments
Attached Residential	Frontage and Orientation, Maximum Size, Materials, Porches / Balconies, Roofs, Foundations, Facades, Garages, Parking Location
Civic Building	Orientation, Location, Materials, Facades, Roofs, Parking, Loading / Service Areas
Shopfront Building	Commercial Building Code Compliance, Orientation, Location, Architectural Front, Materials, Facades, Base / Top, Glazing, Roofs, Parking, Loading / Service Areas, Drive-Throughs
Workplace Building	Orientation, Architectural Front, Minimum Height, Materials, Facades, Base / Top, Glazing, Roofs, Parking, Loading / Service Areas, Drive-Throughs, Pedestrian Circulation
Commercial / Retail	Orientation, Architectural Front, Unity, Materials, Facades, Glazing, Roofs, Outdoor Gathering, Parking, Loading / Service Areas, Drive-Throughs, Pedestrian Circulation, Compatibility
Large Retail	Redevelopment, Compliance with Commercial / Retail Standards, Customer Entrances, Facades, Glazing, Roofs, Parking
Flex / Industrial	Orientation, Architectural Front, Materials, Roofs, Loading / Service Areas, Compatibility

ting it right'" in terms of design and compatibility, according to the town's planning director. These general standards focus on the street presence rather than the form of the building and parallel the structure of many form-based codes, which recite generally applicable facade and orientation controls once rather than repeating them for each building type.

Specific Form Standards. The Mooresville ordinance also requires all development to follow one of nine specific building forms based upon the use type and its zoning district. Table 2.5 summarizes the nine specific building forms and the applicable standards for each. An example of the building form standards is shown in Figure 2.4.

Summary Use Table. The allowable type(s) of specific building form standards are established in the Table of Allowed Uses, based on the proposed type of use and its base zoning district. Note that this structure maintains the overall focus on permitted uses, rather than building form, as an organizing principle. Applicants locate their use first, then the zoning district, to determine what building forms are permitted.

An excerpt of the town's use table is shown in Figure 2.5. New development must be built according to the building form standards listed for that

6.7.5 Shopfront Building

The Shopfront Building Form is typically employed on small-scale structures intended to accommodate a variety of uses, including a ground-level storefront on one or more facades. Shopfront Buildings can be used by retail or service uses such as a neighborhood store or dry cleaners within and in close proximity to residential neighborhoods. Multi-story structures using the Shopfront Building Form can accommodate live/work dwellings and vertically-integrated mixed-uses over ground-floor nonresidential uses. The uses permitted within a structure using the Shopfront Building Form are determined by the base and overlay zoning districts in which it is located.

(1) Residential Uses
If live/work units or residential uses are included with commercial uses in a structure using the Shopfront Building Form, the residential portion of the structure shall conform to the North Carolina Commercial Building Code to permit future conversion to a non residential use.

(2) Retail Uses
Retail uses within a structure using the Shopfront Building Form shall be located only on the ground floor.

(3) Orientation
The front façade of a structure using the Shopfront Building Form shall be oriented to the primary street if fronts.

(4) Location
(A) Except on lots fronting arterial streets, structures using the Shopfront Building Form shall be built to the edge of the street-right-of-way. In the case of corner lots, the structure shall be built to both street rights-of-way.
(B) Structures using the Shopfront Building Form located on lots fronting arterials (except within the TC and VC Districts) shall be setback from the street right-of-way a distance within 25 percent of the average front setback for structures along the same block face.
(C) Lots containing a structure using the Shopfront Building Form within the TC and VC Districts shall be built to the edge of the street right-of-way regardless of the street type.

Figure 6.7.5.1: Shopfront Building Examples.

Architectural front
A principal, functional doorway for public or direct-entry access into a building shall be from the fronting street. Corner entrances shall be provided on corner lot buildings or have dual entries. A secondary entrance may be oriented towards off-street surface parking.

Materials
(A) The primary exterior treatment of walls on a structure using the Shopfront Building Form shall be brick, cast concrete, stone, marble, or other materials similar in appearance and durability. Regular or decorative concrete block, float finish stucco, EIFS-type stucco, cementitious fiber board, or wood clapboard may be used on the front façade as a secondary treatment or trim but shall not be a primary treatment. All accessory buildings shall be clad in materials similar in appearance to the principal structure.
(B) Pitched roofs on structures using the Shopfront Building Form shall be clad in wood shingles, standing seam metal, corrugated metal, slate, asphalt shingles, or similar material.

Facades
(A) Structures using the Shopfront Building Form with front façades of 60 feet in width or more shall incorporate one or more of the following details:
(i) Wall offsets of at least one foot in depth and 10 feet in width a minimum of every 40 feet;
(ii) Façade color changes following the same dimensional standards as the offset requirements;
(iii) Pilasters having a minimum depth of eight inches, a minimum width of eight inches, and a minimum height of 80 percent of the façade's height;
(iv) Roofline changes coupled with correspondingly aligned façade material changes. (A stepped façade should have a corresponding step in the roof line).
(B) Structures using the Shopfront Building Form shall include at least one storefront
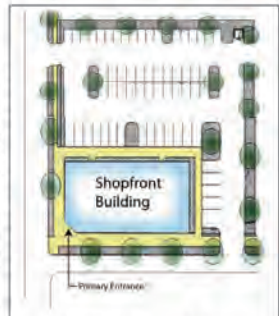
Figure 6.7.5.2: Shopfront Building Orientation. This diagram depicts Shopfront Building placement and entrance location.

Figure 6.7.5.3: Shopfront Details. This diagram depicts some of the basic architectural components on the primary façade of a Shopfront building.

use; in some cases, more than one type of specific building form is allowable for a particular use type. For example, restaurants in the Residential Mixed (RMX) District must be configured using the Shopfront building form standards, but in the Village Center (VC) District, restaurants may be configured using the Shopfront, Civic, or Workplace building form standards. Different form standards may not be mixed in a multibuilding development.

Figure 2.4 (above). Mooresville, North Carolina, page layout
Town of Mooresville

Figure 2.5 (below). Part of the Mooresville, North Carolina, use table
Town of Mooresville

TABLE 5.1.4: TABLE OF ALLOWED USES [1]
ALLOWABLE BUILDING FORMS

DH = Detached House / MA = Mansion Apartment; AR = Attached Residential / NA = Not Applicable; CV = Civic / SF = Shopfront; WP = Workplace / CR = Commercial/Retail; FX = Flex/Industrial / LR = Large Retail

Use Category	Use Type [2]	R-2 Use	R-2 Bldg Form	R-3 Use	R-3 Bldg Form	R-5 Use	R-5 Bldg Form	RMX Use	RMX Bldg Form	RMX-MH Use	RMX-MH Bldg Form	TND-C Use	TND-C Bldg Form	NMX Use	NMX Bldg Form	CMX Use	CMX Bldg Form	HB Use	HB Bldg Form	VC Use	VC Bldg Form	TC Use	TC Bldg Form	GI Use	GI Bldg Form	EI Use	EI Bldg Form	PC-C Use	PC-C Bldg Form	Additional Requirements
Restaurant	Restaurant without Drive-Through Service							C	SF			C	SF	P	SF WR	P	SF WP CR	P	SF WP CR	C	CV SF WP	P	CV SF WP					P	CV SF WR	5.3.3 (7)
Restaurant	Restaurant with Drive-Through Service													C	SF WP	P	SF WP CR	P	SF WP CR					C	WP CR			C	CV SF WP	5.3.3 (7)
Retail Sales and Services	Bar, Nightclub, or Similar Establishment											C	SF			C	CV SF	P	SF WP CR	C	SF WP	C	SF WP	C	WP CR					5.3.3 (8)(A)
Retail Sales and Services	Crematory																	C	CV WP					C	WP	C	CR WP			
Retail Sales and Services	Retail/Service Use with Gasoline Sales													P	SF WP	C	SF CR	P	SF CR	P	SF CR	C	CV SF WP	C	CV SF WP			C	WP CR	5.3.3 (8)(B)
Retail Sales and Services	Type I Retail Use							C	DH AR SF	C	DH AR SF	P	DH AR SF	P	DH AR CV SF WP	P	DH AR CV SF	P	DH AR CV SF WP CR	P	DH AR CV SF WP CR	P	DH AR CV SF	C	SF WP			P	SF WP	5.3.3 (8)(D)

Other Standards. Because the Mooresville ordinance is a hybrid zoning ordinance that incorporates Euclidean and form-based code elements, it does not include frontage standards or a regulating plan. While there are no public space standards other than the provisions pertaining to required open space set-asides, streets, and sidewalks, these aspects are treated comprehensively in other portions of the ordinance. The ordinance relies on the transportation and recreation master-plan portions of the comprehensive plan for guidance about where particular public features such as streets, sidewalks, and open space should be located and how they should be configured. The same is true for block and subdivision provisions, which are addressed comprehensively elsewhere in the code.

The Mooresville ordinance places a strong emphasis on mixed use development: it establishes a number of mixed use zoning districts and allows all constituent parts of mixed use development (e.g., multifamily, retail, office, and commercial development) by right in most zone districts. The ordinance also accommodates horizontal mixed use and allows a wide variety of different residential building types by right in most residential districts.

Finally, administration occurs much as it did before the new code was adopted, through a combination of zoning permits and special approvals by the board of commissioners. While some form-based codes try hard to avoid conditional approvals, the Mooresville code has some conditional uses available, and each requires a public hearing. Conditional zoning (where an applicant voluntarily limits the range of otherwise allowable uses or applies other conditional limitations on the configuration of by-right uses) is quite common in North Carolina and is frequently used in Mooresville as well.

The Mooresville ordinance also includes a procedure for administrative review and approval to modifications of the building form standards. Upon a finding of consistency with any of five standards relating to special architectural or historic styles, infeasible materials or impractical construction techniques, or proposed interior uses, the planning director may modify any building form standard and apply additional conditions of approval to address any potential negative impacts resulting from the modification.

To date, the modification process has not been used very frequently. One instance involved a popular fast-food restaurant that was redeveloping its building into a new "urban café" model. The redevelopment shifted the location of the building such that the drive-through window could no longer be accommodated to the side or the rear as required. The town staff and the applicant negotiated a solution that allowed the drive-through on the front of the building through inclusion of an oversize portico structure that served as a significant entry feature as well as a drive-through canopy. In many cases, however, town staff have simply modified the ordinance text in response to difficult site characteristics or unintended consequences that have arisen since adoption.

Experience

Mooresville decided to use an approach linking use and form controls because it perceived it as simpler, more predictable, and potentially more legally defensible than more typical form-based approaches. For example, state enabling legislation and zoning case law require or presume that zoning districts will be based on distinctions in permitted uses, and the Mooresville approach allows building form controls to be integrated without abandoning the use-based district approach.

According to staff, Mooresville decided to "major in the majors," developing a short list of specific building form standards to regulate fundamental design relationships rather than adopting a more prescriptive and detailed form-based approach and regulating plan. Staff reasoned that good develop-

ment could result from simple regulations through picking the "right" design aspects and then regulating them appropriately. These design aspects include:

- Requirements for buildings to front streets (rather than parking areas);

- Controls on facade massing (size);

- Provisions for a minimum amount of glazing or transparency on the front facade;

- Limitations on parking (or garage) location; and

- Controls on exterior materials.

Mooresville adopted its new regulations in 2008, and despite the economic downturn that began that same year it has continued to experience significant development activity. The town issued 221 new residential building permits in 2008, 106 in 2009, and 113 in 2010. It also approved 61 permits for new commercial development in 2008, 20 in 2009, and 17 in 2010 (not including upgrades to existing buildings), though commercial permitting trends are a little harder to discern in that the number of permits alone may not adequately capture the scope of the work undertaken, and it is hard to distinguish between major and minor work.

Mooresville has approved three large projects since adoption of its new regulations, all of which are under construction or complete. One, the Town Square Project (Figure 2.6), is a mixed use project consisting of over 100,000 square feet of commercial space organized into a series of detached anchor-store buildings and three in-line multitenant spaces. The site also includes several three-story apartment buildings, each with at least 30 units, and is configured with internal off-street parking, a central jazz pavilion, and a

Figure 2.6. *Mooresville, North Carolina, Town Square*

Clarion Associates

musically themed fountain. Another, Legacy Village, was conceived as a mixed use transit-oriented development adjacent to the Lowe's headquarters campus and a commuter-rail stop planned for southern Mooresville. The project was approved and the town home portion of the development was constructed; however, a decision was subsequently made by the Charlotte Area Transit System and town leaders to relocate the station in order to preserve roadway capacity into the Lowe's campus for employees. This decision effectively removed the perceived investment potential for commercial development, which is no longer included in the project. Legacy Village features central greens, two-story condominiums, and parking areas configured as on-street parking as well as alley-loaded garages. Both projects were approved without the need for variances from the Mooresville form / use standards.

In addition to these significant projects, the town has seen a wide variety of smaller single-use and mixed commercial / office developments, as well as two large phased residential subdivisions with single-family and multi-family developments served by common streets and open space. The town has also benefited from the adaptive reuse of a downtown textile mill into a furniture store and warehouse with additional office space and restaurants planned for other buildings on the site.

Key Lessons

- The use of zoning districts is a logical alternative to a transect-based approach and can be applied in already developed areas without the need for significant rezonings.

- Integration of form controls into a zone district framework helps assuage landowners' concerns about the possibility of objectionable adjacent development.

- Boiling down the standards to a few basic requirements helps make the regulations easy to explain, easy to administer without the need for architectural or design training, and easy to defend.

- Building form standards work well at the micro scale (individual buildings) but may not be as effective at ensuring compatibility at the macro scale (block face, corridor, neighborhood, etc.) unless they are supplemented with standards requiring adjacent buildings to follow complementary forms.

- Form standards work well for communities that do not have large staffs or the capacities to conduct detailed design review. The limited number of building form controls to review and the basic nature of those controls reduces administrative time needed for building approvals.

▶ **MANDATORY FORM-BASED ZONES WITHOUT REGULATING PLANS: MAIN STREET ZONES IN DENVER**

Many form-based codes require a regulating plan that addresses the preferred pattern of development for a discrete area, often to a significant level of detail (sometimes lot-by-lot). Regulating plans show the proposed layouts of building types, frontage types, and street designations for areas that can range in size from a few blocks to over 100 acres—often a downtown core, a transit node, or an old shopping street. In theory, a regulating plan is a superior way to achieve consistent development or redevelopment across an area. In practice, however, redevelopment often occurs one building at a time and in scattered locations. A city may not have the money to develop regulating plans for each area in need of redevelopment, and it may be impractical to require individual property owners to develop regulating plans

that include properties surrounding their own, especially if the owners of those properties will not cooperate. In addition, some cities do not want to impose the level of detailed control that such a plan requires—they want to allow more flexibility to respond to market forces and the individual preferences of owners.

Denver addressed these challenges through its Main Street form-based building type regulations that (a) do not require a regulating plan and (b) assume that redevelopment will occur in a piecemeal fashion over time. The Main Street zones are intended to allow for parcel-by-parcel redevelopment of buildings in accordance with form-based concepts without specifying how individual buildings fit into an overall plan. Although Denver's original Main Street zones have now been modified and incorporated into a citywide form-based code, we chose to include them because they illustrate a form-based approach applicable to key transit corridors, and their early adoption provides more completed projects illustrating how this tool works in practice.

Background

Colfax Avenue is often referred to as Denver's Main Street. One of the longest continuous streets in the nation, it starts on the plains east of the city and runs straight westward through the cities of Aurora, Denver, and Lakewood, terminating at the base of the Rocky Mountains. It served as a vibrant primary shopping street for a century, but suffered the decline and disinvestment so common to auto-oriented commercial corridors with the construction of Interstate 70 to the north. Even as Colfax declined, however, many of the adjacent residential neighborhoods remained strong, and the street has remained a robust transit route, with more than 420 Regional Transit District buses passing along it each day. Colfax has been the subject of repeated reinvestment and revitalization plans over the past half century.

In 2002, the city adopted Blueprint Denver, a new comprehensive plan focusing on three major themes: (1) "Areas of Change" and "Areas of Stability," (2) multimodal streets, and (3) mixed use development. Areas of Change were portions of the city in the path of growth, around transit or infrastructure investments, or needing reinvestment to alter their path of decline, while Areas of Stability were generally slated for reinforcement of the current urban fabric. The focus on multimodal streets and mixed use development reflected an increasing concern with greenhouse gas emissions—a focus that was further articulated in Greenprint Denver, the city's sustainability plan. Almost the entire length of Colfax Avenue was mapped as an Area of Change; it was a key multimodal street for cars, buses, and pedestrians; and it was an obvious target for mixed use development.

In 2005, Denver decided to develop a set of form-based "Main Street" zone districts for use on linear commercial streets—particularly the "enhanced transit corridors" identified in Blueprint Denver. Although intended for use on other major arterials as well, the zones were designed based on an analysis of Colfax Avenue and were first applied there. After a year of design, drafting, and testing, the city council adopted the three Main Street districts unanimously in September 2006. By that time, Denver had begun a more ambitious program to draft a new form-based code for the entire city, and experience with the Main Street zones contributed to that effort. The Main Street districts live on—with revisions—in the new citywide form-based zoning ordinance adopted in June 2010. Importantly, the new code carries forward two key features of the Main Street zones: a presumption of piecemeal redevelopment over time and the application of form-based tools without a regulating plan requirement.

The Regulations

The key features of Denver's first-generation Main Street controls are summarized in Table 2.6. These districts grew out of the city's East Colfax Plan, which identified several shortcomings in the existing (primarily B-4) zoning that failed to implement the vision of a vibrant, pedestrian-friendly, mixed use street.

Table 2.6. *Denver's Main Street zones*

Form-Based Controls	Main Street Zones
Building Types	No types—but standards included
Frontage Types	No—but transparency and entryway standards
Public Space Standards	No—but standards emphasize Colfax Avenue as a key public space
Block and Subdivision Standards	No
Regulating Plans	No
By-Right Development	Yes—no conditional uses

The intent behind the districts was to:

- Promote the sustainable development of Denver's commercial corridors.
- Promote efficient utilization of land for housing and business development along commercial streets.
- Correlate higher densities with proximity to downtown, the presence of large development parcels, and the intersection of enhanced transit corridors.
- Improve the function and appearance of commercial streets, and enhance the convenience, ease and enjoyment of transit use, walking, shopping, and public gathering.
- Clearly define and activate the public realm by locating buildings to form street edges and corners, and locating entrances and windows to activate the street level.

Figure 2.7. *Denver Main Street building placement diagram*
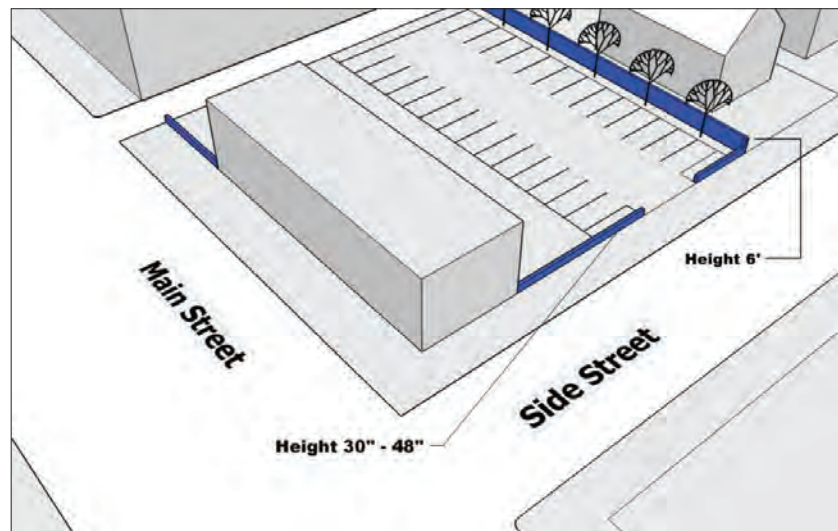
City of Denver

MS-1 38' Max Ht.
MS-2 65' Max Ht.
MS-3 100' Max Ht.

- Require building forms to be compatible with their context.

- Provide appropriate buffers between incompatible uses and site elements.

- Establish flexible parking standards that respond to zone lot sizes, the presence of transit and the pedestrian oriented nature of Main Streets, and support the adaptive reuse of historic resources and buildings that meet Main Street forms.

The MS-1, MS-2, and MS-3 Main Street zones were developed to roughly correspond to the low, medium, and high ends of the density range desired along different stretches of a main street. The Main Street zones were intended to be applied to lots with existing commercial zoning along commercial corridors, between the commercial corridor and a parallel alley one-half block to the north or south, if one exists (which is rare, since most alleys in the area run north-south), and farther from the commercial corridor where the residential fabric had already been eroded. Figure 2.8 shows the how the three districts were configured along the Colfax Avenue corridor.

As with previous commercial zoning in areas along main streets, the city was concerned that the new districts not promote further erosion of adjacent residential fabric; it therefore limited the intended application of the three zones, as shown in Table 2.7.

Zone	Intended Location	Lot Depth	Adjacent Building Heights
MS-1	Close proximity to residential neighborhoods with 1–2 story structures	Generally no more than 125 feet	Generally less than 38 feet
MS-2	Close proximity to residential and mixed use neighborhoods with 2+ story structures	Generally greater than 125 feet	Generally greater than 38 feet
MS-3	(1) Within 600 feet of intersections of enhanced transit corridor; and (2) Within 1 mile of downtown Denver	N/A	N/A

Table 2.7. Denver Main Street zone application

The first-generation Main Street zone district regulations focused on eight building and site parameters. Five of these parameters (setbacks, required parking, parking screening, parking structure design, and entrances) remained constant in all three zones, while three of them (building placement, height, and transparency) varied. The five constant parameters are summarized in Table 2.8, while the three variable parameters are summarized in Table 2.9.

Consistent with form-based theory, the Main Street zones addressed permitted uses only after regulating building forms. Because Denver was about to begin a major revision of its entire zoning code, however, it did not pursue a radical simplification of use regulations for the Main Street

Table 2.8. *Denver Main Street regulations (constant)*

Form-Based Regulation	Uniform Requirement
Setback / Build-to	• 5-foot setback from any residential zone district; • Otherwise, buildings must be built within 18" of lot lines.
Amount of Parking	• 1:500 square feet for nonresidential uses; • 1 / unit for market-rate housing; • 0.8 / unit for affordable housing; • 0.25 / unit for seniors, affordable units for those at less than 40 percent of area median income, units less than 550 square feet, single room occupancy, boarding / rooming houses, special needs housing; • 0 for buildings meeting form standards but built prior to current zoning code.
Parking Screening	• 36"–48" solid screening device (masonry wall or evergreen hedge) required where adjacent lot is not zoned residential; • 5-foot-wide buffer with 6-foot-tall solid screening wall or fence (which can count as the required setback, where adjacent lot is zoned residential).
Parking Structure Design	Facades openings facing any Main Street or a side street may not have visible vehicle ramps, and floors fronting those street facades must be level.
Entrances	Primary entrances must face Main Street (in this case, Colfax) but may be angled at the corner and may be set back up to 10 feet from Main Street.

zones but moved only one step farther along the path of generalizing and simplifying permitted use controls that it had been pursuing for several years.

The resulting regulations represent a midpoint between the level of detail that Denver's code contained in the 1990s and that of its 2010 citywide zoning code. The permitted use list was the same for all three Main Street zones and can be summarized as follows:

- Residential: Virtually all residential uses available in the city (including single- and multifamily) are permitted;

- Arts, Entertainment, Recreation, and Institutional: Virtually all uses available in the city are permitted;

- Commercial: Thirty-eight categories of commercial uses are permitted, encompassing most of those available in the city (including most retail,

Form-Based Regulation	District-Specific Requirement		
	MS-1 (low density)	MS-2 (mid-density)	MS-3 (high density)
Building Placement	75 percent of Main Street and 25 percent of side-street frontage must be occupied by building	75 percent of Main Street and 25 percent of side-street frontage must be occupied by building	75 percent of Main Street and 40 percent of side-street frontage must be occupied by building
Height and Upper-Story Setbacks	1. Maximum height = 38 feet 2. No upper-story setback	1. Minimum height = 24 feet 2. Maximum height = 65 feet If adjacent residential lot has structure no taller than 38 feet, all portions of building over 38 feet must be set back 25 feet from residential lot	1. Minimum height = 24 feet 2. Maximum height = 100 feet If adjacent residential lot has structure no taller than 38 feet, all portions of building over 65 feet must be set back 25 feet from residential lot 3. All portions of building over 65 feet must be set back 25 feet from Main Street
Transparency	Between 3.5 and 8.5 feet above grade, 60 percent of facade on Main Street and 25 percent of facade on side streets must contain windows	Between 3.5 and 8.5 feet above grade, 60 percent of facade on Main Street and 25 percent of facade on side streets must contain windows	Between 3.5 and 8.5 feet above grade, 60 percent of facade on Main Street and 30 percent of facade on side streets must contain windows
	For residential buildings, (1) between 4 and 10 feet above grade 40 percent of facade on Main Street and 25 percent of facade on side streets must contain windows OR (2) building may be set back 5–10 feet from lot lines and the setback area enclosed by a screening device		

Table 2.9. Denver Main Street regulations (variable)

auto-oriented, and service / repair uses). Adult uses, body art, and liquor uses are subject to spacing requirements.

- Industrial: Twelve categories of industrial uses are permitted, encompassing most of those available in the city (including light, medium, and heavy manufacturing, wholesaling, and storage).

Figure 2.9. *Denver Main Street building placement diagram*

City of Denver
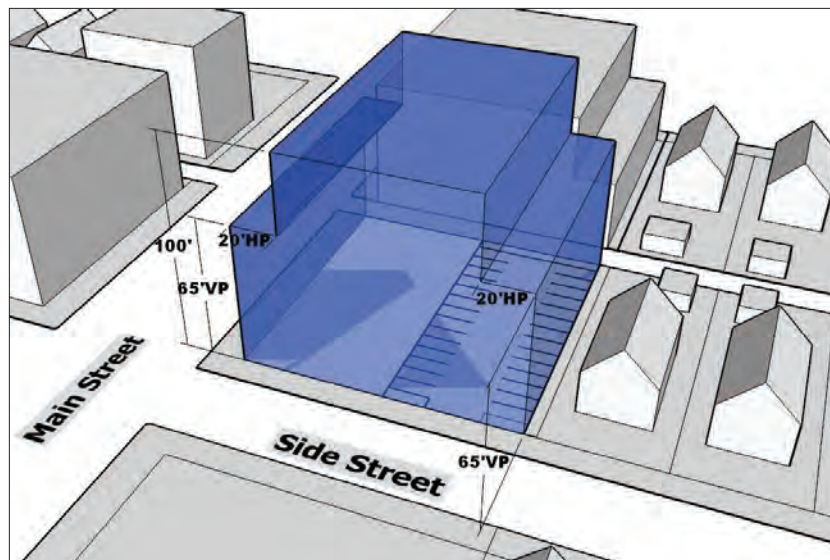
While several of the 77 listed primary uses were subject to distance requirements or use-specific standards governing how they were to be constructed or operated, none was listed as a conditional use.

In short, the standards reflect a very broad approach to mixed use development that includes a focus on the key elements of building form, application of form requirements in a somewhat general manner, and a permissive range of uses. In part, this reflected the wide range of existing uses along Colfax Avenue (which already included single-family homes, auto-oriented uses, civic institutions, adult uses, and general manufacturing), as well as a community sentiment to "let Colfax be Colfax" (Frosch 2007). The standards also reflect a strong belief that the future revitalization of aging commercial strips will be encouraged by building and site design rather than use restrictions. Not only do they allow development and redevelopment to proceed without creating a new round of nonconforming uses (a common unintended consequence of many zoning reforms), but they acknowledge that the eclectic mix of uses is not just a transitional phase—it reflects the future of Colfax as well as the past.

Experience

Once the Main Street zones were added to the Denver zoning code, a two-mile stretch of Colfax from the eastern edge of downtown to Colorado Boulevard containing approximately 300 parcels was rezoned through a legislative rezoning process, which uses local governments' power to enact zoning changes for an entire area without following an individual, quasi-judicial process for each parcel. Once that was completed, Denver rezoned the remaining 2.5 miles between Colorado Boulevard and the eastern city limits, as well as the three miles of Colfax between the west edge of downtown and the western city limits (approximately 800 parcels), into the three Main Street zones.

Prior to these rezonings, many of the affected properties were zoned Business 4 (B-4), which allowed a maximum intensity of 2.0 floor area ratio (FAR) with relatively high parking requirements. Because the Main Street zones generally allow more density, permit taller buildings, yet require less parking than the previous zoning, property owners treated these as "upzonings." There was little opposition, even though form and design controls were much more prescriptive than the existing zoning. The only controversy surrounded a property so interested in MS zoning that the owner wanted it extended farther back from Colfax to allow demolition of two single-family homes and the construction of a larger residential-over-retail mixed use project. (It was eventually approved.) By the time the Colfax Avenue area rezonings were completed, Denver had committed to drafting a new form-based code for the entire city, and further legislative rezonings were not pursued since the new code would require its own legislative rezoning actions.

Figure 2.10. *Colorado Coalition for the Homeless project*
Maya Elliott

Figure 2.11. *Street entrance and minimum height requirements on large format retailer*
Maya Elliott

Figure 2.12. Mixed use project showing increased scale permitted under Main Street zones

Maya Elliott

Between the adoption of the Main Street Districts in 2006 and the adoption of the new citywide Denver Zoning Code in 2010, Denver gained experience administering the Main Street districts and evaluating whether they were producing the types of redevelopment intended. During that time, four buildings were constructed or redeveloped within the Main Street zones. They included a 40,000-square-foot replacement for a 20,000-square-foot 1960s-era liquor store, a residential project funded by the Colorado Coalition for the Homeless, and a new bank building. All four buildings were constructed under the Main Street zone district standards without variances from their form-based design requirements. While there was some discussion of possible variances from the street-facing entry requirements and the 24-foot minimum height requirements in the case of both the bank and liquor-store buildings (both of which have single-story operating requirements), in the end both applicants built two-story-tall buildings with entrances on Colfax.

Denver was generally pleased with both the results of these four buildings and with the lack of opposition to the broad rezonings into the form-based zones. While the 2006 Main Street zones focused largely on older, redeveloping auto-oriented areas, the new 2010 citywide code divides the city into seven different intensity-based "contexts" with a separate menu of zone districts for each. The Planning and Community Development Department decided to refine the Main Street zone districts and to make them available in five of the context areas (suburban, urban edge, urban, general urban, and urban center)—all except the downtown and special purpose character areas. This expanded role for Main Street zoning required an extension of the three-district menu both upward (to more intense nodes) and downward (to less-intense context areas). The city's new zone terminology used designators indicating the maximum height of buildings, so MS-1 became MS-3 (for three-story), MS-2 became MS-5 (for five-story), and MS-3 became MS-8 (for eight-story). In addition, the city developed an MS-2 zone district for use in its suburban context areas and an MS-12 zone for use in its urban center areas. Although the original Main Street zones did not include defined building types, the 2010 revisions to those districts do include them.

Under Denver's new 2010 zoning code, the menu of Main Street zone districts has expanded to the 15 zones shown in Table 2.10.

While this change may appear complex, there was less difference than the expansion suggests. All of the substantive provisions of the "3" zones are identical, all of the "5" zones are identical, and all of the "8" zones are identical.

In theory, these districts should be differentiated based on context, but in practice they were not, for two reasons. First, the standard provisions developed for Colfax Avenue appeared to be generally acceptable in other context areas, and the city felt it could refine the form-based parameters to match distinct contexts in the future. Second, not all of the new zones were mapped—for example, the suburban scale S-MU-3 and S-MU-5 districts are "floating zones," meaning that no lands have been mapped into those districts yet. Because no property owners were affected and because specific examples were not available to test the standard Main Street parameters in a suburban context, it was not considered important to refine those parameters as part of the citywide code effort.

Table 2.10. New zones

S-MS-3	Suburban–Main Street 3
S-MS-5	Suburban–Main Street 5
E-MS-2	Edge–Main Street 2
E-MS-2.5	Edge–Main Street 2.5
E-MS-3	Edge–Main Street 3
E-MS-5	Edge–Main Street 5
U-MS-2	Urban–Main Street 2
U-MS-2.5	Urban–Main Street 2.5
U-MS-3	Urban–Main Street 3
U-MS-5	Urban–Main Street 5
G-MS-3	General–Main Street 3
G-MS-5	General–Main Street 5
C-MS-5	Center–Main Street 5
C-MS-8	Center–Main Street 8
C-MS-12	Center–Main Street 12

Figure 2.13. *McDonald's built under C-MX-5 and Colorado Coalition for the Homeless housing built under MS-5*

Maya Elliott

Other communities that have incorporated mandatory, area-specific form-based code requirements with no regulating plan in ways similar to Denver include:

- Blue Springs, Missouri: Downtown Development Code

- Carmel, Indiana: Old Town District Overlay Zone

- Fort Myers, Florida: Downtown Smart Code

- Grandville, Michigan: Downtown (CBD, Prairie/Barnett subdistricts) Form-Based Districts ◀

Key Lessons

- Denver's Main Street zones promote street- and pedestrian-oriented building forms along a very diverse commercial strip. The four buildings built to date are visible departures from the auto-strip development of the 1960s.

- The districts do not require the city, property owners, or associations to fund a regulating plan for the area.

- The Main Street districts accommodate piecemeal development over time—they apply to property-by-property reinvestment and do not presume a major redevelopment project funded by a large property owner or the city.

- The districts accommodate a very wide range of mixed uses—they implement the principle that form is more important than use much more aggressively than many form-based tools do.

- Both the city and the property owners viewed the Main Street zones as a success, in part because they reflect an "upzoning" that increases development opportunities.

- The Main Street districts allow for significant by-right densification along a key transit corridor. Using legislative means, Denver permitted significantly more intense development along a key transit corridor without parcel-by-parcel upzoning battles with adjacent neighborhoods.

▶ **OPTIONAL DISTRICTS WITH INCENTIVES:**
THE COLUMBIA PIKE FORM DISTRICT, ARLINGTON COUNTY, VIRGINIA

When it was adopted in February 2003, the Columbia Pike form-based code was one of the first major applications of form-based development regulations in the country and the culmination of decades of planning and revitalization initiatives. As in Denver's Main Street districts, the code was intended to foster preferred growth patterns and redevelopment along an existing commercial corridor. Unlike Denver's regulations, Arlington County's controls are optional and rely on incentives to encourage the types of redevelopment desired.

While one common criticism of form-based controls is that they are too prescriptive, it was this feature that gave local residents and elected officials the confidence to incorporate a streamlined review process and other incentives such as density bonuses, reduced parking requirements, and lower application fees into the regulations. This approach proved successful, spurring redevelopment along a corridor that had seen little change in the previous 30 years. The code was designed "to foster a vital main street for its adjacent neighborhoods through a lively mix of uses—with shopfronts, sidewalk cafes, and other commercial uses at street level, overlooked by canopy shade trees, upper story residences and offices." The trick was finding the right tool to do that.

Background

Columbia Pike is a heavily traveled section of State Highway 244 connecting southern Arlington and Fairfax counties to the Pentagon and central Washington, D.C. The 3.5-mile segment in Arlington County carries between 30,000 and 40,000 vehicles per day, and it is one of the busiest bus routes in Virginia, with around 10,000 riders each day. When originally developed in the early 1900s, Columbia Pike served individual commercial buildings that were constructed close to the street. Ground-floor retail uses with display windows were located below offices or apartments. Most parking was located on the street, and buildings were located close to one another, creating a somewhat continuous building wall along the street edge.

Shortly before World War II, developers and retailers discovered the shopping center concept—a place where sales volume could be increased by allowing customers to meet most or all of their shopping needs in one place. Early shopping centers along Columbia Pike were geared primarily to shoppers walking from nearby neighborhoods, but with the rise in automobile use in the years after World War II, the continuous building wall along the street was slowly dismantled in favor of buildings set back from the street, fronted by off-street parking. With further increases in traffic volumes, sections of Columbia Pike were widened, and on-street parking was lost. By the 1970s, Columbia Pike had become a strip-style, four-lane, automobile-oriented corridor consisting largely of low-rise, stand-alone structures surrounded by on-site parking.

Despite the explosive growth in the Washington, D.C., metropolitan area during the 1970s and 1980s, development along Columbia Pike was stagnant or declining. Retail vacancy rates increased, marginal uses moved into the area, and the desirability of the area for living, working, and shopping eroded. Determined to reverse these trends and spur redevelopment, Arlington County embarked on its first attempts to revitalize the corridor with the Columbia Pike Revitalization Plan in 1985, followed by 1989's expanded Columbia Pike 2000: A Revitalization Plan. In 1998, the county announced the creation of the Columbia Pike Initiative, and four years later it rolled out another revitalization plan. Despite almost two decades of planning, little change along the corridor had been realized, until in the fall of 2002, the county conducted a multiday charrette to explore how best to implement the goals in that plan. The result was a series of specific design recommendations that became the basis for the form-based controls adopted in February 2003.

One of the most interesting aspects of the Columbia Pike form-based code is its application within a built-out area. The code articulates a fundamental change in the built environment of an established corridor from a heavily auto-oriented strip for commuters to a main street where local residents can meet their daily needs and travel without automobiles. To do this, it defines and applies the Columbia Pike Special Revitalization Zoning District (essentially an overlay zoning district) to four multiblock areas at strategic street intersections along the corridor: the Western Gateway, the Neighborhood Center, the Village Center, and the Town Center. The code does not apply to areas between these four nodes.

Figure 2.14. *The Columbia Pike corridor*

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COLUMBIA PIKE CORRIDOR ILLUSTRATIVE PLAN

COLUMBIA PIKE CORRIDOR CONCEPT
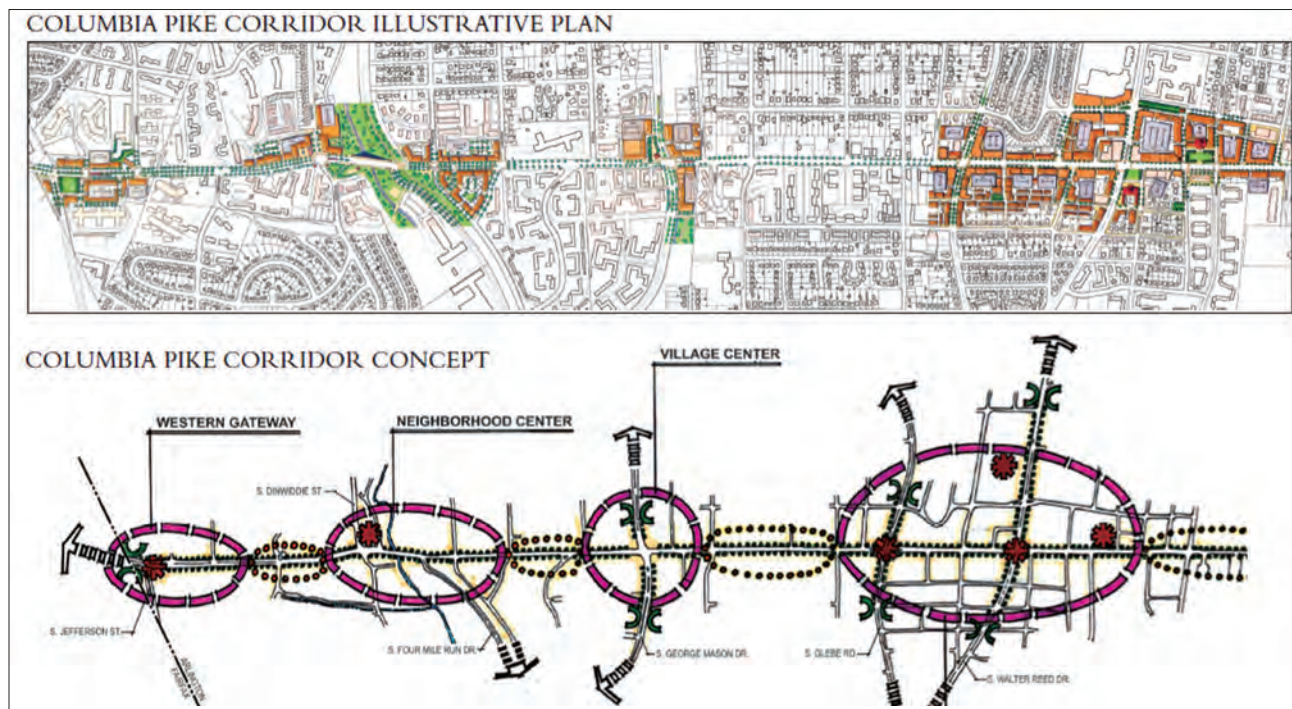
Lands within these four development nodes may be developed or redeveloped in accordance with either the applicable base zoning-district standards or the form-based code provisions, which are considered a "parallel" zoning code that may be used voluntarily. Use of the form-based controls allows an applicant to obtain higher residential densities, increased nonresidential floor area, and reduced land area dedicated to off-street parking than would otherwise be allowed. Form-based code users also benefit from reduced application fees and an expedited review procedure for developments smaller than 40,000 square feet. In return for these incentives, the form-based code requires minimum building heights, building locations along the right-of-way edge, mandatory ground-floor retail along some streets, and pedestrian-oriented building facade and streetscape features. Since the code's adoption in 2003, all but one of the seven new development projects approved along the corridor have used the new provisions.

Figure 2.15. Looking east down Columbia Pike, prior to completion of many of the new mixed use projects

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The Regulations

The key features of the Columbia Pike form-based controls are summarized in Table 2.11. They are codified as Section 20 of the Arlington County Zoning Ordinance, which includes a subsection establishing the administrative provisions for the Columbia Pike Form Based Code District (CP-FBC) and an appendix including the various definitions, regulating plans, and standards applied there.

Table 2.11. Columbia Pike form-based district

Form-Based Controls	Columbia Pike Form-Based District
Building Types	Yes
Frontage Types	No—but architectural feature standards provided
Public Space Standards	No—but streetscape standards emphasize Columbia Pike as an important public space
Block and Subdivision Standards	Nothing form-related
Regulating Plans	Yes—one for each of four activity nodes
By-Right development	Yes—expedited administrative review

The CP-FBC is an overlay zoning district applied to lands in specific base zoning districts located within the Columbia Pike Special Revitalization District. By applying the revitalization district designation to specific lands at the time of adoption, Arlington County allows redevelopment in those areas to take advantage of the form-based code incentives without the need for rezoning. However, there are no restrictions on property owners seeking to change the current base zoning-district designations. Only those lands subject to the CP-FBC designation may take advantage of the form-based code provisions, and application of the CP-FBC district may be initiated only by the county. In the case of conflict between the CP-FBC standards and other standards in the Arlington County Zoning Ordinance, the CP-FBC standards prevail.

There are three basic review paths available to development on land within the CP-FBC:

1. Review and approval of a site plan / permit under the existing zoning-district designation and review procedures available to all other lands in the county (the "no form-based code" option);

2. Administrative review and approval of a site plan (depending on the size of the project) under the form-based code provisions; or

3. Use permit review and approval by the Board of Commissioners under the form-based code provisions.

The "no form-based code" option allows development pursuant to the county's zoning ordinance. Given that the majority of base zoning districts within the CP-FBC are multifamily and commercial districts, review typically requires approval of a use permit and associated site plan. This process is often highly negotiated, includes two or more public hearings, and typically takes between 12 and 16 months, though it can take considerably longer for complex developments.

Development proposals that are in alignment with the form-based code standards, are 40,000 square feet in area or smaller, and include only by-right permitted uses are reviewed administratively. Developments that exceed 40,000 square feet, individual building footprints that exceed 30,000 square feet, and developments that include "special exception" uses or that do not fully comply with all the requirements of the form-based code are reviewed as use permits. The range of deviations from the form-based code provisions that may be approved is limited to the following:

- The height of the first floor relative to the sidewalk;

- Required building (build-to) lines along new streets or alleys;

- Design issues related to historic structures or retention of mature trees;

- Breaks between buildings along a street;

- Streetscape details; or

- Signage.

Approval of projects via administrative review takes 30 days or less, and the process for review and approval of use permits takes 55 days. However, in practice, this period is longer because the clock does not start until the application fully complies with all the district standards or the requested deviations have been limited to only those that may be considered as part of the use permit process. In addition, the application is reviewed by an informal citizen's review committee to ensure it is consistent with the Columbia Pike Revitalization Plan. Thus, the approval process typically takes between four and six months, and use permit approval typically requires 12 months. Nevertheless, the form-based code review process is perceived as significantly faster and more predictable than the standard review procedures.

Rule	Provisions
1. Blocks / Alleys	• All lots shall front a street. • No block shall exceed 400 feet without a midblock alley, access easement, or pedestrian pathway. • Alleys are required to provide access to the rear of all lots. (Alley dedication is required on interior lots where an alley cannot be included with construction.) • Curb cuts are limited to 1 for every 200 feet along main and avenue street frontages.
2. Buildings	• Building footprints over 30,000 square feet require a use permit. (Grocery stores may not exceed 50,000 square feet.) • All building facades along a street frontage shall include a primary entrance on the street. • Building facades on opposite sides of a street must follow the same building envelope standards. • Publicly owned civic buildings are exempted from the building envelope standards.
3. Streetscape	• Street trees are required along both sides of all streets. • Streetlights are required along both sides of all streets, spaced 60 feet on center. • Sidewalks must include materials other than poured concrete except within the six-foot-wide pedestrian clear zone located two feet from building facades.
4. Parking	• Sites under 20,000 square feet have no parking requirements. • Residential development over 20,000 square feet must provide 1.125 parking spaces per unit, with the one-eighth of a space per unit provided as shared parking. • Nonresidential development over 20,000 square feet must provide one shared parking space for every 1,000 square feet of floor area. • There are no caps on the amount of shared parking provided, but reserved parking is capped at one per 1,000 square feet of nonresidential space or two per residential unit. • A one-time payment-in-lieu per space may be provided instead of shared parking. • Access to off-street parking shall be from alleys or side streets, not the Columbia Pike corridor. • Residential, retail, office, and hotel uses must provide dedicated and separate bicycle parking spaces for tenants / employees and visitors / customers. Sites under 20,000 square feet have no parking requirements.
5. Retail	• The ground floor of main street sites must be occupied by primary or secondary retail uses. • The ground floor of avenue and local sites may be occupied by primary or secondary retail uses; residential uses may be included as ground floor uses as well. • The ground floor of neighborhood sites may not include retail uses. • Some primary or secondary uses require a use permit (e.g., nightclubs, self-storage, automobile service stations).
6. Historic Preservation	• Designated historic structures and buildings with historic facades may be redeveloped in accordance with the CP-FBC provisions, following issuance of a certificate of appropriateness from the Historical Affairs and Landmarks Review Board. • Historic structure and historic facade buildings are exempted from parking requirements and some streetscape improvements, and the building envelope standards may be modified in order to preserve historic character.
7. Public Improvements	All development shall install: • Required sidewalks, curbs, and gutters. • Underground utilities. • Street furniture (benches, bike racks, trash cans, etc.). • Street trees and streetlights. • Public art (as indicated in the Public Art Master Plan). In addition, all development shall dedicate and construct public spaces (greens, squares, alleys, etc.).

Table 2.12. *General rules*

The form-based provisions themselves can be organized into four different sets of standards: regulating plans; building envelope standards; streetscape standards; and architectural standards. The CP-FBC district standards are a blend of generally applicable standards, plus development, design, and building envelope standards that vary with the street frontage designation in an area's regulating plan. The building envelope standards control aspects such as building height, required windows, and ground-floor use mix. In addition, there are overarching streetscape and architectural standards.

General Provisions. All regulating and development plans are subject to seven basic rules related to block configuration, streetscape, parking, retail, and other factors. Table 2.12 summarizes these rules.

Regulating Plans. A regulating plan is a map or graphic depiction of where particular standards in a form-based code are applied. (See Figure 2.16.) Although not required in Austin, Mooresville, or Denver, in this case the regulating plan is one of the most important elements of the form-based code. The CP-FBC indicates that the regulating plan is the "principal tool or coding key" for implementing the code. The regulating plan sets out four main standards for each lot subject to the plan: the required building line (RBL); the parking setback line; the street-tree alignment line; and the types and locations of the street frontage boundaries within the area covered by the regulating plan.
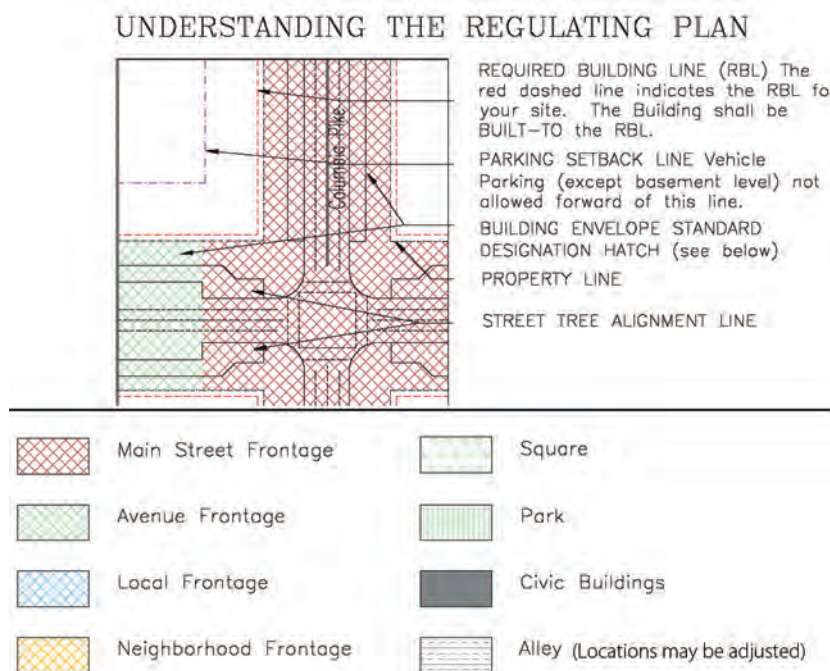
Figure 2.16. Key to the Columbia Pike regulating plan

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The RBL is a build-to line that runs parallel to the street and serves as a maximum front setback applied to any redeveloped structure. Its purpose is to establish a continuous street wall of building facades in order to reestablish enclosure along the corridor—an "urban room" for the public. The standards do not require a building wall along the full lot frontage, and the amount of building wall built to the RBL may differ from site to site, based upon the designated street frontage. For example, lots located along a Main Street frontage are required to maintain building wall along at least 75 percent of the RBL, while lots along a Neighborhood Street frontage must maintain building wall along only 33 percent of the RBL. This is similar to Denver's Main Street district provisions that apply different requirements to Colfax Avenue than are applied to side streets.

The regulating plan also establishes the parking setback line, which is parallel to and behind the RBL and limits the placement of surface and

aboveground parking. The parking setback line ensures that automobile parking is located behind building facades or underground as a means of preserving pedestrian orientation along the corridor.

Street tree placement is controlled by a specific regulating plan or a generic street-tree alignment line. The standards also include species requirements and an average spacing requirement of not more than 25 to 30 feet on center.

Finally, the regulating plans set out the geographic boundaries of the four street frontage types in the CP-FBC district (Main Street, Avenue, Local, and Neighborhood). The type determines the building envelope standards applied to building facades (as in Austin, Texas). Building envelope standards control a range of features such as height, placement, and fenestration. The building envelope standards thus control the character of a particular portion of the corridor. As in the Mooresville, North Carolina, code, the CP-FBC requires buildings on opposing sides of a street to follow the same building envelope standards as a means of maintaining continuity.

Building Types. In general, Main Street frontages are located along the Columbia Pike corridor, Avenue frontages line the block faces directly off the corridor, and the Local and Neighborhood frontages are found along secondary streets one block away from the corridor. Main Street sites tend to be the tallest and densest mixed use sites, with requirements for ground-floor retail uses. Avenue sites allow shorter buildings and ground-floor residential uses. Local and Neighborhood sites are the shortest and least dense but still seek to bring buildings up to the street and incorporate streetscape elements that are conducive to pedestrian activity. Neighborhood sites do not allow ground-floor retail uses. Table 2.13 summarizes the building envelope standards for the four street frontage types in the CP-FBC district.

Table 2.13. *Key building envelope standards by street frontage type*

	Standards	Main Street Sites	Avenue Sites	Local Sites	Neighborhood Sites
Height	All buildings to be between:	3 and 6 stories	2 and 5 stories	2 and 3 stories	1 and 3 stories
	Buildings within 40 feet of a lower-order frontage or single-family home may not exceed 32 feet				
Building Placement	Building facades must be atop the RBL for:	75 percent of the lot frontage	Not less than 10 percent of the lot frontage	75 percent of the lot frontage	Not less than 33 percent of the lot frontage
		Lot frontage subject to RBL requirements but lacking a building facade must include a wall or fence			
	Maximum lot coverage:	85 percent of lot area	70 percent of lot area	85 percent of the lot area	70 percent of lot area
	Garage doors may not face the RBL				
Building Elements	Ground-floor fenestration requirements:	60 to 90 percent	30 to 70 percent	30 to 70 percent	None
	Other standards	Upper-story fenestration requirements: 30 to 70 percent	Blank walls exceeding 20 feet are prohibited.	Each dwelling must have a porch or stoop.	Front porch is required.
Use Requirements		Ground floor must contain retail uses	Ground floor may include residential or nonresidential uses	May include live / work units of up to 1,200 square feet	Ground floor may not include nonresidential uses

In addition, the controls contain architectural standards that "utilize a discipline of form when designing new buildings in order to foster a coherent Columbia Pike aesthetic." The standards apply to surfaces, materials, and facades that are clearly visible from the street. In addition, all applicants in the district are required to complete and submit a LEED scorecard during the review process. Table 2.14 summarizes the architectural standards.

Table 2.14. *Architectural standards*

Building	• Heavy materials shall support or be located below lighter materials. • Wall openings shall not span more than one story.
Walls	• Changes in wall materials shall follow horizontal lines, continue around corners, and be made in logical locations. • Faux wood grain and "cake icing" stucco finishes are prohibited.
Roofs and Parapets	• Pitched roofs shall be configured so that the ridgeline runs parallel to the street. • Hip and gable roofs shall maintain a pitch between 6:12 and 12:12. • Eaves shall overhang 24 inches, and gable ends shall overhang 18 inches. • Flat roofs are permitted only on Main Street, Avenue, and live /work sites. • Flat roofs shall incorporate a cornice that projects outward 6 to 12 inches. • Skylights and roof vents are permitted only when not visible from a RBL.
Street Walls requirements	• Lot frontages where the building facade does not span the minimum RBL shall incorporate a street wall with a minimum height of 7 feet. • Street walls made of stucco shall incorporate a climbing vine.
Windows and Doors	• Window glass at the ground floor shall allow 90 percent light transmission, and upper-story windows shall allow 75 percent light transmission along Main Street sites. • Window screens shall be black or gray. • Windows, except bay windows, shall be at least 30 inches from a building corner. • Exterior shutters shall be sized to cover the window they are associated with (even if inoperable). • Fixed windows are permitted only as part of a window system that includes operable windows. • Residential buildings shall incorporate glass panes no larger than 30 by 36 inches. • Nonresidential buildings shall incorporate glass planes no larger than 40 by 48 inches, • Except that single-glass panels on ground floor facades may be 4 feet wide by 6 feet tall. • Shopfronts may extend up to 24 inches past the RBL. • Doors shall not be recessed more than 3 feet behind shopfront windows. • Roll-down security gates or doors are prohibited.
Signage	• Wall signs are permitted only between first- and second-story windows. • No signage letters can exceed 18 inches in height. • Window signs must be able to fit within an 8-square-foot rectangle. • Blade signs are encouraged 9 feet above the sidewalk. • Canopy, marquee, freestanding, and any signs higher than 35 feet above grade are prohibited.
Lighting and Mechanical Equipment	• Streetlights shall be no taller than 16 feet above grade. • Streetlights shall be placed along the street tree alignment line spaced 60 feet on center. • Building-mounted lights shall not exceed 16 feet in height. • Lots with alleys shall include lighting to illuminate the alley. • Floodlights shall not exceed 75 watts and shall not shine on other lots or the street. • No flashing or animated lights visible from outside a building are permitted. • Roof-mounted equipment shall not be along the RBL and shall be screened from the street.

Street Trees	• Trees must be planted in accordance with regulating plan or along street tree alignment line, spaced 25–30 feet on center. • Each tree shall be planted in a pit or strip that includes at least 60 square feet per tree. • All trees shall be at least 4 inches in diameter and 12 feet tall at time of planting. • Street trees shall be limbed-up to maintain • access over sidewalks and streets. • Tree pits and strips shall include low fencing or railing to prevent pedestrian damage to plantings. • Invasive or exotic species located anywhere on a site shall be removed.
Sidewalks	• Sidewalks shall be at least 5 feet wide. • Sidewalks along the Columbia Pike right-of-way shall include 3 distinct zones: a shy zone of 2 feet next to building facades, a clear zone 6 feet in width, and a furniture zone of up to 6 feet in width next to the curb. • Clear zones shall consist solely of poured concrete. • Landowners are responsible for maintenance of the area between the lot line and the curb.
Street Furniture	• Benches shall be provided every 50 feet along Main Street and Avenue frontages and every 100 feet for Local frontages containing live / work units. • Benches shall be placed in the furniture zone and be at least 8 feet from building facades. • Benches placed perpendicular to the street shall not exceed 4 feet in length. • One waste receptacle shall be provided at each block or building corner. • Bike racks shall be an inverted U, black, sized to accommodate two bicycles, and distributed across a site.
Squares and Greens	• Squares and greens shall be dedicated and constructed as indicated in the applicable regulating plan. • Squares shall be at least 30 percent pervious and at least 30 percent impervious, though impervious surfaces may cover up to 70 percent of the square. • Greens shall be at least 60 percent pervious and at least 30 percent impervious, though impervious surfaces may cover up to 40 percent of the site. • Squares and greens shall include public art. • Paved surfaces shall maintain a distinctive pattern that indicates the pedestrian nature of the area.

Table 2.15. Streetscape standards

Streetscape Standards. Streetscape standards in the CP-FBC district regulate distances between building fronts, the number of traffic lanes, and the locations of street trees and on-street parking to ensure coherence of street network and encourage pedestrian activity. The standards further address the area between a building's facade and the street and deal with street furniture, public art, and sidewalks. These standards also establish the configuration requirements for public squares, civic greens, and gathering areas. As with many form-based controls, these standards require that most access to off-street parking must be through side streets or alleys and not from Columbia Pike. Whether applicants use the form-based option or not, proposed developments containing more than 100,000 square feet of gross floor area require a traffic impact analysis. Table 2.15 summarizes the district's streetscape standards.

Incentives. The key incentive in the CP-FBC district has been an expedited review process for developments that choose the form-based option. In addition, the form-based provisions allow higher densities, taller buildings, and less off-street parking than typically required. As in the Denver Main Street districts, property owners might consider the optional controls a form of nonlegislative upzoning. Finally, development using the form-based provisions has lower application fees, though this is likely the least significant incentive.

Experience

Since the Columbia Pike form-based code was adopted in February 2003, the county has reviewed and approved seven major projects using its provisions. Three of these projects have been completed, together adding 692 dwelling units and more than 91,000 square feet of retail and office floor area to the Columbia Pike. (See Figure 2.17.)

A fourth project, still under construction, includes the redevelopment of a grocery store into a mixed use development including 299 dwelling units and 97,000 square feet of retail and office space. (See Figure 2.18.) The grocery store predates the form-based code regulations and exceeds 50,000 square feet (the maximum size for grocery stores under the CP-FBC district standards), so the project was reviewed using the county's typical site plan process. Nevertheless, the project complied with the form-based code provisions.

Figure 2.17. *The Halstead was the first project developed under the Columbia Pike form-based code.*

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Figure 2.18. *Construction of the Penrose Square site*

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▶ **OPTIONAL FORM-BASED DISTRICTS WITH INCENTIVES**

Other communities that have incorporated optional form-based districts with incentives similar to those adopted for Columbia Pike include:

- Albuquerque, New Mexico: TOD-MAC, TOD-COM, MX, ID, PND-C / -G / or -E Districts

- Clark County, Washington: Highway 99 Subarea hybrid form-based code

- Mobile, Alabama: Village of Spring Hill Traditional Center District

- Beaufort, South Carolina: Boundary Street Redevelopment Area

- Birmingham, Michigan: Downtown and Triangle Districts

- Hercules, California: Central Area Regulations

- East Lansing, Michigan: East Village Area

- Memphis–Shelby County, Tennessee: Medical Center Overlay District

- Overland Park, Kansas: Downtown Form-Based District ◀

The remaining projects are to include 180 dwelling units and around 70,000 square feet of retail and office floor area. Together, all seven projects account for 1,171 new dwelling units and 257,469 square feet of retail and office space.

Since adoption, various elements of the code have been amended 15 times, often in response to situations where the code lacked sufficient detail or to clarify details in the standards. One significant procedural amendment was the inclusion of the informal application review by affected civic associations, which is intended to ensure that new applications are consistent with the spirit of the 2002 revitalization plan. (The county has provided a list of the amendments at www.columbiapikeva.us/revitalization-story/columbia-pike-initiative /columbia-pike-form-based-code.)

Arlington County staff is now considering expanding the CP-FBC district boundaries to include blocks containing multifamily development that line the Columbia Pike corridor between the four main activity nodes. This expansion would be consistent with the 2002 revitalization plan.

Key Lessons

- Favoring one development form in the review process can be highly successful.

- Adopting form-based code provisions without testing them leads to difficulties with application of the standards, particularly in instances where the provisions are silent on an issue. This worked against the development review speed incentive. Testing could have identified these problems before the regulations were adopted.

- There were several cases where the form-based code provisions did not anticipate how to handle compatibility between lands subject to the form-based standards and existing adjacent auto-dependent development not subject to the standards. The result was an increase in the time of review and the need for negotiation and interpretation that worked against the predictability and review speed incentives.

- The imposition of rigid maximum building size thresholds, as in the case of the existing grocery store, can complicate a project and lead to it following the nonform-based review standards.

- Piecemeal redevelopment using form-based codes that require off-street parking behind a building are a major problem for interior lots that are not already served by an alley. There is no way to provide off-street parking to these uses, which inhibits the redevelopment process. Fee-in-lieu of parking provision tools can help but ultimately work against profitability and marketability of redeveloped floor area or dwelling units.

▶ **MANDATORY FORM-BASED DISTRICTS FOR SPECIFIC AREAS: THE HYBRID CODE IN LIVERMORE, CALIFORNIA**

When form-based controls are mandatory, they are often applied only to specific areas of a municipality, such as downtowns, transit nodes, transit corridors, or large strategic redevelopment parcels. As part of its development code update, the City of Livermore, California, developed a series of eight form-based districts—including four variations of the T4 district—while carrying over 15 nonform-based districts.

Background

Located in Alameda County, Livermore is a far-flung suburb of San Francisco and Oakland that is also home to the Lawrence Livermore National Laboratory. Partly because of the presence of the lab, in 2005 the city boasted a median household income of $96,632, the third highest in California. The city's character reflects the influences of San Francisco cosmopolitanism, the rural traditions of the Central

Valley, and the many Italian families who settled in the region and developed a wine-making economy. As Livermore grew, it expanded onto the agricultural lands that are the economic engine of the surrounding valleys; to protect those lands, the city in 2002 adopted an urban growth boundary (UGB). With little undeveloped land within the UGB, future growth and renewal of the community will occur through redevelopment and densification rather than further sprawl.

In 2001, Livermore initiated a Vision Plan that generated significant public discussion about the future of the city. That was followed in 2004 by three key policy documents: a General Plan update, City Design Standards and Guidelines, and a Downtown Specific Plan. To ensure that the planning directions in these documents were reflected in the city's land-use regulations, Livermore moved to update its zoning code and to integrate that document with its subdivision regulations, green building ordinance, and public improvement standards. From the outset, the city anticipated a hybrid document, in which form-based standards would apply to selected areas of the city and the more traditional controls would be updated and continue to apply to the remaining areas. The resulting Livermore Development Code was adopted in 2010 and became effective in May of that year.

The Regulations

The key form-based features of the Livermore, California, code are summarized in Table 2.16.

Form-Based Controls	Mandatory Zones in Specific Locations
Building Types	Yes
Frontage Types	Yes
Public Space Standards	No—but guidelines included
Block and Subdivision Standards	Yes
Regulating Plans	Yes—required in only one circumstance
By-Right Development	No—standard provisions apply

Table 2.16. *Livermore, California*

The Livermore Development Code is organized into 10 substantive chapters that largely follow the organization of the SmartCode. Nonform-based content has been reorganized to fit into this structure. A preamble to the code introduces form-based coding principles and the transect concept. The 10 chapters are listed in Table 2.17.

1. Introduction
2. General to All
3. Specific to Zones (Transect Zones / Nontransect Zones / Planned Development)
4. General to Zones (Development Standards, Parking, Landscaping, Frontages, etc.)
5. Building Types
6. Specific to Uses
7. Thoroughfare Types
8. Civic Space Types
9. Permits and Approvals
10. Subdivision

Table 2.17. *Livermore chapters*

The core of the code is the menu of zone districts crafted to achieve its hybrid purpose. The general model for form-based coding is based on Transects 1 through 6, with a "special districts" category available for unique zones that do not fit the model. In Livermore, this template was modified and calibrated to reflect the facts that: (1) the city wanted to continue to use its existing low-density Euclidean zone districts, so there are no T1 or T2 zones, just placeholders; and (2) there are few areas of the city that meet the density levels of T5 and T6. All form-based coding was done through calibration of T3 and T4 zones.

The resulting menu of form-based districts is provided in Table 2.18.

Table 2.18. Livermore form-based districts

T3N: Transect 3 Neighborhood
T4N: Transect 4 Neighborhood
T4N-O: Transect 4 Neighborhood–Open
T4MS-O: Transect 4 Main Street–Open
T4MS: Transect 4 Main Street
NMU: Neighborhood Mixed Use

The term "Neighborhood" here generally designates a residential district, while "Main Street" identifies one designed for commercial or mixed use development. The "Open" designation means that a wider mix of uses is available.

The Neighborhood Mixed Use (NMU) zone is not identified with any particular transect. In fact, it is designed to apply to a specific area of the city through a mix of the various T4 districts, but only after it has been built out under the city's previous neighborhood commercial district regulations. Once the NMU district becomes effective, future redevelopment will need to comply with its form-based standards. NMU may also be applied to other areas intended to be walkable mixed use areas in the future.

Within each form-based district, tables and graphics based on the SmartCode template address the items shown in Table 2.19. Permitted use tables have been simplified into broader categories, with most districts listing no more than 30 use types. Sample pages from the T4MS district are shown in Figure 2.20.

Table 2.19. District tables and graphics

A.	Purpose
B.	Allowed Building Types (sometimes only one type allowed)
C.	Building Placement
D.	Building Form (height, footprint, etc.)
E.	Allowed Use Types (and a use table with use-specific standards)
F.	Frontage Types and Encroachments
G.	Required Parking

In contrast to the six form-based zones, which together currently cover less than 5 percent of the land in the city, the Livermore Development Code carries forward 16 nonform-based districts that cover the remaining land. The preamble clarifies that "these zones are typically reliant on automobile

and other vehicle use and must be regulated with consideration for that context. With these requirements in mind, the updated Development Code has retained the naming conventions of the past code for these zones."

A final category includes four Planned Development districts, which offer significantly more flexibility in both agricultural and nonagricultural contexts. In essence, these are very similar to the types of negotiated zoning districts available in most municipal codes.

The code also contains site planning and subdivision design standards applicable to all districts, including standards for roads and
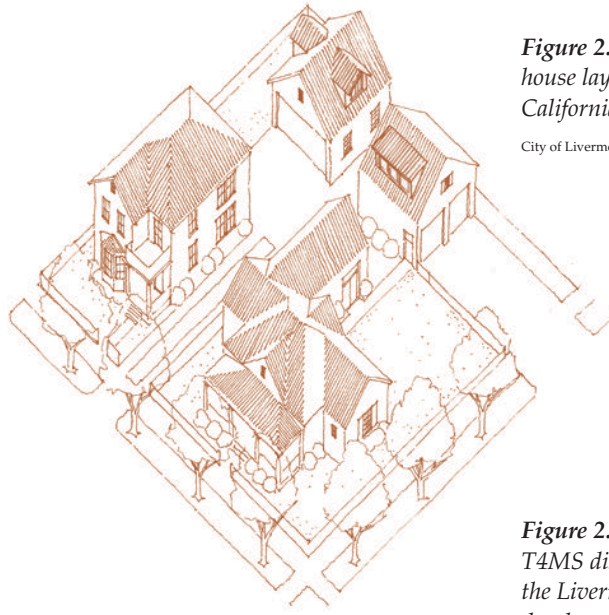
Figure 2.19. *Example carriage house layout, Livermore, California, development code*

City of Livermore

Figure 2.20. *Page from the T4MS district section of the Livermore, California, development code*

City of Livermore

3.02.110 T4 Main Street (T4MS) Standards
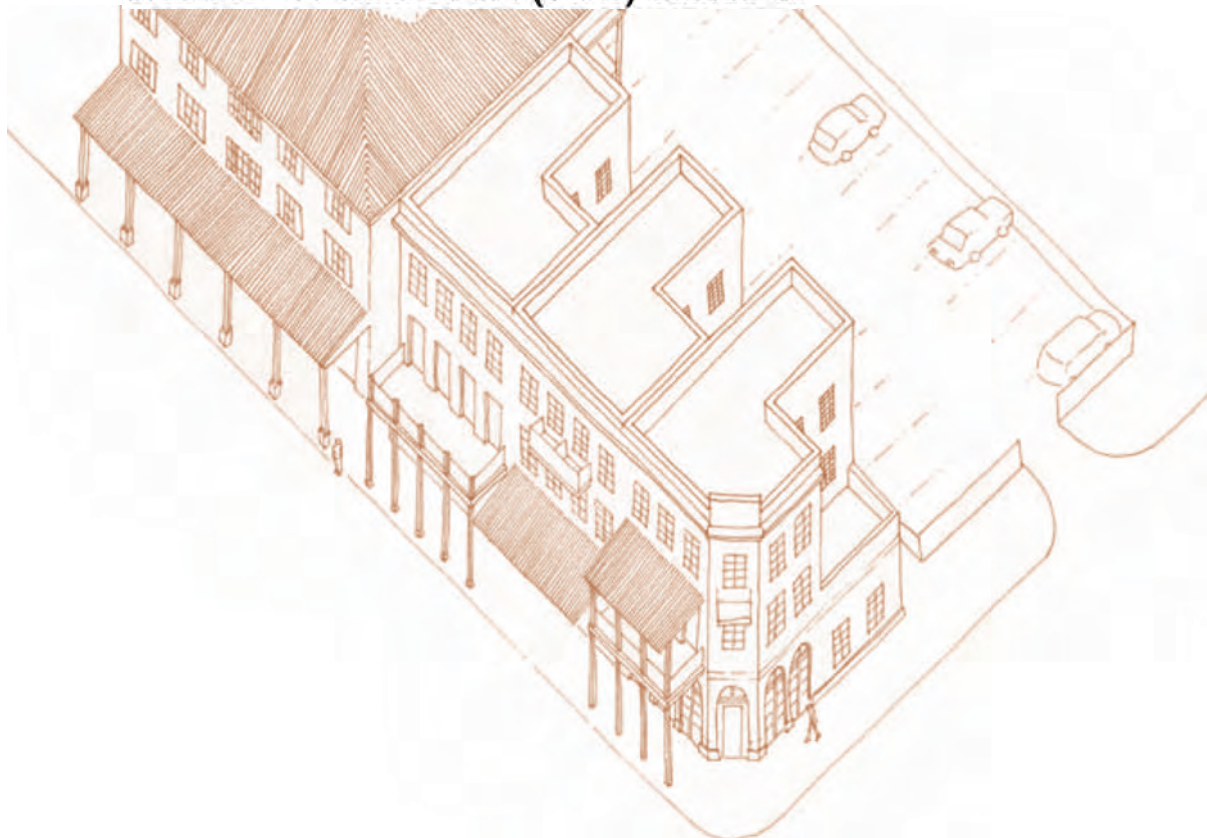
General Note: the illustration above is intended to provide a brief overview of the Transect Zone and are descriptive in nature.

A. Purpose	B. Allowed Building Types[1]
This Zone's primary purpose is to integrate vibrant main-street commercial and retail environments within walking distance of neighborhoods that will provide day-to-day commercial amenities, reinforce an existing or potential transit stop, and serve as a focal point within the neighborhood.	Commercial Block
	[1] See Part 5 (Building Types) for descriptions and regulations.

streets, block size, parcel design, public access, energy conservation, environmental health, and other general matters. In addition, a subsection contains specialized standards for Traditional Neighborhoods (TND) and Transit-Oriented Development (TOD) applicable only to the layout of parcels of 10 acres or more in the transect zones. Basic provisions address neighborhood layout, neighborhood centers / main streets, and civic space requirements. For example, standards state that each pedestrian shed should have at least 400 feet of Main Street, and that individual sections of Main Street should be at least 120 linear feet (60 feet on each side). This section also includes tables designating the minimum and maximum amount of each TND and TOD that can be designated into different zones. A portion of the TND table applicable to sites smaller than 40 acres is in Table 2.20.

Table 2.20. Traditional neighborhood development: required allocation mix of transect zones

Sites less than 10 acres	Minimum percent of land	Maximum percent of land
Sites less than 10 acres shall allocate zones as set forth in the MNU zone. See 3.02.030 (Neighborhood Mixed-Use)		
Sites greater than or equal to 10 acres but less than 40 acres		
T3 Neighborhood	0 minimum	25 maximum
T4 Neighborhood	25 minimum	80 maximum
T3 Neighborhood Open	0 minimum	50 maximum
T4 Main Street Open	10 minimum	50 maximum
T4 Main Street	10 minimum	30 maximum

The layout of development in the different Transect zones is to be accomplished through a regulating plan, and a sample plan is shown in the code. TODs and TNDs are the only situations where the Livermore code requires the creation of a regulating plan.

Chapter 4 of the code contains a wide variety of design and development requirements, including standards for development; frontage; parking; landscaping; signs; and historic preservation. Chapter 5 contains a description of 11 types of buildings that together constitute the palette of permitted options in the six form-based districts. The defined types include: carriage house; single family; bungalow court; duplex, side by side; duplex, stacked; duplex, front and back; town house; fourplex and sixplex; courtyard apartment; live / work; and commercial block. Each type includes a narrative description, several pictures, an axonometric drawing showing proper location on a lot, and plan and elevation drawings of key parameters. Code sections address lot requirements; pedestrian access; frontage types; vehicle access and parking; usable open space; and building size and massing. The requirements for the single-family building type are shown in Figure 2.21a–b.

5.01.040 Single-Family

General Note: the drawings and photos below are illustrative.

Newly constructed single-family home with stoop frontage and detailed elements such as the bay window, rake and eaves, and windows.

A. Description

Single-unit detached houses typically located within primarily single-family neighborhoods or near neighborhood main streets. Well designed single-family homes engage the street with porches or stoops and place garages and parking pads behind the house.

Newly constructed small lot single-family home in Livermore.

Figure 2.21a. Single-family building form standards, Livermore, California

City of Livermore
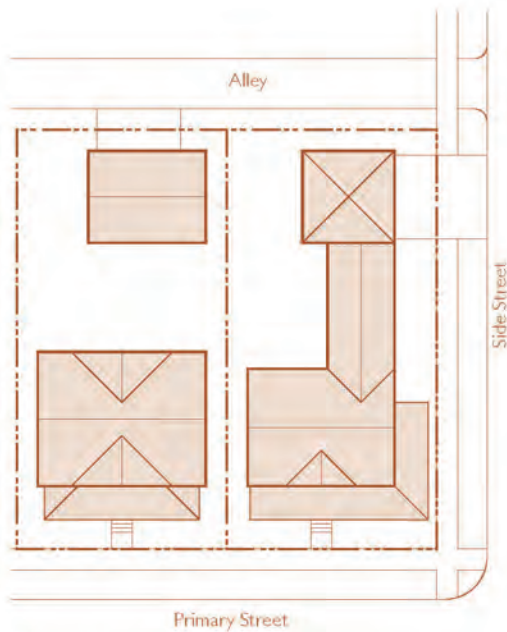
Typical Alley Loaded Plan Diagram
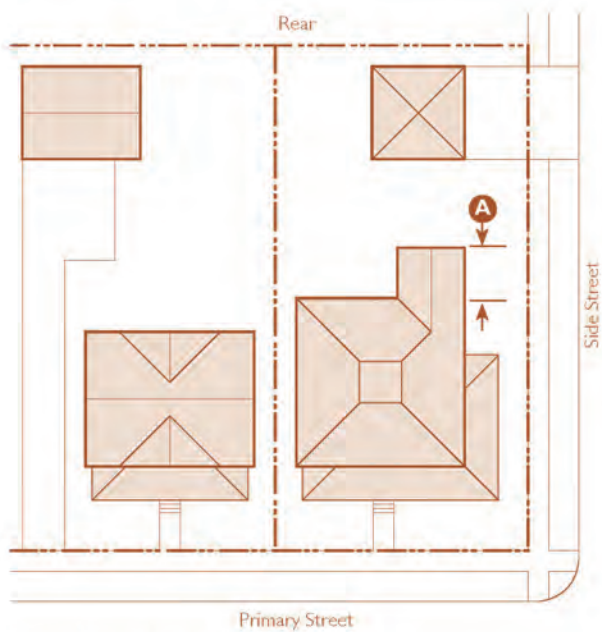
Typical Front Loaded Plan Diagram

Key

---- ROW / Property Line   ▣ Building Area

B. Lot	
Lot Size	
Width	50' min., 75' max.
Depth	75' min., 150' max.
Size ¹	5,000 sf min.
¹ Smaller lot size permitted only if already existing at time of adoption, 05/01/10.	
C. Pedestrian Access	
Main Entrance Location	Primary street
D. Frontages	
Allowed Frontages	
Porch	
Stoop	
E. Vehicle Access and Parking	
Parking spaces may be enclosed, covered or open.	

F. Open Space, Usable	
Width	15' min.
Depth	15' min.
Open Space Area	300 sf min.
Required street setbacks and driveways shall not be included in the open space area calculation.	
G. Building Size and Massing	
Main Body	
Width	36' max.
Secondary Wing	
Width	24' max. 🅐
Detached Garage	
Width	22' max.
Depth	25' max.

Figure 2.21b. Single-family building form standards, Livermore, California

City of Livermore

As with some form-based zones in other cities, the list of building type requirements overlaps the list of district requirements. Both, for example, address building form and frontage types. In case of conflict, the more specific information for the building type prevails. Similarly, the Transect district materials in Chapter 2 address required parking, the specific amounts of parking required for different uses are in Chapter 4, and the specific types of parking (open, covered, within, or under buildings) are addressed for each building type in Chapter 5.

Chapter 6 (Specific to Uses) consolidates all conditions and requirements that apply to a use regardless of the zone district in which it is located. The material is subdivided into those standards applicable throughout the city and those that apply in nontransect zones, apparently because these uses are not permitted in the transect zones. There is no subset of conditions applicable only within the transect zones.

Chapter 7 (Thoroughfare Types) includes guidelines for the design and retrofit of Livermore streets to more pedestrian- and bicycle-friendly designs over time. Although the design of streets is critical to new urbanist and form-based philosophies, many cities find it difficult to regulate street design through zoning ordinances. This is also the case in Livermore, where the introduction to Chapter 7 indicates that the materials supplement those in the City of Livermore Standard Details, Standard Specifications, and Development Plan Check and Procedures Manual, and that in case of conflict the existing manual (not Chapter 7) governs. Like other aspects of the Livermore code—such as the description of Transects 1, 2, 5, and 6, even though there are no zones developed for those districts—this chapter intends to develop a vocabulary and design ideas for streets that would reinforce form-based zones even if they do not have regulatory effect.

Finally, Chapter 8 (Civic Spaces) presents a menu of six preapproved types of civic spaces appropriate for walkable communities, including Plazas, Pocket Parks, Urban Parks, Neighborhood Pocket Parks, Community Gardens, and Playgrounds. Each type includes a definition, narrative description, photos of examples, size and location standards, a character statement, allowed / typical uses, and stormwater management techniques. Text clarifies that only the dimensional and location standards are intended to be regulatory. However, in case of conflict with the Design Standards Guidelines, Standards Details, or Standard Specifications, the latter will govern.

Chapter 9 (Permits and Approvals) consolidates materials in that category but does not differ significantly from those of nonform-based codes. The SmartCode procedural tools of Warrants and Waivers are not used.

The Livermore Development Code is an impressively thorough attempt to apply the SmartCode template to the structuring, formatting, and "feel" of a hybrid development code, even though the zones are developed only for T3 and T4 and those zones apply to less than 5 percent of the land in the city. In 2011, the Form-Based Codes Institute gave the Livermore code a Driehaus Award, stating, "It provides a valuable model of how to code a medium-sized town with existing walkable and sprawl neighborhoods," and, "The document is organized to incorporate a form-based code into a larger development code overhaul, such that the sprawl areas of the city remain under Euclidean zoning while the form-based code is designed for walkable areas of the city and designed to expand to all walkable areas—as the city is ready."

The Livermore code applies form-based structure and content to a new code while not applying the substance of those controls to the majority of the city that is currently low density and not particularly walkable. It gives Livermore an almost complete palette of SmartCode structure, vocabulary, and tools, although some form-based concepts appear only as placeholders and some key tools are guidelines rather than regulations. It also allowed Livermore to pursue a strong form-based agenda for the two percent of its lands that represent key walkable areas while reassuring the majority of the city's residents in low-density residential areas (and many agricultural, commercial, and industrial areas) that their current zoning has not been changed.

▶ **MANDATORY FORM-BASED DISTRICTS FOR SPECIFIC AREAS**

Another community that has incorporated mandatory form-based districts for specific areas similar to those adopted by Livermore is Flagstaff, Arizona.

In addition, other communities have integrated a mix of form-based and nonform-based districts into a unified structure that is not based on the SmartCode model, including:

- Duluth, Minnesota: Unified Development Chapter

- Grass Valley, California: Development Code, Traditional Neighborhood Development Zone

- Hamden, Connecticut: Zoning regulations (R- zones and T1–T5 zones) ◀

Experience

Livermore has not yet applied the Transect Districts of its new development code to specific building applications, as there have been no applications for significant development within those districts. However, Livermore staff report that some potential applicants for land-use approvals have made test inquiries and that the city has not yet seen any need to revise the regulations based on those inquiries.

Key Lessons

- Start the form-based code effort by understanding the basic nature of the city—which in Livermore's case was stable, affluent, and largely suburban and auto-oriented. The Livermore code acknowledges that a revised menu of development controls was not necessary for areas that were happy with their form of development and unlikely to redevelop into walkable mixed use neighborhoods in the foreseeable future.

- It is possible to create a development code structure based on the Smart-Code and use it to organize all of the zoning provisions for a relatively large city, even if those controls apply to only a small portion of the city.

- When significant areas of a community will not be subject to transect-based zones, it may still be possible to reorganize the nonform-based content to fit into the SmartCode chapter template. Livermore built a SmartCode house but was able to furnish only a few rooms with SmartCode furniture.

- If this approach is followed, those building in the nontransect districts will need to get used to the new code organization—i.e., the SmartCode progression of General to All – Specific to Zones – General to Zones – Building Types – Specific to Uses.

- A disproportionate amount of the code content may be relevant to only small areas of the community, but that is not unusual even in nonform-based codes.

- Even a form-based code that includes several detailed T3 and T4 zones may have to "carve out" some form-based areas for special treatment. In this case, Livermore needed to define a Neighborhood Mixed Use area that allowed more flexibility to build out under current regulations before applying a mix of transect-district requirements to redevelopment of that area in the future.

▶ **MANDATORY CITYWIDE FORM-BASED CODES: THE MIAMI 21 ZONING ORDINANCE**

Because the SmartCode represents such a thorough departure from most zoning ordinances, few cities have implemented it as a complete and mandatory replacement for their current zoning codes. While many cities refer to the SmartCode in zoning reform efforts and implement parts of it—particularly its use of graphically depicted building, frontage, and street types—few of the resulting codes "look like" the SmartCode, and those parts that do follow the template closely typically apply only to specific areas of the city.

The exception is Miami, which in 2005 began to completely reinvent its approach to zoning based on close adherence to the SmartCode. The resulting Miami 21 code was adopted in October 2009. To date, Miami is the largest American city with a mandatory SmartCode-based ordinance; there is no alternative "traditional" code for applicants to choose and no areas of the city to which Miami 21 does not apply.

Background

With an estimated population of 390,000, Miami is Florida's second-largest city and a growing gateway for trade and travel between the United States

and Latin America. The city occupies an area between the Atlantic Ocean, the Everglades, and Biscayne Bay—natural constraints that limit and push growth north and southwest. Like most Florida cities it grew sporadically through boom-and-bust cycles into the 1920s and 1930s. World War II turned much of south Florida into a military base and embarkation area, but when the war ended the growth did not. Demographic shifts, relatively cheap land, and an expanding economy combined to fuel consistent and sprawling growth.

Figure 2.23

The city adopted its first zoning ordinance in 1934, and its postwar growth led to thousands of amendments to the zoning code and map, which were periodically replaced. New codes were adopted in 1960, 1982, and 1990; by 2005, the flaws in 1990's "Ordinance 11000" had become glaringly clear. Two real estate booms in the intervening 15 years had resulted in high rises sprouting above Miami's low-rise neighborhoods. This pattern was spurred in part by a fee-in-lieu provision that allowed developers to "buy" additional density in return for cash contributions to an affordable housing fund. As Miami commissioner Johnny Winton commented that year, "There is nothing like a development boom to expose the flaws in the current system" (Viglucci and Haggman 2005).

Miami 21 was a comprehensive overhaul of the zoning ordinance, with Duany Plater-Zyberk as lead consultant and the SmartCode as the model. The two-year project was to consider each of the city's four quadrants on a six-month schedule, but it soon became clear that a longer process would be necessary. Building height and scale was one of the key issues to be addressed, but because the high-rise building industry is a high-stakes business and community organizations were determined to protect lower-scale neighborhoods, Miami 21 soon became highly controversial. To defuse controversy and improve understanding of both form-based zoning in general and Miami 21 in particular, the city funded and conducted an elaborate public involvement program through all forms of media, including more than 500 public meetings.

Mayor Manuel Diaz made Miami 21 the centerpiece of his administration, but it took until the closing days of his term to complete the process. On October 22, 2009, the Miami City Council voted 4–1 to approve the new code, with Councilmember Tomas Regalado voting no. One month later Regalado was elected mayor, and the pro-Miami 21 majority evaporated. The new administration delayed implementation, but the investment and effort in Miami 21 had created momentum, and on May 20, 2010, the first mandatory SmartCode-based zoning ordinance for an entire large American city took effect.

The Regulations

The form-based controls in Miami 21 are summarized in Table 2.21.

Table 2.21. Miami 21 controls

Form-Based Controls	Miami 21 Form-Based Code
Building Types	No types—but standards included
Frontage Types	Yes—Table 6
Public Space Standards	Yes—Table 7
Block and Subdivision Standards	Nothing form-related
Regulating Plans Design	Yes—initially for one area. Later expanded to two more areas (Miami Citicentre and Miami District)
By-Right Development	Yes

The code is structured differently than conventional district-by-district zoning ordinances and is organized into nine articles:

1. Definition

2. General Provisions (legal materials)

3. General to Zones

4. Standards and Tables

5. Specific to Zones

6. Supplemental Regulations

7. Procedures and Nonconformities

8. Thoroughfares

9. Landscaping

Following the SmartCode template, the bulk of the regulations are consolidated into several tables. Table 1 lays out eight zone districts, the first five of which correspond closely to T1 through T5. However, T6 (designed for the densest urban fabric) is divided into seven zones depending on the maximum permitted building height (from eight to 80 stories). The seventh district is a civic (C) zone, which contains three subzones based on the character and intensity of the civic use; and the eighth district (D) zone category

also contains three subzones based on intensity and location. Instead of just six transect zones, Miami wound up with 18 zones, but all of the variation is contained in the dense urban core and employment areas.

Table 2 consolidates information about "lot occupation" (lot area, width, coverage, frontage, open space, and density), building setbacks, outbuilding setbacks, private building frontages, and maximum heights for each of the 18 districts. (See Figure 2.24, pages 64 and 65.) Lots are treated as having "layers"—the first layer is closest to the street, the second layer is farther back, and the third layer is the farthest back—in order to permit or prohibit different types of structures, parking, and uses in those areas. The tables address the massing and location of buildings on their sites before discussing uses. They also discuss the location of buildings and their relation to the street (frontage types) before discussing building heights. This table was amended in April 2012 to include minor changes.

Table 3 summarizes the uses permitted in each of six districts. (See Figure 2.25, page 66.) The "collapsing" of districts from 18 to six is accomplished by ignoring the very low-density T1 and T2 districts (whose uses are listed elsewhere in the code) and by allowing all of the same uses in the seven T6 districts, the three C districts, and the three D districts. Almost all of the permitted uses are consolidated into 46 categories, which are variously allowed on "Open," "Limited," or "Restricted" bases or else prohibited. The distinctions among use designators are generally based on intensity, with "Open" being the most generous, "Restricted" corresponding roughly to an accessory or residential use, and "Limited" falling somewhere in between. For each use permitted, the table indicates whether it is permitted by right, by "warrant" (an administrative process), or by "exception" (after a public hearing before an appeals board).

Table 4 summarizes intensity and parking requirements for each use category (residential, lodging, etc.) through a separate table for each transect or district and different requirements for Open, Limited, and Restricted uses in that category. Not surprisingly, the regulations become more complex and the tables longer for the T5, T6, and D districts. Table 6 illustrates eight frontage types and indicates where they are allowed in the T3 through T8 districts. Table 7 illustrates eight types of civic space and where and how they are permitted.

But the code is not as simple as the tables suggest. The SmartCode model includes several instances where summary tables refer the reader to other chapters where more detailed use- or topic-specific regulations read like more traditional zoning codes. Miami 21 uses this technique frequently, reflecting the inherent messiness of urban development and the fact that large cities are complex places. For example, Article 3 (General to Zones) includes details about

- Successional Zoning (which limits rezoning to the next higher intensity district in most cases);

- Neighborhood Conservation Area (existing overlays stay in place);

- Special Area Plans (which allow negotiated development parameters if you have nine acres or more); and

- The Midtown and Miami Worldcenter areas of the city, which are carved out and kept as appendixes somewhat outside the SmartCode regulatory approach.

LOT OCCUPATION	T1 NATURAL ZONE	T2 RURAL ZONE	T3 SUB-URBAN ZONE	T4 GENERAL URBAN ZONE	T5 URBAN CENTER ZONE	T6-8 URBAN CORE ZONES	T6-12	T6-24
a. Lot Area			5,000 s.f. min.	1,400 s.f. - 20,000 s.f. **	1,200 s.f. - 40,000 s.f.**	5,000 sf. min 40,000 s.f. max.**	5,000 sf. min. 70,000 s.f. max.**	5,000 sf. min. 100,000 s.f.max. **
b. Lot Width			50 ft. min.	16 ft. min / 50 ft. min.**	16 ft. min / 50 ft. min.**	50 ft. min.	50 ft. min.	50 ft. min.
c. Lot Coverage			50% max.1st Floor 30% max. 2nd Floor for T3 R & T3L only	60% max.	80% max.	80% max.**	80% max.**	80% max.**
d. Floor Lot Ratio (FLR)						5	8	7
e. Frontage at front Setback				50% min.	60% min.	70% min.	70% min.	70% min.
f. Green / Open Space Requirements			25% Lot Area min.	15% Lot Area min.	10% Lot Area min.	10% Lot Area min.	10% Lot Area min.	10% Lot Area min.
g. Density			9-18 du/acre max.**	36 du/acre max.	65 du/acre max.	150 du /acre *	150 du /acre *	150 du /acre *
BUILDING SETBACK								
a. Principal Front			20 ft. min.	10 ft.min.	10 ft. min.	10 ft. min.	10 ft. min.	10 ft. min.
b. Secondary Front			10 ft. min.	10 ft. min.	10 ft. min.	10 ft. min.	10 ft. min.	10 ft. min.
c. Side			5 ft. min.**	0 ft. min. / 5 ft. min.**	0 ft. min.**	0 ft. min.**	0 ft. min.**	0 ft. min.**
d. Rear			20 ft. min.	20 ft. min.	0 ft. min.**	0 ft. min.**	0 ft. min.**	0 ft. min.**
OUTBUILDING SETBACK								
a. Principal Front			20 ft. min. (T3 L only)	30 ft. min.				
b. Secondary Front			10 ft. min. (T3 L only)	10 ft. min.				
c. Side			5 ft. min. (T3 L only)	0 ft. min. / 5 ft. min.				
d. Rear			5 ft. min. (T3 L only)	5 ft. min.				
PRIVATE FRONTAGES								
a. Common Lawn			permitted	permitted	prohibited	prohibited	prohibited	prohibited
b. Porch & Fence			permitted	permitted	prohibited	prohibited	prohibited	prohibited
c. Terrace or L.C.			prohibited	permitted	prohibited	prohibited	prohibited	prohibited
d. Forecourt			prohibited	permitted	permitted	permitted	permitted	permitted
e. Stoop			prohibited	permitted	permitted	permitted	permitted	permitted
f. Shopfront			prohibited	permitted (T4 L, T4 O)	permitted (T5 L, T5 O)	permitted (T6-8 L, T6-8 O)	permitted (T6-12 L, T6-12 O)	permitted (T6-24 L, T6-24 O)
g. Gallery			prohibited	prohibited	permitted **	permitted **	permitted **	permitted **
h. Arcade			prohibited	prohibited	permitted **	permitted **	permitted **	permitted **
BUILDING HEIGHT (Stories)								
a. Principal Building			2 max.	3 max.	2 min. 5 max.	2 min. 8 max.	2 min. 12 max.	2 min. 24 max.
b. Outbuilding			2 max.	2 max.				
c. Benefit Height Abutting T6, T5 & T4 only						4 max.**	8 max.**	24 max.**

PUBLIC FRONTAGES (deleted)

* Or as modified in Diagram 9

** Note: Refer to Article 5 for Specific Transect Zone Regulations

Figure 2.24. Miami transect summary table

City of Miami

Impressively, the Miami 21 effort also included a complete remapping of the city to reflect the new districts. This did not involve simply translating the existing zones to the most similar Miami 21 districts but a remapping of most areas based on their existing built structures, which could be significantly above or below the permitted heights and densities under the old system. In fact, significant support for the adoption of Miami 21 came from neighborhoods and organizations that believed much of the city was overzoned and that the new approach would limit future buildings to those similar in scale and size to the existing fabric.

Experience

Because of the economic recession that began in 2008, there has been only a moderate amount of development submitted or approved under Miami 21. However, at least five buildings have been approved, the most notable an office building for Santander Bank, which was approved with several waivers from the requirements of the code. The approved waivers included:

- A waiver of the requirement that ground floor facades include pedestrian-active "liner" uses. The Santander Bank building includes an eight-story
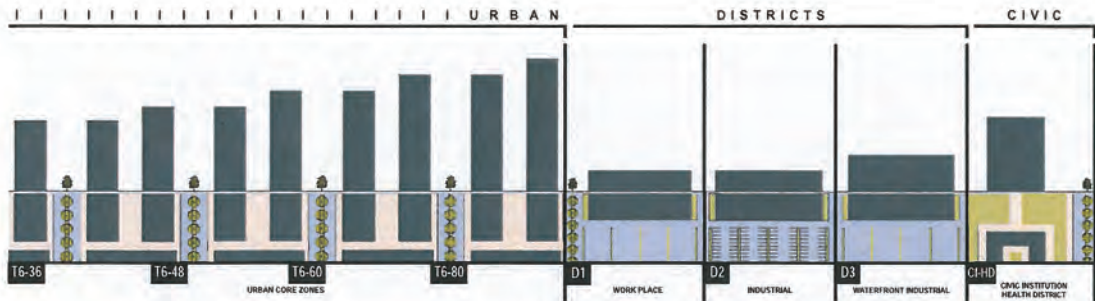
	T6-36	T6-48	T6-60	T6-80	D1 WORK PLACE	D2 INDUSTRIAL	D3 WATERFRONT INDUSTRIAL	CI-HD CIVIC INSTITUTION HEALTH DISTRICT
LOT OCCUPATION								
a. Lot Area	5,000 sf. min.	5,000 sf. min.	5,000 sf. min.	5,000 sf. min.	5,000 s.f. min.	5,000 s.f. min.	10,000 s.f. min.	10,000 s.f. min.
b. Lot Width	100 ft. min.	100 ft. min.	100 ft. min.	100 ft. min.	50 ft. min.	50 ft. min.	100 ft. min.	50 ft. min.
c. Lot Coverage	80% max.**	80% max.**	80% max.**	80% max.**	80% max	90% max	90% max	80% max
d. Floor Lot Ratio (FLR)	a.12 or b.22	a.11 or b.18	a.11 or b.18	24				8
e. Frontage at front Setback	70% min.	70% min.	70% min.	70% min.	None	None	None	None
f. Open Space Requirements	10% Lot Area min.	10% Lot Area min.	10% Lot Area min.	10% Lot Area min.	5% Lot Area min.	5% Lot Area min.	5% Lot Area min.	10% Lot Area min.
g. Density	150 du /acre *	150 du /acre *	150 du /acre *	150 du /acre *	36 du/acre max.			150 du /acre *
BUILDING SETBACK								
a. Principal Front	10 ft. min.	10 ft. min.	10 ft. min.	10 ft. min.	10 ft. min.	10 ft. min.	5 ft. min.	10 ft. min.
b. Secondary Front	10 ft. min.	10 ft. min.	10 ft. min.	10 ft. min.	10 ft. min.	5 ft. min.	5 ft. min.	10 ft. min.
c. Side	0 ft. min.**	0 ft. min.**	0 ft. min.**	0 ft. min.**	0 ft. min.**	0 ft. min.**	0 ft. min.**	0 ft. min.**
d. Rear	0 ft. min.**	0 ft. min.**	0 ft. min.**	0 ft. min.**	0 ft. min.**	0 ft. min.**	0 ft. min.**	0 ft. min.**
OUTBUILDING SETBACK								
a. Principal Front								
b. Secondary Front								
c. Side								
d. Rear								
PRIVATE FRONTAGES								
a. Common Lawn	prohibited	prohibited	prohibited	prohibited	prohibited	prohibited	prohibited	permitted
b. Porch & Fence	prohibited	prohibited	prohibited	prohibited	prohibited	prohibited	prohibited	prohibited
c. Terrace or L.C.	prohibited	prohibited	prohibited	prohibited	permitted	permitted	permitted	permitted
d. Forecourt	permitted	permitted	permitted	permitted	permitted	permitted	permitted	permitted
e. Stoop	permitted	permitted	permitted	permitted	permitted	permitted	permitted	permitted
f. Shopfront	permitted (T6-36 L, T6-36 O)	permitted (T6-48 L, T6-48 O)	permitted (T6-60 L, T6-60 O)	permitted (T6-80 L, T6-80 O)	permitted	permitted	permitted	permitted
g. Gallery	permitted **	permitted **	permitted **	permitted **	permitted **	permitted **	permitted **	permitted **
h. Arcade	permitted **	permitted **	permitted **	permitted **	permitted **	permitted **	permitted **	permitted **
BUILDING HEIGHT (Stories)								
a. Principal Building	2 min. 36 max.	2 min. 48 max.	2 min. 60 max.	2 min. 80 max.	none 8 max.	none 8 max.	none 8 max.	1 min. As regulated by F.A.A.
b. Outbuilding								
c. Benefit Height Abutting T6, T5 & T4 only	24 max.**	32 max.**	unlimited **	unlimited **	2 max.**			

* Or as modified in Diagram 9
** Note: Refer to Article 5 for Specific Transect Zone Regulations

atrium designed so that there is activity on each level facing the atrium and generally visible from the streets outside the atrium. The street-facing glass facades would therefore allow views of the activities inside the atrium—but that is not itself a pedestrian-active use. The waiver allowed Santander to ignore the "liner" requirement subject to review of the atrium facades and design by the Urban Development Review Board. Generally, a waiver of a code requirement does not require review by the board, but waivers of pedestrian-active liner requirements on primary frontages are an exception. This is a level of detail not included in the SmartCode but achieved (or negotiated) through the "calibration" process.

- A waiver of the requirement that parking structures be lined with pedestrian active uses, to allow the use of a terra-cotta screening material on ground-floor facades.

- A waiver of the limit on accessory compact-car spaces. Santander could meet that standard for required spaces but wanted more flexibility to use compact spaces for additional parking provided at their option. Miami 21 does not include parking maximums but requires that parking be counted

	T3 SUB-URBAN			T4 URBAN GENERAL			T5 URBAN CENTER			T6 URBAN CORE			C CIVIC			D DISTRICTS		
	R	L	O	R	L	O	R	L	O	R	L	O	CS	CI	CI-HD	D1	D2	D3
DENSITY (UNITS PER ACRE)	9	9	18	36	36	36	65	65	65	150*	150*	150*	N/A	AZ**	150*	36	N/A	N/A
RESIDENTIAL																		
SINGLE FAMILY RESIDENCE	R	R	R	R	R	R	R	R	R	R	R	R						
COMMUNITY RESIDENCE	R	R	R	R	R	R	R	R	R	R	R	R			R			
ANCILLARY UNIT		R		R	R	R												
TWO FAMILY RESIDENCE			R	R	R	R	R	R	R	R	R	R						
MULTI FAMILY HOUSING				R	R	R	R	R	R	R	R	R			R			
DORMITORY					E	E		R	R		R	R		E	R			
HOME OFFICE	R	R	R	R	R	R	R	R	R	R	R	R			R			
LIVE - WORK					R	R		R	R		R	R			R			
WORK - LIVE															R	R		
LODGING																		
BED & BREAKFAST				W	R	R	E	R	R	E	R	R			R	R		
INN						R		R	R	E	R	R			R	R		
HOTEL								R	R		R	R			R			
OFFICE																		
OFFICE					R	R		R	R		R	R		E	R	R	R	W
COMMERCIAL																		
AUTO-RELATED COMMERCIAL ESTAB.									W		W	W				R	R	
ENTERTAINMENT ESTABLISHMENT						R		W	R		R	R				R	R	
ENTERTAINMENT ESTAB. - ADULT																		R
FOOD SERVICE ESTABLISHMENT					R	R		R	R	W	R	R	W	E	R	R	R	W
ALCOHOL BEVERAGE SERVICE ESTAB.					E	E		E	E		E	E			E	E	E	E
GENERAL COMMERCIAL					R	R		R	R	W	R	R	E	E	R	R	R	W
MARINE RELATED COMMERCIAL ESTAB.								W	W		W	W	E			R	R	R
OPEN AIR RETAIL								W	W		W	W	W	E	R	R	R	W
PLACE OF ASSEMBLY								R	R	E	R	R		E	E	R	R	W
RECREATIONAL ESTABLISHMENT								R	R		R	R		E	R	R	R	W
CIVIC																		
COMMUNITY FACILITY					W	W		W	W		W	W	W	E	W	R	R	
RECREATIONAL FACILITY	E	E	E	E	R	R	E	R	R	E	R	R	W	E	W	R	R	
RELIGIOUS FACILITY	E	E	E	E	R	R	E	R	R	E	R	R	W	E	R	R	R	W
CIVIL SUPPORT																		
COMMUNITY SUPPORT FACILITY					W	W		W	W		W	W		E	E	R	R	W
INFRASTRUCTURE AND UTILITIES	W	W	W	W	W	E	W	W	W	W	W	W	W	E	W	W	R	W
MAJOR FACILITY														E	R	E	E	E
MARINA				E	W	W	E	W	W	E	W	W	R	E		R	R	R
PUBLIC PARKING					W	W	E	W	W	E	W	W		E	R	R	R	W
RESCUE MISSION														E	R	E	W	W
TRANSIT FACILITIES					W	W	E	W	W	E	W	W		E	R	R	R	W
EDUCATIONAL																		
CHILDCARE				E	W	W	E	W	W	W	W	W	E	E	R	E		
COLLEGE / UNIVERSITY								W	W		W	W		E	R	E		
ELEMENTARY SCHOOL	E	E	E	E	E	E	E	W	W	E	W	W		E	R	E		
LEARNING CENTER					E	E		R	R		R	R	E	E	R	E		
MIDDLE / HIGH SCHOOL	E	E	E	E	E	E	E	W	W	E	W	W		E	R	E		
PRE-SCHOOL	E	E	E	E	E	E	E	R	R	E	R	R		E	R	E		
RESEARCH FACILITY					R	R		R	R		R	R		E	R	R	R	W
SPECIAL TRAINING / VOCATIONAL						E		W	W		W	W		E	R	R	R	W
INDUSTRIAL																		
AUTO-RELATED INDUSTRIAL ESTBL.																R	R	W
MANUFACTURING AND PROCESSING																R	R	W
MARINE RELATED INDUSTRIAL ESTBL.																R	R	R
PRODUCTS AND SERVICES																R	R	W
STORAGE/ DISTRIBUTION FACILITY																R	R	W

R Allowed By Right

W Allowed By Warrant: Administrative Process - CRC (Coordinated Review Committee)

E Allowed By Exception: Public Hearing - granted by PZAB (Planning, Zoning & Appeals Board)

Boxes with no designation signify Use prohibited.

Uses may be further modified by Supplemental Regulations, State Regulations, or other provisions of this Code.

* Additional densities in some T6 zones are illustrated in Diagram 9.

** AZ: Density of lowest Abutting Zone

Figure 2.25. *Miami use table*

City of Miami

in calculating project floor area ratios (FARs), which discourages excess parking.

- A waiver of maximum driveway width from 30 to 38 feet, because the parking garage would have only one entrance (rather than several).

- A reduction in required loading spaces from five to four.

Another approval under Miami 21 was the 192-unit My Brickell residential building. Although this project had vested rights under the prior zoning code, Miami 21 provides that amendments to prior approvals that comply with Miami 21 are administrative (i.e., do not require public hearings), while those that do not meet Miami 21 standards require a hearing. In addition, while reuse and redevelopment of existing buildings and already approved buildings do not need to conform to Miami 21, expansions of existing buildings do need to comply. The owners of this parcel wanted to expand the approved building and remove a requirement for a parking garage, so they brought the amendment through in compliance with Miami 21.

Other relatively large buildings approved under Miami 21 include:

- The 237-unit Rex Art Residences (with 7,000 square feet of commercial space), which required only a minor waiver of a setback from 10 to 9.4 feet;

- The 442-foot-tall, 382-unit Millecento building, which opted for a 30 percent waiver of parking requirements due to its proximity to transit; and

- The 75-foot-tall, 250-unit Miami River Apartments, which required a waiver of 10 percent of the required off-street parking spaces (from 400 to 360).

All five of these large projects are located in the T6 zones: Santander Bank, My Brickell, and Millecento in the T6-48 (story) district, and Rex Art and Miami River in the T6-8 district. All are under construction except the Miami River Apartments (for which the approval is being revised) and the Santander Bank building.

Although the passage of Miami 21 resulted in litigation, most of the cases centered on two issues:

(1) Several claims were filed under the Bert Harris Act, which creates municipal liability for virtually any zoning changes that reduces property values. These types of suits could have accompanied any significant zoning reform, form-based or not. One specific invocation of the act arose from Miami 21's creation of a view corridor to protect views of the Vizcaya Museum and Gardens, because the prior zoning would have generally kept heights at a level that did not interfere with those views. Some property owners whose heights were restricted to protect the view corridor in ways that do not apply to other similar properties challenged the application of those special controls. Most of the suits alleged constitutional regulatory takings or similar statutory claims under the Harris Act.

(2) Some suits challenged a system of transferrable development rights that was approved concurrently with Miami 21. A companion piece of legislation restricted heights in the "Miami Modern" (MiMo) historic district and allowed forgone development potential to be used in some of the Miami 21 districts.

MANDATORY CITYWIDE FORM-BASED CODES

Another community that has incorporated mandatory citywide form-based codes similar to that adopted by Miami is:
• Cornelius, North Carolina: Zoning ordinance

Key Lessons

The ambitious scope of Miami 21 produced numerous lessons regarding the application of the SmartCode to an existing large city. Those include:

• The complexity of form-based zoning increases rapidly when it covers an entire city. Older cities did not grow according to a pattern, and attempts to discover and apply one after the fact are bound to run into conflicts between actual and desired forms. To stretch the model to meet local conditions, existing overlay restrictions were retained, and the T6 zone was expanded and divided to cover a wide variety of different downtown conditions.

• Even a very ambitious and thoughtful citywide zoning project may need to carve out some areas for special treatment. In this case, the Midtown and Miami Worldcenter areas were made subject to separate regulations, which probably reflects the political difficulty of forcing all of any city into a particular zoning model. What is technically possible may turn out to be politically impossible (or simply not worth the effort).

• Although both Miami 21 and the SmartCode consolidate development regulations into graphically attractive tables, there are many exceptions and instances where the tables simply contain cross-references to lengthy regulations that could not (and probably should not) be forced into a table.

• Administrative approval of form-based designs may turn out to be a significant incentive for property owners.

• Neighborhoods may have different needs and preferences, with some wanting more and some wanting less regulation—something Miami 21 does not fully address. Planners may need to consider the potential of overlays to vary controls even within a specific transect district.

Form-Based Controls
in the Broader Planning Context

Better control of the built form of our communities is not the only major challenge facing America's planners. This chapter explores whether form-based zoning tools can help achieve better planning solutions to four additional planning challenges.

More specifically, we explore whether form-based zoning will make it easier, make it harder, or make no difference in our ability to find good planning solutions to these trends:

- *Sustainability.* It is now abundantly clear that the way we have built our cities and transportation systems over the last 50 years has contributed significantly to the increased emission of greenhouse gasses and to unsustainable levels of resource consumption.

- *Demographics.* America is becoming more diverse, older, and less healthy, which has implications for the types of communities we need and the types of activities we need to encourage.

- *Housing Affordability.* The average cost of housing has risen faster than average wages for the past 50 years, with the result that a steadily rising share of the U.S. populace is unable to afford the types of housing that planners have approved and builders have built.

- *Historic Preservation.* Although we have regulatory tools in place to protect important historic districts and structures, most of them focus on the architectural details of individual structures rather than the fabric of the an entire historic area, and many of the tools we use conflict with current zoning controls.

All four of these trends suggest that the form and design of American cities will be forced to change in significant ways—and that the rules that shape urban form also need to change. What is not clear is whether form-based zoning controls are part of the solution to some or all of these problems.

FORM CONTROLS, SUSTAINABILITY, AND CLIMATE CHANGE

Form-based controls and sustainable development are two of the most popular recent trends in urban planning, and while media coverage may suggest that sustainable development planning can best be implemented by form-based controls, experience has shown that the goals of these two planning movements do not always align. This section attempts to disentangle these two topics and evaluate the strengths and weaknesses of each individually by looking at the essential components of zoning for sustainable development and then evaluating where those components align with the key tools of form-based zoning and where they do not.

What Is Sustainable Development?

Despite many attempts, there is still no widely accepted definition of what is included in sustainable development or sustainable zoning (Herman 2010; Duerksen 2008), and different cities use different definitions. The popularity of "sustainability" as a planning term has made it broad enough to cover almost any planning concept with an advocacy group behind it. The list almost always includes environmental systems—air, water, and waste—but it is often expanded to include habitat, food supply, economic development, and housing. Yet if we make "sustainability" synonymous with "good long-range planning," it becomes even more difficult to identify its distinguishing features.

One way to narrow this discussion is to focus on elements of sustainability that can be addressed through zoning and subdivision regulations. To implement their plans, cities must translate aspirational language into objective and measurable standards that they are politically willing to enforce. With this in mind, many cities have narrowed the discussion of sustainability to five discrete topics where good zoning can and does make a difference:

- *Air / Climate Change:* Reducing vehicle-miles traveled and related carbon dioxide emissions

- *Energy:* Promoting energy conservation and renewable energy

- *Water:* Promoting water conservation and quality

- *Food:* Promoting urban agriculture and local food production

- *Health:* Promoting walkability and community health

In most cases, the items not included in this list—economic development, attainable housing, green infrastructure, wildlife habitat, solid waste management, and others—are addressed by some other municipal regulation or standard; to narrow the list of sustainable zoning topics that need to be addressed through land-use regulations, cities often choose to focus on those topics that are not adequately addressed by existing programs and initiatives.

This section will explore where the use of form-based zoning tools support improved sustainability in these five areas—and where the goals of the two movements may be in tension. Figure 3.1 shows the areas of comparison; the question is how and where these two circles overlap.
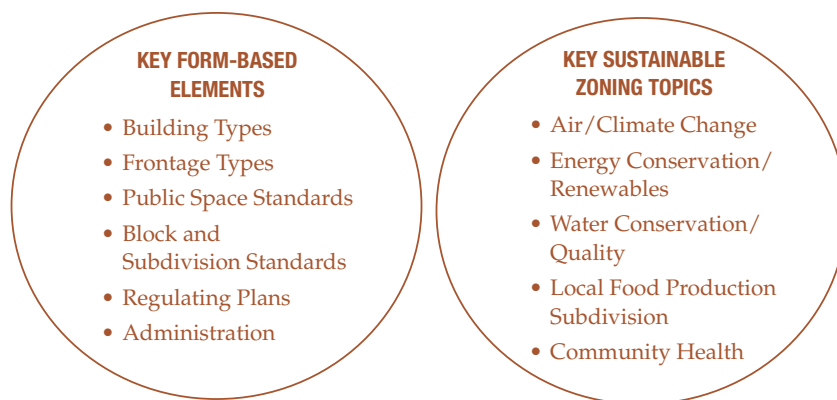
KEY FORM-BASED ELEMENTS

- Building Types
- Frontage Types
- Public Space Standards
- Block and Subdivision Standards
- Regulating Plans
- Administration

KEY SUSTAINABLE ZONING TOPICS

- Air/Climate Change
- Energy Conservation/ Renewables
- Water Conservation/ Quality
- Local Food Production Subdivision
- Community Health

Figure 3.1. Comparison between form elements and sustainable zoning

Clarion Associates

Air / Climate Change, Energy Conservation, and Community Health

We group together the impacts of form-based controls on air quality / climate change, energy conservation, and community health because they all relate to driving behavior, walking, biking, and their effects on CO_2 emissions and energy consumption. While zoning can also influence energy consumption and renewable energy by allowing (or preventing) solar collectors, wind energy conversion systems (WECS), and geothermal energy equipment, there is no significant difference between the ways in which form-based and nonform-based zoning approach those issues.

Building Type and Frontage Standards. One of the most distinctive characteristics of form-based controls is their use of building types and form standards—templates of permitted sizes and shapes of buildings and their placement on the lots in different zone districts. The requirements and impacts of the more urban transects (T4–T6) often differ from those in the more rural or suburban transects (T1–T3).

In more urban areas, form-based zoning often requires buildings to be constructed close to the primary fronting street (and sometimes also to a side street), with vehicle parking located behind, within, or under a building. For example, the Denver Main Street zones, several of Mooresville's permitted building types, Austin's street-based frontage controls, and Miami 21's transects 4 through 6 require buildings near the street and parking behind or within the primary building. In addition, many building form controls

include a menu of permitted building-frontage types addressing in detail how the building "fronts" the street—e.g., as a storefront, stoop, porch, arcade, covered walkway, or another defined form. Miami 21 contains a menu of frontage types tied to different streets in order to encourage walkability, and the Livermore code also deals with frontage types.

These controls are aimed not only at the positive design impacts of street enclosure but at promoting walkability and at emphasizing the role of the pedestrian over the automobile. They make it more likely that building tenants, occupants, and visitors will walk to buildings from nearby locations, reducing driving trips and related CO_2 emissions as well as promoting general health through exercise.

Of course, many nonform-based zoning controls also aim at the same result by establishing "build-to zones" that prevent large building setbacks or requiring that parking be located behind the front building facade. For example, Mooresville addresses the "friendliness" and "walkability" of buildings not through defined frontage types but through the same types of direct access, facade articulation, and transparency requirements found in the downtown portions of many nonform-based codes. Still, for more urban areas, form-based controls are an elegant way to establish buildings close to the street as the norm for building location, rather than a rule applied to only selected streets or areas.

Public Space Standards. Another key element of form-based codes is their inclusion of public space standards: regulations for land-use elements in the public realm, such as parks, plazas, greens, greenways, and squares, as well as streets, travel lanes, sidewalks, on-street parking, and street furniture. Zoning for public streets as well as private property represents a radical departure from traditional zoning. In most cities, the design and dimensions of streets are the purview of traffic engineers, and

Pedestrians and a bicyclist in the commercial center of a redeveloped naval training station in Orlando, Florida

Brett VA

this disconnect between the regulation of the public and private realms has often resulted in awkward relationships between the two. Requiring that streets be designed to complement the intended use and functions of the buildings, and vice versa, is a major improvement that could pay important dividends in terms of sustainability.

In theory, buildings closer to the street and continuous sidewalks with fewer interrupting cuts for driveways encourage walkability, streets with bicycle lanes encourage biking, smaller parking areas in less visible locations under or behind buildings may discourage driving, and increased numbers of street trees can better offset the heat island effect of roadway concrete and absorb more carbon dioxide, all of which could benefit air quality, slow down climate change, reduce energy consumption, and improve public health. Street designs incorporating bioswales or other rainwater infiltration areas provide water quality and conservation benefits as well. While the biggest payoffs come from improved multimodal streets, the incorporation of parks, plazas, and greenways could also have positive effects on health—more people walk if there is an attractive place to walk to—and tree cover in these spaces contributes to the absorption of carbon dioxide.

Two qualifications should be noted, however. First, these benefits are not unique to form-based controls. Many American cities have been moving toward narrower, more pedestrian-, bicycle-, and transit-friendly streets, and the public has long been pushing for more pleasant street environments for pedestrians, without embracing form-based controls. Similarly, many cities have been requiring that medium and larger projects include publicly accessible parks, plazas, and open spaces since the 1970s. One nice feature of form-based approaches is that they graphically describe how to coordinate the right hand of building design with the left hand of road design.

Second, form-based codes often do not include revised street standards because of institutional barriers between planning and public works departments. None of the six examples in Chapter 2 includes regulatory standards on street design—their regulatory controls all stop at the property line, sidewalk, or curb. This reflects the fact that there is much more to the art and science of road and traffic management than the relationships of streets to the adjacent buildings. In addition to creating a pedestrian- and bike-friendly relationship between the two and reducing auto trip volumes (which many traffic engineers would readily endorse), street design needs to accommodate the realities of utility network design and maintenance, through-traffic movements, turning movements, sight distances from intersections, emergency vehicle access, traffic-light timing requirements, and (in some cases) storm evacuation routes. As a result, many communities that adopt form-based regulations leave street design and engineering to the public works department. In some cases, the form-based controls include public space standards that address complementary street designs, but those are treated as advisory by public works officials. Alternatively, a form-based code for a smaller area may regulate design for local and collector streets in that defined area, while the design of the arterials that border or intersect the area are left to public works standards.

However, form-based controls that do include regulatory public-space standards may be significantly more effective than those that only include advisory standards. And care needs to be taken to ensure that gains in walkability and reduced driving in one area does not result in longer drives or increased emissions when surrounding areas or the city as a whole are taken into account. Although form-based controls provide a more graphically direct way to coordinate building and street design, they may not be significantly more effective than nonform-based controls if the public realm standards do not result in improved street design regulations.

Nonform-based controls also sometimes require and provide standards for parks, plazas, squares, and other nonstreet public spaces. Because the science of open-space design evolved as a suburban planning tool, in many cities traditional open-space requirements are built on designs and standards more

appropriate for auto-oriented communities. But ever since the New York City zoning code of 1961, cities have also been requiring or incentivizing more urban plazas, arcades, and squares through nonform-based tools. The major difference between form- and nonform-based approaches in this area is that some form-based controls include a more extensive, graphically illustrated menu of urban open space types for use in the denser transects. Nonform-based codes are more likely to require x acres of open space per y dwelling units in the form of plazas, arcades, balconies, or patios, while form-based controls are more likely to provide a drawing of each type, a table of maximum and minimum dimensions, and detailed development standards. Among the Chapter 2 case studies, only Miami 21 contains form-based standards and requirements for nonstreet open spaces, and those are advisory.

Regulating Plans. In theory, the power of regulating plans to require a more specific mix of building types should also help enhance dense urban walkability and the environmental benefits that come with it. Putting more complementary uses within walking distance could reduce driving and promote positive impacts on air quality, climate change, energy conservation, and community health. But form-based codes focus on controlling building form, not use, so requiring a specific mix of building types may not result in a use mix that reduces walking. For example, requiring a commercial-storefront building type in an area dominated by office buildings may not result in those buildings being occupied by convenience retail uses, which could reduce auto trips, if the code allows office uses in that building type. Therefore, the degree to which regulating plans contribute to sustainability goals depends on whether they control building use, either directly or indirectly.

Figure 3.2. Detail of a sample regulating plan

Macomb Township, Michigan

In most cases, a nonform-based regulation would control building use (after all, that is the premise of Euclidean zoning), but it would not attempt to mix uses at the fine grain of a small-scale area regulating plan. In addition, as Chapter 2 demonstrates, many form-based approaches do not require regulating plans at all. Of the six case studies, only two (Livermore and Miami) have requirements that approach this finer grain of control, and only for limited situations.

Rural and Suburban Areas. In rural and suburban areas, form-based controls operate differently but may produce indirect benefits for air quality, climate change, and energy conservation. T1 identifies land that should never be developed; T2 areas should be developed for agricultural and rural uses only; and T3 reflects suburban development patterns. In each of these cases, form-based controls tend to prevent significant changes in the current scale and character of development, but locking in suburban densities prevents the densification of these areas to more urban scales over time—the very densification that could make those areas more energy efficient and less auto-dependent.

Broadly defined, this is a risk with all form-based controls that are based on current development patterns: by better defining the scale and form of development to match current conditions and development forms, they can slow down the densification of suburban areas over time. This "lock-in" effect can be avoided by using form-based controls that allow bigger buildings than currently exist, but that is also true of nonform-based controls; many areas of U.S. cities are considered "overzoned" by their residents, meaning that the current zoning allows buildings significantly larger than those now in place. While overzoning allows buildings that are too big to "fit in" with their neighbors, it also allows densification of urban areas over time without the need to rezone or to obtain special approvals.

While locking in densities in T3 and T4 areas may slow down the air quality and energy efficiency gains that come with denser development, the opposite may be true in rural and preservation areas. By clearly stating that T1 lands are not to be developed and that T2 lands are rural in character, the lock-in effect tends to operate as an indirect growth management system. In effect, T2 controls say "rural means rural"—not just farmland awaiting development. Since sprawling, auto-dependent land-use patterns are one of the primary culprits leading to energy consumption and air pollution (long drives) and water consumption (big yards), tools that slow down sprawl generally promote more sustainable land-use patterns. The same graphic tools that allow citizens to better visualize matching scales of development in T3 and T4 areas (which could make densification more difficult) can also help communicate the appropriate scale of T2 rural development (making sprawl more difficult). All of this assumes that lands are appropriately mapped to match transect-based land-use principles. If land that should be zoned rural because of its clear rural character is instead zoned suburban to enable suburban-scale development in the future, then the antisprawl bias inherent in transect-based coding is lost.

None of the case studies in Chapter 2 included a serious attempt to control development in preservation or rural areas through form-based controls; while several of the tables in Miami 21 include columns for T1 and T2 areas, those columns are often blank. All of the other case studies focus on urban corridors or nodes and use form-based controls to promote urban-scale walkable mixed use. The potential for form-based controls to act as antisprawl tools has not been realized in these six communities. Only Miami 21 addresses the middle of the density range (T3), where the question of whether form-based tools promote or thwart sustainability depends on whether that code enables or stops densification over time. As noted, however, significant

support for Miami 21 came from "overzoned" neighborhoods that did not want to see density increases. In more urbanized contexts, it is likely that at all six examples of form-based controls will tend to reduce climate change impacts, promote energy conservation, and promote community health by promoting dense, mixed use, walkable developments, at least compared with older nonform-based approaches that have not included the same form controls in other ways.

Water Conservation and Quality

Water conservation is another key area in sustainable zoning but one in which the performances of form-based and nonform-based approaches do not differ significantly. The major areas for progress in building- and zoning-related water conservation are:

- Water-Efficient Buildings. Cities can require the use of more water-conserving appliances and systems (e.g., low-flow toilets and showers or waterless urinals) within a building, but these are generally regulated through building codes rather than zoning.

- Water-Efficient Sites. Cities can reduce the amount of water consumed outside the structure by requiring water-conserving landscaping or limiting turf areas, topics increasingly addressed through zoning. Outside water use can also be reduced by limiting or prohibiting outside water connections, but that is generally regulated through the building code.

- Water Reuse. Cities can require graywater recycling (two-pipe) systems in new buildings and new developments. While individual building systems are generally regulated by the building code, requirements or incentives for project- or areawide systems can be included in zoning and subdivision regulations.

This leaves us with a zoning focus on water-conserving landscaping and (perhaps) graywater recycling systems. Most form-based codes do not address these issues in significant detail, and none of our six case studies include significant tools in this area. In urban areas, the shift in focus to walkable density has resulted in fewer and smaller open areas to landscape, so less attention is paid to that topic. In theory, denser mixed use development consumes less land per person, so there is less land per person to be mowed and irrigated, and total water use on landscaping goes down. The impact of form-based tools occurs indirectly through density, however, and a nonform-based code that produced the same higher urban densities would produce the same results.

The impacts of form-based controls on graywater recycling systems are also unclear. The total water savings of a graywater system depend on how many people are participating in the system and how many opportunities there are to substitute graywater for potable water. Denser development means more people participating and more toilets where graywater can be used, but fewer acres of outside landscaping that could be irrigated by graywater. Less dense development means higher costs for two-pipe systems that have to serve more acres but the same number of toilets, and more acres of landscaping where graywater can reduce potable water consumption. At this point it is not clear whether denser development actually promotes or reduces the feasibility and economics of graywater systems.

Few cities mandate graywater systems except in major new developments. The upfront expenses are significant, and few cities have shown the political will to impose extra costs on development. Instead, they are more likely to offer incentives such as higher allowed density in return for

the installation of graywater systems. In theory, form-based systems avoid the use of incentives that result in larger or taller buildings because they require the form of development that best fits the surrounding area, and this would be compromised by allowing buildings that do not fit, even if they provide public benefits. Denver followed this approach in developing its citywide form-based ordinance between 2005 and 2010. The city's old code had numerous density incentives, but the new code does not—it allows only buildings that fit into its menu of building types and sizes for each of the seven context areas.

Interestingly, Miami 21 does include incentives for affordable housing and open space, even though the SmartCode upon which it is based does not. In recent years, an optional, supplementary SmartCode module has been released to show how incentives can be integrated into even heavily form-driven documents. Still, incentives appear to be occasional and secondary concerns in many form-based codes. When cities want to rely on incentives rather than mandates to encourage graywater systems (or any public amenity), they are more likely to find good examples of those incentives in nonform-based zoning codes than form-based ones.

A perforated concrete pipe forms part of a stormwater management system in a suburban pond.

iStockphoto.com / Brian Guest

Stormwater Management

While not directly related to water conservation, the issue of stormwater management and quality is demanding more attention from planners throughout the United States. In coding more urban areas to become truly urban, some form-based controls may make it more difficult to implement emerging practices in stormwater management. Historically, the urban treatment of storm water has been to move it away through pipes or lined ditches, treat it (or not) somewhere else, and then deposit it in a river or stream. These "hard engineering" solutions cost money and create significant environmental impacts but allow valuable urban land to be used for buildings and related parking rather than on-site retention, detention, or infiltration. Over the past few decades, however, the U.S. Environmental Protection Agency (EPA) has been requiring cities to convey less stormwater off-site in order to reduce the volume of water added to rivers, the speed at which water reaches rivers, and the levels of pollutants in that water. This revised approach has sometimes taken the form of a requirement that the first inch of rainfall be accommodated on-site without significant runoff—which in practice means that stormwater has to infiltrate the ground or be retained in a pond or cistern somewhere between where it fell and the river.

The green infrastructure and low-impact development movements have developed numerous "more-infiltration / less conveyance" tools including swales, "green streets" (infiltration strips in streets and parking lots), "green roofs," engineered wetlands, and other techniques, many of which require land free of buildings. But requiring more permeable land on-site tends to push buildings farther apart, decreasing walkability, increasing the required lengths of pipes, wires, and roads between development parcels, and reducing the "urbanity" of the place. While form-based controls often require open space types (parks, pocket parks, plazas, squares, greens, and greenways) that can be fit into an urban pattern without compromising its urbanity, those forms of open space are often too small to act as infiltration points that can meet EPA on-site retention requirements for the large amounts of urban-density development surrounding them.

Since form controls for more urban areas often require a significant majority of building parcels to be covered by buildings, this means that a portion of the stormwater will need to be either captured in on-site underground cisterns and then released over time or transmitted off-site to a treatment facility or to lower-numbered transect areas where more infiltration can occur. While cisterns and underground detention structures help achieve the EPA's goals of reducing runoff without reducing land occupied by buildings, they are not considered sustainable solutions but simply another form of hard engineering. They are also probably more expensive than current engineered approaches.

One response to this tension has been for advocates of denser, mixed use, walkable development patterns to argue that the efficiency of stormwater approaches should be evaluated in terms of costs per resident rather than costs per acre. So although the use of underground pipes and cisterns may cost more per acre than green infrastructure solutions, when the added density in urban districts is taken into account the cost per resident is actually lower (U.S. EPA 2005, 2009). Again, the answer lies in density. In areas of greater density, costs per person decline, but that is not dependent on whether form- or nonform-based zoning is used to achieve that density.
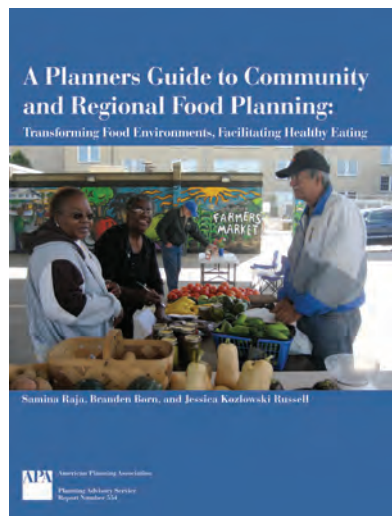
Local Food Production

Recent studies show that the average vegetable travels hundreds of miles from the location where it is grown to the place where it is consumed (Pirog and Benjamin 2005). That adds up to many millions of rail and truck miles traveled, with the accompanying fuel consumption and pollution generated during that travel. For this reason and many more, the desire for fresh, locally produced food has become a surprisingly powerful force in planning and regulation for local sustainable development.

Food-related land uses have not been a focal point of form-based use controls, and both form-based and nonform-based controls can be amended to permit local food uses such as community gardens, farmers markets, and community-supported farms. Historically, however, agriculture has not been considered an urban land use, and form-based controls for the dense urban transects were generally not developed with urban agriculture in mind. As with stormwater, this issue can be finessed with innovative ideas—vertical farming, agricultural uses of green roofs, terraces, and rain gardens—but as a practical matter it is easier for most people to grow food horizontally at ground level.

Higher-density form-based controls that require minimum densities and lot coverage patterns that do not leave open spaces for urban gardening or do not include urban agriculture as a permitted use make local food production more difficult. However, by protecting current patterns of density and open space in T1 and T2 areas, they may preserve more land for agriculture

than would be available if those lands were consumed by sprawl development. Therefore, the impact of form-based controls on local food production is probably neutral—or at least unknown at this point. The same is true, however, of nonform-based codes, many of which allow agricultural uses in low-density zones and do not allow these uses in denser development zones. Both form- and nonform-based land-use controls can be adapted to promote urban agriculture, and it is not clear that either tool has inherent advantages in this area.

By-Right Development

All land-use codes include review and approval procedures to evaluate whether a proposed development complies with a city's rules for that type of project. These administrative procedures have an important indirect effect on sustainability: codes that make it easier to get approval for sustainable development and harder to obtain approvals for less-sustainable development will significantly affect the character and quality of what is built. Real estate development is a financially risky business, and builders favor projects that minimize risk. The mantra among land-use review mavens is "make it easy to do the right thing."

Because form-based controls focus on the form of the building rather than its specific use, they aim at allowing more uses by right. In contrast, many older codes, focused primarily on the separation of incompatible uses, have long lists of conditional uses requiring individualized review or hearings. In recent years, however, both form-based and nonform-based code reform efforts have moved to favor by-right development because more voters are willing to accept mixed use development and because it reduces administrative review costs.

As a corollary, most form-based controls address more aspects of building design and quality than nonform-based systems do. In addition to front, side, and rear build-to lines or setbacks, building height, and required on-site parking and open space, building form templates often address frontage type, roof or cap type, door and window patterns, and facade articulation in greater detail. Just as for uses, however, adding more regulations on building shape and form increase the chances that an applicant will need relief from one of them. If the need to apply for a conditional use permit in a Euclidean use-based system is simply replaced by the need to ask for relief from a form-based control (for example, to request parking between the building and the street), the efficiency of the review system may not have improved.

While needing to ask for city approval through a conditional use or variance process generally makes it more difficult to complete the development process, the amount of time it takes to receive permission can vary widely. Under traditional zoning theory, the only way to get relief from the strict application of the code was to ask for a variance and prove "hardship," which generally required a public hearing and generated a significant body of law on what, exactly, defined a zoning hardship. As an alternative, the SmartCode recommends a system of "warrants," exceptions to the strict application of form-based controls that can be approved by staff without the need for a hearing if certain conditions are met. The Miami 21 code follows this approach, while our other five examples have retained the traditional variance approach. Clearly, an individualized review process that does not require the time and expense of a public hearing is easier for applicants than a hearing requirement. Nonform-based codes have been moving in the same direction, however, and many cities now offer an "administrative variance," "administrative adjustment," or "administrative departure" that allows staff to make some decisions without the need for hearings.

Those systems that allow more by-right uses and more density while requiring more pedestrian-friendly and walkable building and site designs may allow those developments to proceed more quickly, and with less negotiation, than systems requiring more conditional use reviews and public hearings during the development process. If appropriate mixes of uses and densities are allowed by right, both form-based and nonform-based codes that follow this approach can help promote sustainability.

Summary Table

The varied impacts of different form-based zoning tools on the five key elements of sustainability are summarized in Table 3.1. Each of the tables in this chapter evaluates the contribution of each element alone, not in combination with other factors.

Table 3.1. Five key targets for sustainable zoning

Key Form-Based Tools	Air Emissions / Climate Change	Energy, Conservation, and Renewable Energy	Water Conservation	Urban Agriculture	Walkability/ Public Health
Building Types / Standards	●	●	O	O	●
Frontage Types / Standards	◆	◆	O	O	●
Public Space Standards	◆	◆	O	◆	●
Block and Subdivision Standards	◆	◆	O	O	●
Regulating Plans	◆	◆	O	O	◆
Administration	O	O	O	O	O

● Potentially significant contribution

◆ Moderate or mixed contribution (e.g., impacts in more dense areas may be offset by impacts in other areas)

O Little impact or no different than nonform-based controls

FORM CONTROLS AND DEMOGRAPHIC CHANGES

There are sweeping demographic changes taking place throughout the United States. For decades, the average age of persons in American households has been increasing, while the average size of households has been falling. The nuclear family of parents and school-aged children has become the exception rather than the norm, and that reality will persist. We are becoming a nation of smaller, older households. At the same time, the proportion of racial and ethnic minorities is increasing, and the country is becoming more diverse. The U.S. Census Bureau recently determined that in 2010, for the first time in history, the number of minority babies outnumbered that of non-Hispanic "white" babies born in the United States (Morello and Mellnick 2012).

At the same time, consumer preferences for housing are also evolving, with the suburban ideal giving way to smaller family sizes, more urban living, and a desire for decreased dependence upon the automobile. These changes are supported by new economic realities. Today, people have less discretionary income, are less likely to be able to afford homeownership, and are delaying major life events such as getting married, having children, purchasing a home, and retiring. The effects of these trends on housing affordability are discussed in more detail later in this chapter.

Our nation's urban form must evolve to reflect and respond to these significant changes. We now consider the degree to which form-based regu-

lations help or hinder our progress toward successfully addressing these demographic shifts. "Success" in this context means the degree to which development regulations help local governments and the building industry meet the needs of their citizens while at the same protecting natural resources and the long-term viability of the community.

Key Demographic Trends

Five key demographic trends are anticipated to have profound effects on the nation over the next 40 to 50 years: the slowing of the population growth rate; the aging of the population; the general shrinking of household size; immigration and changes in ethnic composition; and changes in residence location preferences.

America continues to grow in population, but the rate is slowing. During the first decade of the 21st century, the nation grew by about 27.3 million people (a 9.7 percent increase) to a total population of 308 million people—the slowest decade of population growth in 70 years (Brookings Institution 2011). Even so, the population is expected to grow to 392 million people by 2050, though the period from 2030 to 2050 is projected to be the slowest growth rate in the country's history (Day 2011). Many experts believe that the slowdown in population growth over the preceding decade resulted from a combination of reduced immigration, slower economic growth, and low birthrates.

Several implications follow from these trends. Declining birthrates mean fewer children. States and metropolitan areas that have relied on heavy in-migration for growth may need to recalibrate their economies to foster more diverse and better job opportunities to retain their populations. The

A senior housing complex in the Midwest

iStockphoto.com / Jennifer Byron

U.S. may need to rely even more heavily on technology and innovation to maintain current levels of economic production with a declining supply of human labor. At the same time, our country's population is getting older. The median age was 34 in 1994 and 35.5 in 2000 and is projected be 39 by 2050, thanks to advances in medicine, health care, and public safety (along with declines in the birth rate). Life expectancy has risen from 76 in 1993 to 77.9 in 2007 and is expected to increase to 82 by 2050 (Day 2011). In 1950, around 8 percent of the population was over 65; by 2009, that figure was almost 13 percent, and by 2050 it is expected to be around 20 percent (Passel and Cohn 2008).

In terms of land use, these trends suggest the nation will need more health-care providers and associated health-care facilities, along with housing, uses, and land-use configurations that cater to older individuals. More persons will need transportation services and easy access to goods and services. As disposable incomes decline during retirement years, a larger portion of the population will struggle to maintain the individual homes where they have lived and want to continue living. Many of these effects are likely to be felt more strongly in suburban areas, as that is where the majority of the over-45 population lives.

As American society evolves and economic conditions change, the notion of what a typical household is continues to change as well. Household size has declined significantly, from 3.8 persons in 1940 to 2.59 in 2010 (Day 2011). In 1970, 40 percent of households were married couples with children under the age of 18. By 2011, this figure had fallen to just 21 percent (Brookings Institution 2011). Attitudes regarding family size are also changing. A 2011 Gallup poll showed that 58 percent of U.S. adults believed that a family of two or fewer children is the ideal size. This figure is remarkably lower than a comparable figure from 1945, when 77 percent of U.S. adults felt that families with three or more children were the ideal size (Saad 2011). Single-person households are also on the rise. In 1960, 13 percent of households consisted of a single person, compared to 25 percent in 2000 and 27 percent in 2010 (Day 2011).

An exception to these trends is the recent rise of multigenerational households. It is becoming more common to see elderly parents move in with their children, "boomerang" children return home after college, and immigrant households comprise extended families. Nearly 50 million Americans now live in homes containing at least two adult generations, up from 28 million in 1980 (Sullivan 2010). Our cities were built with the expectations that households had children that needed parks and schools close by—but it now may be that we need fewer neighborhood schools and more elder care facilities. One of the primary ramifications of these changes is the growing need for more yet smaller homes, more diverse housing options, and housing that is capable of greater flexibility over time to accommodate changing family conditions.

Another factor of change in the United States is racial composition. As mentioned, immigration is the primary driving force behind U.S. population growth today; every year about one million new immigrants arrive in the country. Forecasts project that by 2050 one out of every five Americans will be an immigrant (Passel and Cohn 2008). Nonwhites (primarily Hispanics and Asians) were responsible for 92 percent of the population growth during the 2000s (Brookings Institution 2011). The Latino population will triple in number from 2005 to 2050, from 14 percent of the population to 29 percent (Passel and Cohn 2008). Hispanic and Asian immigrants bring different cultural views regarding living arrangements, employment, and shopping. Communities that respond to the tastes and preferences of these ethnic groups will be more successful at capturing growth and investment. The range of social service demands (and associated costs) is also likely to change. It is worth noting that a majority of every large minority or ethnic group is now living in the suburbs instead of in urban areas. While immigrants are still moving to urban areas, the immigrant population in the suburbs is growing faster than in urban core areas.

Alongside these other changes, some portions of the population are returning to urban areas or seeking out urbanlike settings in suburban contexts. In recent years housing prices in central cities have soared, even in places where population growth is modest or declining (*Economist* 2011). One demographic group seeking out urban lifestyles is Generation Y, or the

Millennial Generation (also known as the Echo Boomers), born during the 1980s and early 1990s, but there is anecdotal evidence that some in the over-45 population are also moving to urban environments in search of convenience, freedom from the responsibilities of property maintenance, and a desire for independence from the automobile. And yet, some researchers expect that most of the growth in the elderly population will be in the suburbs of major metro areas and regions of the country not capturing new immigrant minorities: in other words, the 76 million baby boomers will "age in place" in suburban locations (Frey 2000). A related phenomenon is that Americans, though they still move more than their counterparts in other developed nations, move a lot less often than they used to.

Finally, a long-term trend in average house size appears to be changing. U.S. Census data show that the average single-family house size grew from 1,660 square feet in 1973 to 2,521 square feet in 2007 but then declined slightly in 2010 to 2,392 square feet (Day 2011). Many researchers believe this signals a trend toward smaller homes. According to developer surveys, while 43 percent of Americans prefer traditional large suburban homes, the majority do not (Showley 2012). While the existing stock of larger single-family homes is not well matched to the long-term decline in household size, it may help accommodate the slowly growing share of multigenerational households and the larger average family size of minority households.

Taken as a group, these trends show a nation with slowing growth, an aging population, smaller and more nontraditional households, an increasing percentage of immigrants, and continued growth in suburban areas relative to urban cores. All of these will require changes in the types of housing we build, the mix of support services we need and their locations with respect to one another, and the ways we move in our urban areas: in other words, changes in urban form. Future needs for the urban areas where the vast majority of our population will live include:

- A wider variety of housing types, particularly for small households;

- Housing types that accommodate multigenerational adult households;

- Less land devoted to elementary, middle, and high schools;

- More land devoted to support services for the elderly (adult day care, health care facilities, nursing homes, continuum of care facilities); and

- More housing and support services accessible to a nondriving population.

The market is already in the process of addressing some of these challenges, and land-use regulations are beginning to recognize and respond to those initiatives (and in rare cases they are leading the response). The following sections will explore whether and how form-based regulations can be effective tools in addressing these demographic challenges successfully, with each of the six distinguishing components of form-based controls being considered in turn.

Building Types or Standards

Form-based codes allow (and sometimes require) a wide range of residential and mixed use building forms. In T3 and T4 areas, form-based standards often encourage or require elements such as "granny flats" or guest houses behind single-family homes or above backyard garages. In the more urban T4 and T5 areas, they often allow live / work structures as well as vertical mixed use (upper-story residential above ground-floor nonresidential uses) and multifamily building forms. Any standard that seeks to provide

a wider variety of housing types (and housing prices) helps to address the changing demographics discussed above by increasing housing options for those wanting to age in place or to live near family support, as well as by accommodating single young persons who want to live in urban areas.

In the middle range of density (T3–T4) areas, the encouragement of vertical mixed use development addresses the need for finer-grained integration of housing with the supporting convenience retail and service uses needed by aging or less mobile populations. Unless carefully calibrated, however, this can have unintended negative impacts: if building-type controls require upper-story residential uses but require the number of building floors to match the scale of the neighborhood, and that number of floors does not produce building revenues adequate to support the cost of an elevator, the elderly and disabled are less likely (or able) to live in those units. This is one area (like housing affordability, discussed below) where the realities of building economics may be in tension with stronger form controls requiring that buildings "fit" their neighborhoods.

Nonform-based codes are also being amended to include these features; many major cities with traditional zoning have considered the wisdom of allowing granny flats in residential areas and residential-over-commercial building types in mixed use districts over the past decade. For example, the 2011 Philadelphia zoning code rejects form-based controls but included major reforms to allow mixed use development in many zone districts, and it allows granny flats on a neighborhood-option basis. However, many form-based codes and building types are "designed for" these features—they make the acceptability of these building types the starting point of conversations, and that may make it easier for these types of regulations to be adopted.

In addition, in the more urban portions of metro areas (T4–T6), the emphasis placed by form-based zoning on the development of more functional neighborhood units that incorporate shopping, recreation, and employment options closer to home makes these areas more attractive to those seeking a more urban, automobile-independent lifestyle. And this demand is not limited to center cities. Over the past decade suburban communities as diverse as Hillsboro, Oregon, and Dublin, Ohio, have seen increasing demand for these housing types, and corporate employers have encouraged local governments to permit and encourage them and the transit service that

Birkdale Village, North Carolina, mixed use town center

Brett VA

completes the Generation Y demand picture. Again, both form-based and nonform-based codes can and do support these kinds of changes; Hillsboro adopted a nonform-based code, while Dublin chose a form-based option. The only advantage of the form-based approach may be that it makes visualizing the building types in question easier and (perhaps) speeds up their acceptance in the reform effort.

Frontage Types or Standards

Frontage-type standards are often calibrated to a particular transect, with stricter requirements applied in the more urban transects (T4–T6), where building frontages are typically closer to the street and seen in more detail than in suburban areas. Many form-based codes include fairly modest frontage controls for rural and suburban areas, where the lower development density, larger lots, wider building separation, and generally larger building setbacks make it somewhat less likely that residents will be able to easily walk to nearby convenience retail and support services. Walkability is still a goal in these neighborhoods, but the lesser attention paid to frontage types and details reflects more modest goals appropriate to a more dispersed development pattern.

In theory, frontage standards can also help promote social interaction between those using a building and those passing by on the sidewalk by including or requiring porch or stoop features. And frontage standards may be a good tool to keep "eyes on the street," an effective crime-prevention technique that can help pedestrians feel safe and more likely to walk.

The primary intended benefits of frontage controls are (1) improved walkability and lower auto-dependence for short trips, (2) more social interaction through easier communication between building occupants and sidewalk users, (3) improved sidewalk safety by having more (and closer) eyes on the street, (4) less-auto-dominated streetscapes through more entries to buildings and fewer front parking lots viewed from the street, and (5) better community health through increased physical activity. Of these benefits, the first two are significantly related to the demographic changes discussed above.

Improved walkability and lower auto-dependence clearly address the changing needs of an aging population with less ability to drive for needed goods and services, as well as the demographic trend toward younger singles and small households that would prefer not to own cars or need them for short trips. As noted, most of the nation's baby boomers will be aging in place, often in T3 (suburban density) areas, so efforts to promote walkability—form-based or not—need to focus on street relationships in those areas as well.

The second goal, social interaction, is related in two ways to the changing demographics of the United States. First, social interaction, while a general goal of good communities, is particularly important for the aging population because continued interaction can delay some of the mental decline that comes from lower levels of stimulation in isolated buildings and communities. Second, as more immigrant households move into suburban areas, more regular social interaction may ease their transitions into new and perhaps more demographically diverse neighborhoods. Again, this points to the need for planners to pay attention to street relationships and walkability in suburban T3 areas. Even if the underlying density of development makes it unlikely that the area will become truly walkable for shopping or service trips, frontage controls may increase walking and social interaction in general.

As with other zoning features, however, controls on building-to-street relationships are not unique to form-based codes and can be implemented in other ways. Austin, Texas, based its recent code revisions on closely analyz-

ing street types and then crafting detailed regulations tying development controls to those types. Austin focused on street relationships rather than building types as the core concept guiding its effort and adopted requirements that do not define either template frontage types or zones. Many of the case studies in Chapter 2 also included standards or incentives to encourage more walkable and pedestrian-friendly street networks within their traditional zoning contexts.

Austin, Texas

Clarion Associates

One aspect of frontage controls may make it harder for planners to accommodate aging populations: requirements for raised foundations in residential structures. Many early form-based standards required foundations on single-family, attached, and live / work building types to be raised at least 18 inches above adjacent sidewalks for increased privacy and a stronger sense of enclosure along the street. Elderly and disabled residents might then need a ramp or access structure that would not be needed for an at-grade structure. Raised foundation requirements drew complaints from supporters of visitability principles and universal design and made it more difficult to comply with the requirements of the Americans with Disabilities Act as applied to residential structures with more than four residential units. As a result, some of the templates (including the SmartCode) were revised to delete this requirement, and an increasing number of form-based controls either do not include it or provide exceptions for ADA-regulated and universal design structures.

Public Space Standards

Form-based public space requirements try to ensure that streets, sidewalks, and related sitting or gathering areas relate well to adjacent buildings. In the postwar era, "public space" generally came to mean parks, plazas, playgrounds, and trails. While larger facilities were purchased, developed, and owned by the city, subdivision and zoning regulations were revised to require smaller public spaces to be set aside within individual development proposals. The unintended impact was to generally force buildings farther apart, decrease walkability, and increase auto-dependence in the name of recreation and health. At the same time, street and sidewalk design were left to traffic engineers who often opted for more lanes and smaller or no sidewalks as traffic increased. Streets and sidewalks were generally not thought of as public spaces but as transportation infrastructure.

In contrast, form-based zoning advocates have insisted that in urban areas, streets are a major (perhaps the major) form of public space and need to be regulated as such. Further, they argue that streets, if properly designed, can draw people together rather than force them apart. Form-based approaches also take a more holistic approach to public space, addressing elements such as sidewalks and gathering areas in front of buildings. This expansion of the public space realm beyond parks and playgrounds may make it easier for planners to respond to changing demographics.

While shorter distances between building entries and sidewalks are important to walkability, continuous sidewalk and trail systems can have a significant impact on replacing short auto trips with walking trips. As is the case with frontage standards, improving walkability helps planners meet the needs of aging populations and those that do not want to be auto-dependent. And if sidewalks also increase social interaction, that is good for the aging and immigrant populations as well.

Two caveats regarding form-based street standards need to be underlined here. The first is that, despite a compelling theoretical defense for inclusion of street and sidewalk design in zoning and subdivision controls, most form-based code either do not include those standards or include them as guidelines rather than regulations. This is the case even in the Miami 21 code. Instead, most cities address street and sidewalk design in public works engineering standards. Where the public works department shares the goals of more pedestrian-oriented streets ("skinny streets" or "complete

Downtown Silver Spring, Maryland

Brett VA

streets"), the engineering standards may be revised to reflect those goals to the degree possible—but where the public works department does not agree, the standards are not changed. Either way, the regulatory controls usually remain in the street standards and therefore seldom reflect or interact with building-type controls in form-based codes.

Second, while form-based zoning can be credited with reviving the much-needed discussion about relationships among buildings, sidewalks, and streets, and the "frontage type" and "public space type" template graphics make these connections much easier to visualize and explain, revisions of street and sidewalk standards have largely occurred independently of form-based zoning control adoption. For example, Portland, Oregon, a constant

innovator in the areas of multimodal streets and better coordination of land use and transportation systems, does not use form-based codes, nor do most communities within the Portland metropolitan area. While street, sidewalk, and building frontage designs are becoming more pedestrian friendly, it is not clear that these trends are linked or that the linking feature is a commitment to form-based zoning controls.

In addition to this increased focus on street design, form-based public space standards have generated the understanding that parks, playgrounds, and trails are not the only nonstreet forms of public spaces. Other urban forms of open space that historically have served the need for public gathering places include plazas, pocket parks, pedestrian passages, greens, town squares, greenways, and community gardens. Including requirements for these types of spaces in more urban-scale developments where the acquisition, development, and maintenance of public parks may be beyond the city's means can increase the number of walkable destinations and provide cost-efficient opportunities for public gatherings. To the degree that America's increasing population of Hispanic, Asian, and African immigrants come from cultures that place a high value on public nonrecreational gathering places, these tools could help meet those needs. This more comprehensive treatment of public space is an advantage of form-based provisions over more traditional regulatory approaches. However, if most of the elderly will be aging in place in the suburbs, and if there is a significant flow of Asian and Hispanic immigrant households to T3-type neighborhoods, then these types of "urban" public places may be just as much needed in those suburban density areas.

Block and Subdivision Standards

Block and subdivision standards typically have the most impact on the walkability and pedestrian orientation of places. Since the previous section deals extensively with the relationships among demographic changes, form-based regulations, and walking, this issue will not be addressed here. However, other aspects of block and subdivision standards can help planners address the nation's changing demographic profile—namely, the importance of alleys and how they can create opportunities for a wider variety of housing types. The T4 and T5 transects typically call for the establishment of rear-loaded alleys to serve residential uses, which allow access to the rear of deep lots that could be developed with additional residential structures, creating greater opportunities for the establishment of accessory dwelling units behind principal dwellings. This feature of form-based codes helps accommodate changing needs and preferences for different housing types, perhaps more so than traditional zoning approaches, since alleys are rarely incorporated into modern residential subdivisions established under these kinds of provisions.

Regulating Plans

In form-based zoning theory, regulating plans are a sort of hybrid between a zoning map and a site plan map intended to lay out required standards to obtain a good mix of building types, streets and frontages, and public spaces that fits the character or intended character of the area. As discussed in Chapter 2, however, regulating plans are only sometimes used and generally only in limited areas (a downtown, a TOD area, or a transit corridor). Larger redevelopment areas with multiple property owners are less conducive to regulating plans, as these areas are typically reinvented over a long period on a parcel-by-parcel basis, and it sometimes does not make sense to require that a street be relocated or redesigned, or that buildings of a certain type be preordained in a specific location, when all neighboring structures still reflect the old pattern. On the other hand, when the land in question is in single

ownership and likely to be redeveloped as a whole, regulating plans can be more powerful than, but not significantly different from, a PUD oriented around specific building and frontage types.

In the context of demographic changes, however, it might be valuable to have more control over detailed mixes of uses. As noted, aging populations will require closer and more convenient access to a range of health and care services. Regulating plans may not be able to achieve the specific mix of uses needed to provide those services any better than Euclidean zoning or PUDs. For example, though a regulating plan might require vertical mixed use buildings, which could accommodate ground-floor health care, pharmacies, or adult care facilities, to be located on specific sites convenient to building types appropriate for multifamily housing uses, it generally would not require a specific private-sector use in a specific location.

This type of detailed site-by-site control of uses could be achieved through a PUD, but that is rare. Instead, PUDs are often used to retain flexibility rather than specificity in the location of permitted uses, or at least to organize uses by general rather than specific locations. In the case of a specific plan for a property or group of properties being developed as a group, PUDs are then sometimes used to designate specific locations, and in that case they function much like regulating plans (though focusing on uses rather than building types). It is therefore not clear that regulating plans have any significant advantage over PUDs in crafting specific neighborhood designs.

By-Right Development

The final distinguishing characteristic of form-based controls is its focus on by-right development (rather than conditional use reviews) as the predominant path to development approval. The advantages of this approach do not appear to be particularly relevant to addressing the nation's changing demographics. It is not clear, for example, that by-right development promotes development focused on housing and support services benefiting the elderly any more than the young or middle aged, or that it allows types of housing or structures supportive of immigrant populations any more than those that are patronized by nonimmigrant populations.

Conclusion

Form-based zoning controls may be helpful in allowing local governments and guiding the private building industry to address the nation's changing demographics, but perhaps not significantly, nor in ways that could not also be achieved by other forms of zoning. The predominant advantage may be that template-based form controls tend to start the discussion from a point that favors walkability, street orientation, and mixed use as a set of related controls, in contrast to a traditional-zoning status quo from which planners have to argue for each of those changes individually. The advantage may be in the packaging rather than in the substance.

To be sure, the building types, frontage types, and public space types generally associated with T4 (general urban) and T5 (urban center) development do promote walkability and reduced auto-dependence in ways that could benefit the elderly and those in Generation Y, and they do so through an elegant package of visual templates that can be understood together. But those changes can and are also being promoted through independent frontage controls and street standard reforms in cities and codes that have not embraced transect-based planning or zoning.

Over the long term, the use flexibility in many form-based codes may better accommodate reuse of buildings over their useful lives compared to strict use-based controls. Similarly, in the suburban and general urban areas where much of the population lives, form-based zoning's inclusion of

a wide variety of housing types and a greater mixing of those types within neighborhoods will support more options for aging in place, single-person households, multigenerational families, and immigrant households than zoning that promotes a monoculture of single-family homes. Building frontage requirements, a broader palette of urban public-space standards, and street standards that see streets as valuable public spaces may also better meet the needs of the elderly and a more diverse population with more immigrant households.

On the other hand, there are some aspects of form-based controls that may not support the adjustments in urban form needed to address these changes. Requirements for raised foundations and entry heights may make some residential units less accessible to the elderly and disabled, and templates for vertical mixed use buildings without enough density to support elevators may make those units of limited appeal to the growing elderly population.

In addition, most form-based controls for suburban residential areas (T3) do not include the types of detailed frontage or walkability standards that may be needed by the aging populations that already live there or the immigrant populations that are moving there. While there is no reason why form-based controls could not be calibrated to include those features, there may be a structural bias against them. Form-based controls requiring buildings similar to those already present may "lock in" the dispersed, less-walkable nature of suburban areas. Building and frontage types calibrated for those areas to reflect the wide setbacks and large lot sizes of the buildings already constructed may make it harder to introduce multifamily units, walkable retail facilities, and dispersed support services. Though single-family large-lot neighborhoods have proved to be the most resistant to change, they may be the areas that need to change most. It is not yet clear whether a zoning system based on similarity of building types will promote or hinder those changes. Suburban residential areas may well be the new frontier of form-based zoning and one of its biggest challenges.

Summary Table

Table 3.2. Five key demographic changes

The varied impacts of different form-based zoning tools on the five key demographic changes are summarized in Table 3.2.

Key Form-Based Tools	Slower Growth Rate	Aging Population	Declining Household Size	Changing Ethnic Composition	Changing Locational Preferences
Building Types / Standards	o	●	●	o	◆
Frontage Types / Standards	o	◆	o	◆	◆
Public Space Standards	o	◆	o	◆	◆
Block and Subdivision Standards	o	◆	o	◆	◆
Regulating Plans	o	o	o	o	o
Administration	o	o	o	o	o

● Potentially significant contribution

◆ Moderate or mixed contribution (e.g., impacts in more dense areas may be offset by impacts in other areas)

o Little impact or no different than nonform-based controls

FORM CONTROLS AND HOUSING AFFORDABILITY

Although we use the term "affordable housing" throughout this chapter, the discussion addresses more than housing for the very poor. At issue is the affordability of housing to all of America's lower- and middle-income cohorts—the entire bottom half of the income pyramid.

The Affordability Issue

For much of America's history, only a relatively small minority of households could not afford to rent or buy housing in the private market. Starting in 1937, the U.S. government began to provide subsidized housing for that minority of households—first through public housing projects and then through construction cost subsidies, rental subsidies, housing vouchers, and tax credits (including the Section 236, Section 8, and HOPE VI programs, and Low Income Housing Tax Credits, among others). Several states and cities with high housing costs and significant numbers of poor households created their own programs to supplement the federal efforts, including property tax abatements or rent control, and they often spent large amounts of money funding the direct and indirect housing subsidies in those programs.

In spite of these efforts, over the past 50 years the percentage of Americans who cannot afford to either rent or buy housing at private-market prices has been growing steadily. Average market prices of housing have been rising faster than average wages, so the ability of wage earners to afford housing has declined. Some key facts help make this trend clear.

- The median percentage of household income spent to rent a home rose from 19 percent in 1960 to 29 percent in 2005, and the percentage of rental households who spent more than 30 percent of their income on housing rose from 23 percent to 49 percent (Wardrip and Pelletiere 2006; Quigley and Raphael 2004).

- Between 2001 and 2005, a period of relatively strong economic performance, median housing rental costs for those categorized as "not low income" rose at 14 percent while their median annual incomes rose at 8 percent. During the same period, for home owners categorized as "not low income," median housing ownership costs rose at 18 percent while median incomes rose at 11 percent. In the case of both renters and owners, the situation was even more serious for those categorized as "low income," "very low income," and "extremely low income" (Wardrip and Pelletiere 2006).

- The National Low Income Housing Coalition recently concluded that the national average "housing wage" needed to afford a two-bedroom rental unit was $18.25 per hour—over $4.00 more than the average renter earned per hour. A household of three minimum-wage earners working 40 hours a week for 52 weeks a year (no vacations) could not afford a two-bedroom unit at the national average fair-market rent (NLIHC 2012).

- According to the U.S. Census Bureau, the 2000s were the first decade on record where real median income declined (Day 2011). In addition, the number of people living in poverty increased to 15.1 percent (46 million people) in 2010—the highest level since 1993. (The poverty threshold is the point below which a household of a given size has a pretax income insufficient to meet basic needs.)

This trend in housing affordability will most likely continue because it is driven by factors outside the control of either local or federal government. Globalization will continue to put downward pressure on wages in many sectors, while the costs of building housing in the United States will continue to rise. And there is good reason to believe that the affordability problem may get worse. The financial meltdown of 2008 makes it unlikely that U.S. financial institutions will be able to offer creative financing like subprime mortgages and first-time homebuyer assistance programs as frequently as they once did, or that the federal government will be willing or able to insure them. There is also pressure to downsize or eliminate the Federal National Mortgage Association ("Fannie Mae") and Federal Home Loan Mortgage Corporation ("Freddie Mac"), which kept the housing finance market liquid by backing secondary mortgage markets, and to significantly narrow the types of products and loans eligible for federally backed insurance.

Older housing in Livermore, California

Clarion Associates

Finally, there is strong evidence that the United States will need to focus on different types of housing in the future to meet the expanding housing affordability gap and to address the demographic changes discussed above. Analysts now say that the country is significantly oversupplied with single-family detached housing on medium and large lots (lots of more than 5,000 square feet) that have been the bread and butter of the U.S. housing industry since World War II—a surplus of as much as 20 million over projected needs by 2030. At the same time, we have shortfalls of approximately 35 million small-lot (less than 5,000 square feet) single-family detached homes and 25 million attached or multifamily units, such as town houses, row houses, apartments, and condominiums (Nelson forthcoming). To some degree, this reflects changes in demand patterns to smaller units requiring less maintenance or shorter commutes, as well as affordability—smaller-lot products and attached units generally cost less than large-lot ones. As a result, a larger share of the housing construction industry will need to shift towards building attached and multifamily products.

A substantial part of the population relies on the "trickle down" of older housing—units that have low rents because building construction and purchase costs have already been amortized or because the building is in an undesirable location—and zoning alone cannot force or incentivize builders to construct new buildings that can be rented at the same prices as older buildings. In the past, zoning has focused almost exclusively on new construction. If it allowed more efficient forms of housing, then eventually those might trickle down to lower-income populations. It did not address the use of existing housing stock in significant ways except by limiting single-family homes to single-family occupancy, two-family homes to two-family occupancy, and so on. Now, however, some cities may conclude that they need to loosen these types of controls to meet the affordability challenge.

To make matters worse, local zoning controls have contributed significantly to rising housing costs, and revised zoning needs to be part of the solution. Numerous studies have documented specific ways in which zoning has prevented some type of residential development that the market would support in a given area. A 1998 report identified four types of regulations that tend to drive prices up: minimum house-size, lot-size, or yard-size requirements; prohibitions on accessory dwelling units; restrictions on land zoned and available for multifamily and manufactured housing; and excessive subdivision improvement standards (Clarion 1998). A 2007 study evaluated the influence of subdivision controls on housing prices, and found that 65 percent of the difference between actual residential lot prices and the lower estimated price of a basic residential lot with utilities in the same location could be attributed to minimum lot-size requirements larger than those necessary to provide basic levels of health and safety. An additional 9 percent of the difference was attributable to minimum lot-width requirements (NAHB and EcoNorthwest 2007).

In 2009, Denver polled its affordable housing builders to identify what features of its existing zoning code made affordable housing development more difficult in order to evaluate whether its new form-based code could address those issues. Focus groups of those builders identified the following eight barriers related to zoning:

• Rezoning and variance procedures (and a culture of negotiation)

• Permitted density limits

• Minimum dwelling-unit sizes

• Minimum parking requirements

• Maximum lot-coverage limits

• Minimum lot-size requirements

• Building step-back requirements

• Unavailability of accessory dwelling units

In short, zoning controls have contributed significantly to the growing housing affordability gap. (See also Levine 2005.) In this section, we examine whether form-based development controls can help address the housing affordability challenge better than other zoning approaches.

Building Types or Standards

In theory, building types or standards could be a good tool to address housing affordability, for three reasons: (1) they can require building forms that lend themselves to attached or multifamily housing; (2) they can allow easier

conversions of nonresidential buildings to residential use; and (3) they can allow more units to be built within a specific building type.

Requiring Attached and Multifamily Building Forms. By requiring that buildings of a certain size and shape be built in specific transect zones, form-based controls can make it more likely that attached or multifamily homes are built in zones where they are permitted. In dense urban areas, form-based codes call for more urban building types, which often means attached housing, multifamily residences, or nonresidential buildings. While conventional zoning might allow single-family homes in an urban center or urban core area (though land values usually prevent them from being built), form-based controls usually prohibit that building type, instead requiring multistory, close-to-the-street building types for multifamily units or nonresidential units. Form-based controls may allow small-lot and attached units in the middle of the density range (T4) but generally restrict large-lot single-family housing to T3 and below.

One of the fundamental claims of form-based controls is that they make urban places urban, suburban places suburban, and rural places rural better than other forms of zoning. Form-based controls can be used to designate more land for the types of housing needed to help address the affordability challenge: small lot, attached, and multifamily. Nonform-based zoning can also do this through minimum density, minimum height, and maximum lot-size requirements, but form-based tools are a more graphic and transparent way of describing what must be built. Of course, not all small-lot, attached, and multifamily housing is affordable, and rising demand for these products may even drive rents and sales prices per square foot higher than those for large-lot detached housing, but it is a step in the right direction.

The Pencil Factory Lofts in Chicago

Timothy Mennel

Allowing Easier Conversions to Residential Use. The form-based principles of focusing less on permitted use controls should allow building use to change from nonresidential to residential over time—for example, from office building or warehouse to lofts, condos, or apartments—which could help meet the nation's shortage of multifamily units. Flexible approaches to permitted use could also avoid fine distinctions between types of housing that could make conversions more difficult; a code that allows "residential uses" could allow conversions more easily than one that specifies single-family dwellings, duplexes, semidetached housing, apartments, or condos. Though the structure of the building itself may limit conversion potential—an old warehouse built to older commercial code standards may be difficult to retrofit to meet residential building codes—at least the zoning code would not get in the way.

In practice, however, many form-based codes include the same residential distinctions found in nonform-based zoning; they define one or more single-family detached building types and specify single-family dwellings as the permitted use, so the outcomes are similar. The same often goes for duplexes, and row house building types are frequently restricted to only row house residential use, even though that building type has been used for office conversions in many cities. In lower-density residential zones, nonform zoning defines a single-family or duplex detached use and then defines an envelope (via setbacks, maximum heights, permitted lot coverage, or bulk planes) that accommodates a single-family home. Form-based controls get the same result a different way: they define different single-family detached building types and then often limit those building types to single-family occupancy.

In theory, form-based controls should allow something other than a single-family home to occupy a single-family structure, but since that building-type zone is usually designed for use in stable single-family neighborhoods there is often strong pressure to limit it to single-family uses to preserve neighborhood character. The general inability to put other uses in a single-family structure, however, does not hurt affordability; rather, it promotes affordability by keeping the housing stock available for residential use by maintaining the number of older (and possibly more affordable) housing units on the market. The general reluctance of form-based controls to allow much flexibility in single-family, duplex, or town house uses puts it on the same footing as nonform-based controls. Both could allow other uses of the structure—nonform-based zoning by adding office or retail uses to the table of permitted uses, and form-based controls by using a light hand on permitted uses—but whether this happens depends more on local politics than on the tool itself.

Allowing More Density in a Given Building Form. Finally, form-based tools could allow more units to be built within a specific building form. More units in a given envelope mean smaller units and more units to bear the land costs, which may make them more affordable. Many nonform-based zoning codes regulate the size of multifamily buildings through building setbacks, maximum heights, and minimum lot square-footage-per-unit requirements. Limiting the number of units based upon the size of the lot prevents the builder from constructing a greater number of smaller and more affordable units in a structure. Additional limits driven by health, safety, and crowding concerns are typically imposed by the building occupancy code. For example, a development code requiring 1,500 square feet of lot area per unit would limit the owner of a 6,000-square-foot lot to four units, even if the setbacks and building heights would allow six units of 1,000 square feet each and the building and occupancy codes only require a minimum size of 500 square feet in each unit.

In theory, form-based zoning should not address the number of units in a structure, especially in the more intense transects. Even if political pressure means that the form-based controls in the T3 areas limit single-family building types to one household, duplex building types to two households, and town house building types to one household per town house, the controls for T4, T5, and T6 areas could allow more units in a given building type. The goal in these zones is urbanism, and more density would promote that—and probably promote affordability in the process. For example, in suburban and general urban (not core) areas, if the building meets the requirements for a duplex or row house building type, an additional small unit could be included—that is, it could look like a duplex but contain three small units. In downtown, if the building is one of the permitted building types and it is located properly on the site, and if residential uses are allowed, then the builder should be able to put as many residential units and as little parking in the building as the market will bear. In practice, as always, there may be a political reaction forcing the maximum density downward, but taking "lot size per unit" out of multifamily zoning is an advantage of form-based controls when it comes to housing price. While nonform-based controls could also delete those limits (and many have), form-based controls may make it easier by giving decision makers the visual assurance that the resulting building will not be too big or too dense for its neighborhood.

On the other hand, there are a number of ways in which form-based controls may not promote housing affordability. First, form-based controls may restrict or eliminate density or height bonuses, a zoning tool first adopted by New York City in 1961 that many cities have found useful in encouraging affordable housing construction. For example, under nonform-based zoning, if residential buildings are usually limited to a floor area ratio of 3.0 (three square feet of building area per square foot of lot area) in a medium-density zone, the city may allow a builder of affordable housing a FAR of 3.3. This permits a building 10 percent larger, which can include more units, improving the developer's balance sheet and allowing them to acquire land they could not otherwise afford. The optimal bonus varies with the land market and may initially be set too low or too high, but the concept is simple: density bonuses allow affordable housing builders to build bigger buildings in order to encourage affordable unit production.

Form-based zoning tools do not use FARs, however, so an affordable housing bonus cannot be tied to this measurement. One alternative is to allow additional height for buildings that include affordable housing. The Miami 21 code does that in the downtown area; for example, while buildings are usually limited to 12 floors in the T6-12 zone, a builder who qualifies for the affordable housing bonus can increase that to 240 feet, or approximately 16 stories. This is a substantial amount of additional floor area and a significant way to encourage affordable housing. But this bonus is not available in T1 through T5 areas, where a difference in height would be more noticeable—for example, in a T4 neighborhood where building types are limited to four floors, one additional floor is a 25 percent increase in height, whereas an additional floor on a much taller building downtown makes less difference. Limiting affordable housing bonuses to the downtown core may tend to concentrate lower-income housing in that area, however, while most U.S. cities now try to disperse it throughout their communities.

Denver's citywide form-based code takes a stricter approach, allowing no height or area bonuses for affordable housing or any other amenity. It is too early to tell whether cities that follow this stricter form-based approach will devise other ways to encourage affordable housing development (such as financial subsidies or the strengthening of bonuses available in their

nonform-based districts), but there is a risk that affordable housing construction will suffer in the interim.

Form-based controls may also inhibit affordability by requiring vertical mixed use buildings (i.e., housing over a retail or commercial ground floor), which may be more expensive to build. The retail portion of the building needs to meet commercial building codes, while the residential portion of the building needs to meet residential building codes. The most efficient floor plates for residential and nonresidential uses may also differ, and when they are combined in a single building, compromises need to be made. All codes that force vertical mixed use construction should be drafted with the understanding that higher construction costs may result. Sometimes the rents from ground-floor commercial or retail users can help keep rents lower in the housing units above, but whether the net result is lower or higher housing prices depends on the specifics of the site and market.

A third way that form-based codes may reduce opportunities for affordable housing is by eliminating "overzoning." Many cities have medium-density areas zoned for residential buildings of three or more stories but developed with one- and two-story single-family homes. Often this is a legacy of the original battles over the adoption of zoning. The response to those who feared that zoning would limit their ability to redevelop their properties with bigger structures was to make the zoning "loose"—to allow significantly bigger structures than those currently in the neighborhood. But if individual property owners take advantage of that zoning and replace their houses with duplexes or small apartment buildings, surrounding neighbors often object.

Form-based controls are sometimes touted as zoning that better reflects the built fabric of each area, preventing out-of-scale redevelopment; they reverse the original overzoning and "lock in" the current neighborhood character more closely. As noted in Chapter 2, the ability to rein in residential overzoning was a significant factor in support for Miami 21. And there are many benefits to doing so, not the least of which is stabilizing neighborhoods and development expectations and avoiding shadowing of many windows and backyards by larger adjacent buildings. But there is a price to pay. When form-based codes are used to "downzone" areas to their current densities, opportunities to increase housing stock without the need for an upzoning are lost. Additional attached or multifamily units that could have been built in these neighborhoods must instead be accommodated elsewhere in the city. Nonform-based codes can also be used to remove overzoning (and were used in Denver to downzone two large areas of the city in advance of the form-based effort), but the more generalized controls in nonform-based codes sometimes make them less attractive for that purpose.

Fourth, both form- and nonform-based controls often include architectural standards for new development and redevelopment that can indirectly raise the cost of housing constructed under the code. One popular architectural control mentioned as a cost inflator by Denver's affordable housing builders was upper-floor step-backs. An increasing number of cities balance their desire for street enclosure (building facades close to streets) with the desire for light and air at or near street level by requiring that ground floor facades be close to property lines and that floors above the second, third, or fourth levels be set back farther from the property line. This results in a "box on a box" building shape with the upper box being smaller than the one below. But the most cost-efficient form of construction is a single box with framing and structural elements continuous to the height of the building. Box-on-box construction raises construction costs and therefore increases the rent or sale prices that need to be charged for space in the building. For that reason, some cities have exempted affordable housing from step-back requirements.

A final concern is the effects of zoning on gentrification, which can be caused by either form-based or nonform-based controls. If architectural standards are very detailed, requiring frequent breaks in roof forms, facade articulation, balconies, courts, plazas, expensive facade materials, or a variety of facade materials, they can drive up building costs. As a result, the resulting new units are more expensive, which tends to raise surrounding property values. Many cities want to see property values rise because they indicate a healthy investment climate and increase property tax revenues, but existing residents who cannot afford the higher tax rates may be forced to find other housing, dislocating those with lower incomes in favor of the middle and upper classes. This is a complex issue, but for cities that want to discourage gentrification the point is clear: do not impose expensive architectural standards—keep them basic, reasonable, and tied to the existing character of the area.

So while form-based zoning has the potential to be a fairly powerful tool for housing attainability, it may not work that way in practice. A lot depends on whether form-based controls are used and mapped to promote more dense (and potentially more affordable) development or to remove current opportunities for densification of residential and mixed use areas.

Austin, Texas

Clarion Associates

Frontage Types or Standards

Unlike building types, building frontage types have relatively little impact on the affordability of housing developed under form-based controls. As noted, the primary advantage of building frontage types is increased walkability, which is not directly linked to development or housing costs. And similar results can be achieved by nonform-based controls through the use of build-to lines and requiring entrances that front directly on sidewalks. Of the six examples in Chapter 2, only Livermore and Miami require specific frontage types, suggesting their secondary importance. For all of these reasons, frontage-type controls are not a significant tool in the battle for affordable housing.

Public Space Standards

Public space standards include requirements to integrate public spaces within new development and to design walkable streets. While nonform-based tools often require that a specific amount of land or site area be devoted to open spaces visible to or usable by the public, few address the design and use of

streets as sources of urban open space. Traditionally, open-space requirements have been imposed to provide adequate light and air and to improve aesthetic reasons, but in more urban contexts the concept has expanded to include public accessibility to promote social interaction. Many older codes require only a stated amount of open space, which is very different than requiring meeting spaces and "third places" aimed at promoting social interaction.

While both open space and public spaces reflect laudable planning goals, neither makes housing more affordable. In fact, by limiting the amount of site area that can be devoted to residential uses, they may restrict the number of attached or multifamily units that can be built on the site. The types of public spaces required in dense urban areas are often small and space efficient, but open space requirements in higher-density nonform-based zoning systems are also generally low. Land in urban cores is very valuable, and the political process tends to ensure that as little of it as possible is put to uses other than building or parking.

In contrast, public space standards calling for narrower, walkable streets tend to promote affordability. Narrower streets allow more land to be devoted to development, which could allow for larger buildings and more residential units on the site, increasing affordability by reducing land costs per residential unit. Walkable streets in theory make residents more likely to get by without a car (or with one less car), increasing affordability by lowering transportation costs and allowing more income to be devoted to rent or mortgage payments. While many cities without form-based codes are also exploring "skinny streets" and complete-street designs for the same reasons (Girling and Kellett 2005; McCann and Rynne 2010), form-based controls try to make those streets an integral part of the zoning approach and may make it easier to discuss and approve alternative street designs. The key affordability issues in this area are keeping on-site public space requirements reasonable and implementing better street designs.

Block and Subdivision Standards

The main purpose of form-based block and subdivision standards is to promote connectivity and walkability—the smaller the block and the more connected the street and trail system, the more people will walk and the shorter auto trips within the area can be. Again, however, this may not have a positive effect on housing affordability. After purchasing a site, street and infrastructure costs are among the most expensive elements of land development. If the result of narrowing streets but then requiring a more fine-grained street network is an increase in total street and infrastructure costs, then block standards may actually increase the costs of housing. On the other hand, if the added cost of more frequent streets is more than offset by the cost savings of building narrower streets, then the effect could be positive.

Again, however, this element of form-based zoning is often not included in the package of controls adopted. Not only is the topic of street design often left to the public works department even if the code contains advisory guidelines, but block design is typically found in land subdivision controls, not zoning, if it is addressed at all.

Regulating Plans

As noted, some cities use detailed regulating plans to organize mixes of building types in defined areas of the city (such as downtowns, waterfronts, or transit-oriented developments), while those that apply form-based tools on a large area or citywide basis often use a zoning map instead. Of the six examples in Chapter 2, only Livermore and Miami have regulating plan requirements and only for limited areas. In contrast to regulating plans, zoning maps make little attempt to require district-specific mixes of build-

ing types in relation to one another. If a citywide zoning map is used, then there is little or no difference between the form-based and nonform-based mapping. In the case of a citywide zoning map, either zoning system can promote affordable housing by mapping more areas for small-lot, attached, and multifamily structures or uses, and by making sure those areas are served by public transportation and supporting retail and personal service uses.

However, true regulating plans could be effective in promoting affordable housing supplies if they require multifamily building types in areas where nonform-based controls would not, or if they require larger residential buildings than nonform-based controls would. Requiring substantial residential, rather than commercial or institutional, development in specific locations can push the market to locate and provide more multifamily units close to transit and services and to construct them in larger buildings where the per-unit construction cost is lower. While a nonform-based code could also allow buildings of that size in a dense mixed use area, few would require that specific well-located sites be developed with residential building types. Area-specific regulating plans that push the market to provide more attached and multifamily units offer an additional tool to address the affordable housing gap, though one that is generally used for specific areas rather than on a citywide basis.

By-Right Development

In addition to requiring, allowing, or incentivizing more small-lot, attached, and multifamily units in better locations, zoning ordinances can significantly promote affordable housing by removing procedural barriers to land-use approvals. Denver's affordable-housing developers cited as the single most significant barrier the difficult procedures involved in rezoning land, obtaining conditional use permits, and obtaining zoning variances, all compounded by a "culture of negotiation." The need for negotiation and discretionary approvals consumed time and money, and public review processes offered opportunities for NIMBYism to enter the discussion. In common with developers everywhere, affordable housing builders in Denver asked for a by-right system that removed the need for discretionary approvals and hearings.

In theory, form-based tools are well-suited to address this barrier. Since form-based controls aim at broadening the types of uses permitted and allowing those uses to change over time, they reduce the number of conditional uses that require discretionary review or approval. In fact, the SmartCode model either prohibits or allows uses at "limited," "restricted," or "open" scales; none requires discretionary approval through a political process. Some adopted form-based codes (such as Miami 21 and the Post Falls, Texas, code) have virtually eliminated the need for conditional use approvals, including those for affordable housing. However, many other form-based systems, such as the mixed form-and-use code in Mooresville, North Carolina, retain a system of conditional uses similar to those in nonform-based systems.

Few urban zone districts today, however, require conditional use approvals for housing. Encouraging mixed use development often means that both residential and nonresidential development are allowed without requiring special approvals. This is the case for nonform-based mixed use districts as well, however, so by-right mixed use is generally not itself a distinguishing feature between form-based and nonform-based zoning.

The procedural barriers more commonly arise when builders need to seek variances from dimensional or parking standards or rezonings to allow more intense development. By defining appropriate building types for each area and a new form-based zoning map, form-based controls should reduce the need for common variances. Because the building types are defined based

on the existing buildings in the area, they should reflect common approved variances and allow that type of development without the need for a variance procedure. If a variance is needed, however (e.g., to allow a bigger-than-its-neighbors building to reduce land costs per affordable unit), there is little difference between the administration of form-based and nonform-based controls—a showing of hardship and a public hearing will generally be necessary. And while form-based controls often include a procedure for administrative approval of minor dimensional adjustments, the same is true of many modern nonform-based codes.

Similarly, there is little difference between the two types of zoning controls when it comes to rezoning land. In both cases, a public hearing and specific showings are needed to remap land from one district to another—the procedural barriers are the same. On one hand, the different zoning approach using form-based controls may result in more areawide or citywide remapping than would nonform-based code reforms, and that could remove the need for many parcel-by-parcel rezonings. On the other hand, many nonform-based code revision projects do not involve remapping at all—instead, they change the rules in existing zones, which could allow more residential, mixed use, or intense development, effectively removing the need for parcel specific rezonings in a different way.

The different approach and language of form-based controls make it more likely that a new citywide map will be adopted to implement the code. If that map proactively upzones land into categories that allow more affordable housing building types (as in the Denver Main Street zone districts), then it can be a significant contributor to housing supply and affordability. If it only remaps land into the form-based district most similar to the previous nonform-based district (as in much of the Denver citywide remapping in 2010), then there may be little change, and builders will face the same need for parcel-specific rezonings they faced under a nonform-based code.

Again, the key issue turns out to be density. If a by-right system allows higher densities—and particularly if it allows affordable housing developers to build bigger buildings than other builders—it can promote housing affordability. If it locks in densities that make affordable housing uneconomic and does not provide for easy relief, then the impact on affordability could be negative.

Summary Table

The varied impacts of different form-based zoning tools on the affordability of housing are summarized in Table 3.3.

Table 3.3. Five key factors in housing affordability

Key Form-Based Tools	Slower Growth Rate	Aging Population	Declining Household Size	Changing Ethnic Composition	Changing Locational Preferences
Building Types / Standards	●	●	◆	◆	◆
Frontage Types / Standards	o	o	o	◆	o
Public Space Standards	◆	o	o	◆	o
Block and Subdivision Standards	o	o	o	o	o
Regulating Plans	◆	o	o	◆	o
Administration	◆	◆	o	o	◆

● Potentially significant contribution

◆ Moderate or mixed contribution (e.g., impacts in more dense areas may be offset by impacts in other areas)

o Little impact or no different than nonform-based controls

FORM CONTROLS AND HISTORIC PRESERVATION

Communities with historic preservation programs have adopted plans, policies, and regulations to identify and protect neighborhoods, buildings, objects, and landscapes that have historic significance. Each preservation program is different, tailored to and influenced by local conditions such as the extant building stock, historical development patterns, and current economic conditions. While most programs began by focusing on iconic or especially remarkable structures such as grand civic buildings or high-style mansions, many have evolved to protect a much wider array of resources, from large neighborhoods of small vernacular dwellings to quirky roadside structures from the 1950s.

Though a great variety of historic resources has been identified, the preservation toolbox used to identify and protect those resources is relatively consistent across the country. Typical elements found in most preservation programs include surveys to identify and evaluate historic resources, ordinances that designate certain historic resources as worthy of protection, regulations that control the types of exterior modifications and additions that may be made to historic properties or infill projects in historic districts, and procedures and criteria to guide decisions on projects affecting historic properties. A local preservation commission often is established to act as the decision-making body for proposals that will affect historic properties.

Many preservation programs have been in place for decades, and the legal foundation supporting them is well established. Indeed, some of the most important court cases upholding the right of communities to adopt zoning and regulate community aesthetics have involved preservation issues, such as 1978's *Penn Central Transportation Co. v. New York City* (438 U.S. 104 (1978)), in which the Supreme Court found New York City's preservation ordinance to be a valid public purpose and a legitimate function of local government.

While preservation controls enjoy a long tradition, most of the formal practice and lexicon of form-based codes has developed within the last decade. Today, form-based codes and historic preservation regulations overlap to a significant extent as to their creation and in their goals. Analyzing and understanding the existing physical built environment is an essential starting point for both disciplines. Both preservation regulations and form-based controls emphasize the need to respect traditional development patterns and to duplicate (or at least complement) historic patterns in new development. The legal foundation for form-based controls also is similar to that of preservation. Both federal and state courts have emphasized that governments may regulate to protect community aesthetics, an issue at the heart of both preservation and form-based ordinances, to further the public welfare.

Despite the success of the preservation movement, the standard toolbox may be inadequate to meet current challenges. In a time of shrinking budgets, local officials may be reluctant to designate new historic districts that are seen as expensive and labor-intensive to administer. Further, many midcentury buildings are approaching or have passed 50 years of age, and if any of those are to be protected, short-staffed planning departments will need new tools that allow protection of increasing numbers of resources yet do not require the labor-intensive approaches typical of traditional preservation ordinances. The use of form-based codes offers a possible new approach to protecting neighborhood character and aesthetics by emphasizing context-based development standards that can be administered mostly by professional planning staff.

This section looks at the extent to which form-based development controls are compatible with historic preservation. To what extent do the goals of form-based codes and preservation overlap? How well do form-based approaches protect historic resources? Are form-based tools an acceptable alternative to more traditional zoning approaches for protecting historic resources? Are they in some ways better?

Goals and Structures of Typical Preservation Programs

Every preservation program is unique, and there are many reasons why a community might choose to adopt regulations to protect its historical resources. Most communities with preservation programs rely on multiple justifications for them. Sometimes preservation is important from an economic standpoint—to encourage tourism or to stabilize and maintain property values. More often, the motivation is to protect irreplaceable architectural and historical resources.

Defining Local Preservation Goals. The typical program is established when community leaders reevaluate local issues and goals. For example, are there any threats to a resource or district calling for immediate action, which would require adopting new regulations? Are future development pressures expected? The community must identify the specific types of historical resources to be protected. Sometimes, there may be only a few scattered buildings, whereas in other places there are entire districts and neighborhoods. Typically, ordinances focus on individual properties with a high level of architectural or historical significance, as well as "contributing" properties in historic districts with a relatively higher degree of significance than "noncontributing" properties. Sometimes programs also focus on the site features, landscapes, and open areas surrounding historic buildings. In addition to residential subdivisions and landmark commercial buildings, communities have designated such unusual resources as historic airplane hangars in Colorado and early California trailer parks. While 50 years is a commonly accepted threshold for determining historic status, exceptions have been made for younger structures. Clear criteria for historical designation are crucial.

The local ordinance establishes procedures for the review of proposed development activities that may affect protected resources. A local preservation commission (sometimes called a landmarks commission) is typically established and empowered as a separate decision-making body within the local government to oversee the implementation of the preservation ordinance and make discretionary decisions on major projects. In some cases the city council or its equivalent may act in this capacity. Staff handles the day-to-day administration of the program and often is empowered to approve minor projects.

Review bodies have wide-ranging responsibilities, which include overseeing surveys of historic resources, establishing designation standards, and implementing review procedures for development projects affecting historic resources. They also conduct general planning and survey work to support the identification and protection of additional historic resources. They typically issue or deny certificates of appropriateness for demolitions, alterations of historical resources, or for new construction in historic areas. They also deal with alteration proposals, which are more frequent than demolition proposals and typically smaller in scale. The goal in these cases is to guide the process of change so that it is sympathetic to the existing character of the area. Few communities want to freeze historic districts in time, but defining acceptable types of infill and redevelopment can be challenging.

Review standards are sometimes codified in the preservation ordinance itself, but are more commonly provided as separate, illustrated design standards and guidelines. To determine the compatibility of a proposed alteration or new construction with historic resources, ordinances typically consider elements such as building massing (height and bulk), materials, the style and shape of the roof, colors, setbacks and the placement of the building on the site, and similar characteristics, including overall architectural style. Many standards are voluminous and often more extensive than the slim ordinances that authorize them. On the other hand, some communities simply refer-

ence other authorities, such as the Secretary of the Interior's Standards and Guidelines for the Rehabilitation of Historic Properties (www.nps.gov/hps/tps/standguide). San Antonio, Texas, currently uses these standards alone for its extensive preservation program, though creation of more tailored local standards is under way.

Form-Based Code Elements and Preservation Goals

Because form-based codes are context-specific and based on analyses of the existing physical fabric and development patterns, they can offer substantial support in the identification and protection of historical development patterns and building types. They are appropriate for areas where a community has prioritized design concerns, and such areas often overlap with historic neighborhoods. Form-based codes can help preserve historic assets while allowing compatible neighborhood evolution and development, especially when existing zoning puts historic resources at risk. They can also offer a more detailed set of tools to allow new uses and building forms to be introduced sensitively into an existing historic district.

Building Types or Standards. A hallmark of form-based codes is the identification and description of various allowed building types, each of which has detailed standards for major physical features such as building height, massing, and facade features. A typical menu of residential building types, for example, includes single-unit houses, duplexes, live / work dwellings, row houses, and courtyard apartments; each code contains tailored versions of some or all of these examples. Building types may be allowed as land uses (as in Mooresville) or can be used as the central organizing principle of a code, as is done in the Traditional Town Overlay District Code of Port Royal, South Carolina (adopted in 1997, following adoption of a new urbanist–oriented master plan).

The descriptions of allowed building types in a form-based code are typically developed following detailed fieldwork physically measuring environments and structures that are thought to represent good design and are consistent with local planning goals. For example, an existing single-family house in an urban neighborhood with an average footprint and setbacks that represent the standard historical pattern might be measured and become the prototypical "urban single-family house" building type. The same process might occur for a detached accessory dwelling unit, a duplex, and a Main Street–type commercial building. Once the

*Masonic temple building,
Miles City, Montana*

David Schott

new code is adopted, new buildings are expected to comply with one of the standard forms.

Building types are designed to reflect and seamlessly carry forward distinguishing features of the existing built environment. From a preservation perspective, the creation of detailed building types in a code can be a valuable tool, helping to guide new construction with a greater level of detail and specificity than is often found in traditional historic design guidelines. The form-based emphasis on building types can be helpful both in designated historic districts and in other neighborhoods where the community wants to protect the existing character and fabric.

Overzoning is a common threat in many historic neighborhoods, whether formally designated or not. Allowing greater densities and larger building forms may encourage the demolition and replacement of historic structures with newer, bigger buildings. For example, a residential neighborhood with average 2,000-square-foot homes on 5,000-square-foot lots may actually be zoned to allow 15 dwelling units per acre, which would allow much more intensive development (including multifamily) than what is currently there. A mismatch between the underlying zoning and existing conditions can lead to teardowns and scrape-offs as developers seek to maximize the potential allowed by zoning, often by replacing single-family dwellings with larger multifamily structures that take advantage of higher allowed densities. Pressure to redevelop and maximize a site's full zoning potential can also lead to speculative demolition of older buildings, creating vacant lots. In some Salt Lake City historic neighborhoods, underlying zoning allows higher-density multifamily projects in some areas that today are predominantly single-family residential, which has led to demolition requests, loss of historic structures, and infill projects that residents have felt are too big for some neighborhoods. This dynamic has led to proposals for the creation of new conservation and landmark districts to limit building sizes and demolition of historic buildings.

The traditional way for communities to address overzoning is via zoning map amendments in historic districts where the underlying zoning is determined to be at odds with long-term preservation objectives. (A draft Salt Lake City preservation plan calls for just such a long-term reevaluation of zoning in all historic districts to identify such potential mismatches.) But changing the zoning map is a long-term solution that takes substantial staff resources and can easily be slowed down or stalled by politics.

Form-based tools, and specifically detailed standards for allowable building types, can help align the base zoning with preservation goals. By focusing on the protection of existing physical character, a new form-based district is more likely to help preserve an historic streetscape than would a more traditional use-based district that authorizes higher densities on a site but provides no design guidance for how that might be sensitively achieved.

A form-based code may also be useful in introducing new building types that may not currently exist in a historic district but that would nevertheless be consistent with the existing fabric and help meet the overall goal of maintaining the neighborhood character. For example, the Benicia, California, form-based code introduces a transitional Neighborhood General-Open district allowing new small-scale mixed use building forms that are compatible with existing single-family residential character, expanding opportunities for mixed uses in the district without sacrificing existing character or encouraging scrape-offs.

As helpful as building form standards can be, however, they likely will not replace detailed historic design standards and guidelines. Form-based principles help address major overall site and building form issues, but they rarely address detailed architectural styles like fenestration details, which

require careful tailoring to local conditions. Repairing a historic window is a good idea in both Santa Fe, New Mexico, and Charleston, South Carolina, for instance, but the architectural treatments of those windows will be quite different and will be addressed in the historic design standards.

Frontage Types and Public Space Standards. A major innovation of form-based zoning is the attention paid to the connections between private lots and the adjoining streets and other public spaces. Preservation ordinances, like most traditional zoning ordinances, commonly focus on the buildings themselves and give little attention to the overall site and issue of building frontages and public spaces. This is changing, however, as a new generation of preservation controls brings attention to site elements outside the structure. For example, San Antonio is developing historic design guidelines that pay special attention to site elements like grading, fences and walls, and landscaping. And many preservation programs increasingly focus on the identification and protection of cultural landscapes. Santa Fe, for instance, has designated its plazas as historic landmarks, and Denver has landmarked several prominent parkways developed during the City Beautiful movement, as well as a lengthy ditch, the sole relic of the city's earliest ambitious irrigation programs.

But the broader embrace of frontage types and public spaces, and the explicit focus on connecting the public and private realm, is still relatively absent from most preservation ordinances, even though streetscapes and other public spaces are crucial elements in creating the overall look and feel of many historic districts and neighborhoods. The tools being developed by form-based codes are a natural fit for preserving these environments and could play an important role in helping to create stronger preservation ordinances that take a more well-rounded view of the overall historic context—supplementing, rather than replacing, existing historic district controls.

Block and Subdivision Standards. Form-based codes emphasize the establishment of maximum block standards and regular street grids to prevent the creation of superblocks and to ensure the creation of walkable urban neighborhoods. They seek to limit the length of single block faces, establish street grid systems to distribute foot and auto traffic across a larger number of possible connections, and call for creating pedestrian cut-throughs and pathways to make very large blocks permeable. The goals are to provide a maximum number of connections for the pedestrian, encourage walkability, and minimize automobile usage.

In the historic preservation context, this is rarely an issue, since historic areas typically have long-established blocks and street networks and new roads or blocks are rarely created in historic districts. Nevertheless, form-based theory's emphasis on pedestrian orientation does have a role to play in maintaining the overall look and feel of the streetscapes in historic districts and neighborhoods and can thus help bolster the goals of historic district controls.

Regulating Plans. Regulating plans are parcel-specific or area-specific maps that tie the form-based controls to precise locations on the ground. Preservation ordinances also may have a parcel-specific focus, in that the underlying map that defines the boundaries of a preservation overlay district typically distinguishes contributing from noncontributing properties on the basis of historic and architectural integrity. A higher level of standards and review typically applies to contributing properties, which are considered essential to the character of the district. Because form-based standards often strive for contextual appropriateness by addressing issues of building form and scale (in addition to architectural details), they are a natural complement to traditional preservation controls.

By-Right Development. The preference for by-right development, versus more lengthy discretionary approvals that may involve public hearings, is a distinguishing feature of form-based theory. In the early days of the preservation movement, ordinances moved in the opposite direction by creating new review bodies and new types of discretionary decisions. Today, however, the trend is toward process streamlining and simplification; it is becoming common for preservation commissions to delegate authority for minor decisions to professional staff to streamline the review process and free up the commission's time to work on major proposals and long-range projects. For example, in San Antonio, staff is granted the authority to approve certificates of appropriateness for minor alterations to designated buildings (e.g., window replacement), whereas major decisions are heard by the Historic and Design Review Commission.

Applying Form-Based Tools in Historic Areas

As described above, form-based theory has much to offer the preservation movement in helping to conserve urban environments. In both designated and undesignated historic areas, form-based tools can help to ensure that infill projects are physically compatible with existing historic resources and historical development patterns. Form-based tools can help introduce a richer array of more descriptive zone districts that reinforce, rather than obstruct and challenge, historical development patterns (such as existing lot sizes). By helping to align base zoning with preservation goals, form-based tools can potentially stabilize property values in historic neighborhoods and help reduce the number of demolitions of historic buildings. By introducing more sensitive and tailored building forms, they can help defuse potential controversies by clarifying in advance the types of infill that would be acceptable in a historic district. Through careful tailoring, form-based standards can provide a clear roadmap of how to return underutilized historic structures to productive use.

But form-based tools are not a replacement for preservation ordinances. As noted, broad-based building form standards are rarely a substitute for detailed architectural design controls that address fine-grained building details and help preserve historic integrity. Further, the embrace of form-based tools must be sensitive to existing historic resources, lest they define permitted building types within specific districts without regard to whether adjacent parcels are designated historic landmarks or districts.

In some cases, communities may opt for form-based controls as alternatives to historic district designations. Though not providing a high degree of control over detailed architectural issues or any of the federal or state tax benefits that come with historic designation, this choice might provide more flexibility in defining appropriate infill and redevelopment and could be simpler for the community to administer over the long run (after the substantial investment in developing the form-based tools).

Jim Lindberg, field director for the western office of the National Trust for Historic Preservation in Denver, has given thoughtful speeches to the preservation community about the value of form-based tools to the preservation movement. He believes that form-based coding offers a valuable approach to conserving and protecting the built environment and should become a new standard component of the preservation toolbox. To Lindberg, form-based zoning provides an essential context-sensitive foundation that can better align the existing zoning with preservation goals. On top of that, traditional preservation tools such as conservation or historic district overlays can provide additional guidance and direction on detailed architectural issues. According to Lindberg, such a system provides a community with

"a more complete set of tools, and form-based codes are an essential part of that foundation." He also notes that, in a time of shrinking local budgets and an expanding number of potential resources hitting the 50-year mark, preservationists need to find new tools to help satisfy an ever-increasing workload.

Lindberg participated on the steering committee in the development of the Denver zoning code adopted in 2010 (see Chapter 2), which is one of the most recent examples of applying form-based controls in a large city with many historic neighborhoods. The Denver code is based on an understanding and thorough documentation of the city's existing character expressed in seven neighborhood contexts. The standards are intended to help guide the fundamentals of urban design, focusing on features such as street type, sidewalk placement, alleys, lot shape, and building placement, rather than detailed building architecture, and help to reinforce existing patterns. Multiple new zoning districts were created for each of the contexts, resulting in substantially more districts than the prior code, which some already thought was too complex. Nevertheless, the code drafters believe the new regulations codify a more robust set of tools that reflect the existing rich variety of the city's neighborhoods necessary to ensure compatible future development.

The local preservation community was active in discussions on the draft code and secured a number of amendments during the drafting process, offering input to ensure new building forms require front wall plates and roof forms compatible with existing neighborhood patterns; encouraging the use of average front setbacks in single-unit zone districts; and supporting a wider range of allowed uses in large, individually landmarked homes to encourage their continued use and preservation. In developing the new zoning map that accompanies the new code, the historic community and residents worked block by block to adjust the allowed scale of underlying zoning in designated historic districts, which in some neighborhoods meant a reduction from high-rise zoning to more compatible, smaller-scale residential designations that provided property owners with more certainty about the types of infill projects that would be allowed. In some parts of Denver's historic but undesignated residential Congress Park neighborhood, for example, zoning allowances went from eight or more stories to two or three stories, depending on the surrounding context.

Unlike the code it replaced, the new code is tailored to documented neighborhood contexts. The city's historic district regulations continue to apply to historic districts as overlay districts that augment the underlying zoning. In addition, Denver authorized the creation of new conservation districts to allow for additional levels of context-based regulations and character preservation for nondesignated areas.

Summary Table

By focusing on the development of tools to ensure that new development is context sensitive and emphasizes the conservation of existing character, form-based tools are a natural complement to traditional historic preservation programs. The consistency of different form-based zoning tools with traditional historic preservation goals is summarized in Table 3.4.

Key Form-Based Tools	Protection of Individual Historic Landmarks	Protection of Historic Districts	Ensuring Compatible Infill in Historic Districts	Protection of Historic Site Elements and Cultural Landscapes	Overall Protection of Community Aesthetics and Character
Building Types / Standards	●	●	●	O	●
Frontage Types / Standards	◆	◆	◆	●	●
Public Space Standards	◆	◆	◆	●	●
Block and Subdivision Standards	O	O	O	O	O
Regulating Plans	◆	◆	◆	O	◆
Administration	O	O	O	O	O

● Potentially significant contribution

◆ Moderate or mixed contribution (e.g., impacts in more dense areas may be offset by impacts in other areas)

O Little impact or no different than nonform-based controls

Table 3.4. *Five key goals for historic preservation*

Conclusion

As we noted in Chapter 1, this report has four goals: to illustrate the wide spectrum of ways in which different U.S. cities have incorporated form-based controls; to review whether and how different approaches have changed the urban form; to examine communities' various experiences in administering form-based controls; and to compare form-based and nonform-based zoning controls in terms of their abilities to help communities address important challenges facing planning and zoning today. Below, we summarize the results of our analysis and provide planners with some general guidance in evaluating whether form-based controls are appropriate tools to help them achieve their communities' planning goals.

DIFFERENT APPROACHES ARE THE NORM

It is safe to say that no two U.S. form-based zoning systems are the same, a fact vividly illustrated by the six case studies in Chapter 2. The codes examined differ not only in their details but also in which of the six fundamental form-based tools they used. While many form-based systems have their roots in zoning principles and standards articulated by the Congress for New Urbanism, the Form-Based Code Institute, or the SmartCode, communities tend to pick and choose tools and elements from those toolkits and then combine them as needed to achieve their planning and development goals. Some tools—regulating plans and street design standards—seem to be left out as often as they are included. Table 4.1 below summarizes which of the six fundamental form-based zoning elements were included in each of the code examples in Chapter 2.

Table 4.1. *Elements addressed by code examples*

Key Form-Based Tools	Austin Standards	Mooresville Code	Denver Main Street	Arlington County / Columbia Pike	Livermore Code	Miami 21 Code
Building Types	1 type	9 types			4 types	11 types
Frontage Types					●	●
Public Space Standards	●					●
Block and Subdivision Standards	●				●	
Regulating Plans				● 4 areas	● 1 area	● 1 area; later 3
By-Right Development			●	●		●

Not surprisingly, the form-based template element most frequently included is the defined building type. This is perhaps the most visible innovation in form-based theory and the most visible difference from the "invisible box" approach of early Euclidean zoning. Defined building types hold the promise of better fitting new development into established areas—or ensuring that new areas develop in a particular form. Four of the six communities included building types (although Austin defined only one). One somewhat surprising exception is Miami, which most closely matches the SmartCode template. Though Miami 21 did include detailed building standards, it does not use graphically depicted defined building types.

The second most common element was building frontage types. Though only three communities defined specific frontage types (and Mooresville combined them into its building types), the three remaining jurisdictions (Austin, Arlington County, and Denver) all included extensive standards addressing the design of building frontages in relation to the street. Frontage controls are clearly important, even if the approach followed does not create define specific frontage types.

The remaining four form-based code elements reviewed in this report were included much more selectively. Only two communities, Austin and Miami, included public space standards that went beyond advisory guidelines. Likewise, only two communities, Austin and Livermore, included general block and lot layout standards in their form-based controls. Three communities included a requirement for regulating plans, but in two of these three instances the requirement applied to only one specific area or situation. Finally, only two communities, Arlington County and Miami, moved substantially to a system of by-right development within areas subject to the form-based standards.

Two important caveats apply to these findings. First, several of the communities that did not include regulatory standards in one or more of the six listed areas did include advisory guidelines. In addition, some of the communities made progress toward reducing the number of conditional uses or discretionary reviews of site features without achieving the goal of by-right development.

In addition, the form-based controls in the six case studies focused almost exclusively on urban and special-purpose areas rather than on suburban and low-density areas. Of the two overtly SmartCode-based examples, Livermore used one zone based on T3 and four based on T4; and Miami used one T3 zone, one T4 zone, one T5 zone, and six T6 zones. None of the six communities developed standards for or applied their codes to T1 or T2 areas. As noted, this may be because form-based theory evolved out of a focus on walkable, mixed use urbanism. It may also result from form-based theory's foundation in architecture, which is generally more closely regulated in urban areas than in rural ones.

These results confirm there is no single approach to form-based zoning controls. This is probably due to a combination of four factors. First, the urban fabric (the historical pattern of platting, streets, and development types and densities) differs widely across communities, and different form-based tools will address different problems with that fabric. Some communities seem primarily concerned with improving the relationships between buildings and streets, while others want to better align the scale of new development with the surrounding area.

Second, planning directors in various communities may differ in their professional judgments as to whether form-based tools will provide better results in given situations. We have spoken to some who feel that creating defined building types is essential to changing urban form and others who felt they could achieve similar results in other ways. Third, politics always plays a role. Even cities and counties that set out to reinvent their zoning by implementing all six form-based tools may face builders and appointed or elected officials who see no reason to reinvent controls that they think are working adequately, so the extent of form-based regulations may be scaled back through the review and approval process. Finally, the state's enabling legislation often influences the choice of approach. While California has explicit enabling legislation authorizing form-based codes, Virginia law prohibits mandatory design regulations, so a community there might have to craft an entirely different approach to incentivize what other communities can require.

FORM CONTROLS ARE GENERALLY WORKING

Our second goal was to evaluate whether the six systems of form-based controls are changing urban form in the ways that their authors intended, and the answer appears to be yes. Five of the six communities point to new construction approved under their systems as examples of how their codes are producing better building design—particularly in relation to streets and walkability. The exception is Livermore, where no new building has yet been approved in the transect zones. Austin has dozens of new projects on its core transit corridors that are implementing the vision behind its new form-based design standards. Denver can point to the almost complete elimination of parking between new buildings and Colfax Avenue, as well as two-story buildings that would almost certainly have been single-story retail structures in the absence of the Main Street District regulations. Miami can point to the My Brickell building, which voluntarily "reentitled" itself under the new code in order to reduce its required parking.

However, many of the form-based systems are relatively new, and the number of buildings and multibuilding developments approved to date is

fairly small. Most of the evidence is at the level of a single building, its location on the site, and its relationship to the street. Most form-based controls have not been in place long enough to show whether the changes they produce in individual buildings aggregate into a significant change in urban form as a whole. Even the Columbia Pike regulations, which have been in place since 2003, have experienced only seven new project approvals to date. Drawing conclusions about urban form will take more time and will depend on factors that will vary significantly across cities and counties:

- The *strictness* of the controls adopted. If the form-based controls use a new graphic style but in fact do not mandate significant change in building design and siting from the controls they replaced, we are not likely to see much change in urban form.

- The geographic *extent* of the community in which form-based controls are implemented. If the controls apply only in a small area, then the changes in urban form will be similarly limited.

- The *aggressiveness* of the change in the status quo required by form-based controls. If form-based controls simply lock in the current patterns of use and development, we are not likely to see much change in urban form.

TESTING AND TWEAKING ARE OFTEN REQUIRED

Our third goal was to evaluate the six communities' experiences with the administration of their form-based controls: were they easier, more difficult, less expensive, or more expensive to administer? Again, the examples produced a wide variety of lessons.

- First and most important, all six of the communities believe that their form-based zoning regulations are generally workable. None of them indicated regret about implementing their regulations, and none of them wished they had followed a different model. Completely honest answers to this question may be hard to come by, however. Most significant zoning code amendments take a long time to negotiate and to get adopted, so some of the satisfaction with the current regulations may reflect relief that the stress of the drafting and approval process is over. In our experience, whenever zoning staff are required to learn a new system of regulation there is some resistance, but our six contacts did not express that sentiment. There was some concern expressed by staff members in Mooresville about whether or not the form-based standards contained sufficient detail to be effectively enforced.

- Most of the communities emphasized the need to work with and through the political realities surrounding land-use regulations and to be flexible about what gets regulated and how to craft the regulations (strict or flexible; optional or incentivized or mandatory). As in almost all zoning code reform efforts, creating and heeding a representative task force of stakeholders can make the drafting and adoption process go more smoothly.

- In some cases, staff felt that crafting the new regulations as a freestanding chapter of their zoning codes, rather than embedding them into the current code structure, made it easier to communicate the differences and the advantages of the form-based controls. In other cases the decision to produce a freestanding document seems to have been driven by worries about the difficult of integrating them throughout the existing code.

- In mature cities, it is important to craft standards that work for building-by-building redevelopment over time, as that is where and how the vast majority of building takes place.

- It is important to craft form-based controls with a level of detail that can be reviewed and enforced within available staff and budget constraints, taking into account the fact that staff turnover may require repeated training on how to use those controls. In addition, administration of form-based controls may require greater staff knowledge of building and rehabilitation codes, since zoning that addresses more of the details of building design runs more risk of requiring something inconsistent with (or prohibitively expensive to achieve within) the building code.

- Regulating plan requirements are more appropriate for greenfield sites and for special redevelopment situations than for routine redevelopment. Greenfield sites are often in common ownership, so a regulating plan requirement works much like a master plan, PUD, or large-scale site planning requirement. However, many older developed areas have multiple sites with multiple owners, and it is very difficult to require a group of landowners to agree on a multiparcel plan as a prerequisite to redeveloping a single site. Both of the citywide code reform efforts reviewed in Chapter 2 will govern redevelopment far more often than greenfield development—and each applied regulating plan requirements in only limited circumstances.

- Worries over the prescriptive nature of form-based controls can be offset by offering incentives to use the system, most notably an administrative approval process that allows approvals of major projects without public hearings. Arlington County, Denver, and Miami all found that worked well.

- As with other zoning reforms, testing new regulations on a variety of typical development applications can help avoid mistakes or ambiguities that will later need to be fixed through amendments to the code.

- The complexity of form-based zoning increases rapidly when it covers an entire city. Even a very ambitious and thoughtful citywide zoning reform project may need to carve out some areas (even the majority of the city, as in Livermore) for special treatment or for continued application of existing zoning controls.

- Finally, no matter how carefully form-based controls are drafted, it is likely that they will need to be revised to cover unexpected situations or unanswered questions. This is no different than nonform-based zoning revisions. Austin, Mooresville, Arlington County, and Miami have all amended their form-based controls after adoption, while Denver incorporated changes to the 2005 Main Street zones when it adopted its 2010 citywide code. It is better to prepare the public and elected officials for that likelihood in order to avoid an early erosion of confidence in (or backlash against) the new zoning provisions.

LIMITED EFFECTIVENESS IN TACKLING OTHER PLANNING CHALLENGES

The fourth goal of this report was to review the intersection of form-based controls with four significant planning trends: promoting sustainable development, accommodating demographic changes, producing affordable housing, and protecting historic resources. As might be expected, the results were uneven. In some cases it was clear that form-based zoning tools could make it easier to attain the planning goals. In many areas, however, the use of form-based zoning had no clear advantage or disadvantage relative to more conventional zoning. And in a few cases it appeared that form-based zoning tools might make it somewhat more difficult to address these needs unless they are drafted to avoid that result. Nevertheless, just as it is possible to "infuse" form-based content into a traditional code (as was done in

Austin, Mooresville, and Denver), it is possible to calibrate form-based tools to avoid potential negative impacts on urban food production, stormwater infiltration, housing affordability, or other planning goals. Both types of zoning controls can usually be drafted to avoid foreseen adverse consequences. For example, if an 18-inch raised porch / stoop requirement will make it difficult for residential units to accommodate the elderly, that form-based standard can be removed. If requirements for additional architectural detail (step-backs, cornices, or specific facade materials) will make the resulting building too expensive for the target affordability level, those requirements can be removed.

We found significant overlap between the requirements of form-based zoning controls and the goals of sustainability, particularly in the more urban transect areas. Most impressively, urban area building types, frontage controls, public space standards, and block and subdivision controls could have a significant impact on promoting walkability and public health. In addition, urban area building-form standards could have significant impacts on air emissions and climate change, as well as on energy conservation and the use of renewable energy. Frontage types, public space types, block and subdivision standards, and regulating plans could also contribute to those goals in lesser ways. None of the form-based tools seem to make a distinctive contribution to water conservation or urban agriculture.

Although the SmartCode provides modules addressing urban agriculture, it is still not common to see form-based zoning promoted as a way to encourage that use of land, and most images of dense, walkable, mixed use neighborhoods do not place any significant emphasis on urban agriculture. The same is somewhat true of low impact development (LID) and green infrastructure; while some forms of LID are designed for and usable in dense urban contexts, those are the exceptions rather than the norm, and there is still some tension between the urban form envisioned for the more urban transect areas and that promoted by LID advocates.

Very importantly, some of the sustainability benefits associated with form-based tools in urban areas are grounded in their ability to promote more dense, mixed use development, and one of the advantages of form-based theory is that it advocates for that with graphic depictions that can help in the debates over appropriate densities. However, a nonform-based code that allowed the same density of construction, the same mix of uses, and the same build-to requirements would have sustainability benefits similar to those of transect zoning for more urban areas. This analysis assumes that a municipality's other environmental controls (e.g., addressing stormwater management, or transportation demand management) remain in place. We did not conclude that the sustainability benefits of form-based zoning were so strong that they would justify repealing those other types of controls.

We also found that form-based zoning tools are likely to have uneven influence on cities' abilities to accommodate and react to the major demographic shifts occurring across the country. Using building type standards could promote an urban form well suited for an aging population and a nation of smaller households. Similarly, frontage types, public space standards, and block or subdivision standards could also help accommodate an aging population, primarily by reducing auto-dependence. Those tools may also help planners accommodate changing location preferences for housing. On the other hand, none of the basic form-based zoning tools is likely to have a significant effect on the impacts of the slowing national growth rate, and it is not clear whether they will have a significant impact on accommodating the changing ethnic and immigrant character of the population. If most of those immigrants settle in the more urban transect areas, then the benefits of walkability and interaction could make it easier to socialize and assimilate

into their communities. On the other hand, if they settle in more suburban neighborhoods, as is increasingly the case, then form-based controls that lock in the current fabric of those areas could have little or no impact on accommodating immigrant populations. Regulating plans and by-right development do not have significant impacts on planners' abilities to respond to any of the demographic changes.

Zoning tools might address housing affordability in five ways: by promoting attached and multifamily development, by easing the conversion of nonresidential buildings to residential use, by allowing more residential units per structure, by reducing household transportation costs, and by reducing overall development costs. In two of these areas, form-based tools have a potentially significant advantage over nonform-based zoning controls. First, the use of building type regulations could significantly promote the construction of attached and multifamily housing by making lower-density or detached housing forms unavailable in urban areas. This draws on one of the strengths of form-based theory—that development in urban areas should be required to meet minimum as well as maximum density requirements—even though some of that benefit will be offset by higher land costs in urban areas. Second, building type regulations and by-right development could ease the conversion of nonresidential buildings to residential uses—since under form-based theory building form is more important than use—in part by making any required approvals administrative rather than requiring a hearing.

In most other areas of affordability, however, the impacts of form-based controls were less significant or nonexistent. For example, few of the form-based zoning tools had a significant impact on allowing more residential units in a given structure. In theory, form-based codes should not care whether a two-family building form is occupied by two households or three, but in practice most form-based codes restrict single-family building types to single household use and duplex building types to duplex use. Block and subdivision standards probably do not have a significant effect on affordability, but if they do it may be positive if the cost savings of narrower streets are not offset by the need for a finer-grain of street connectivity—or negative if the reverse is true. While several of the form-based tools may reduce transportation costs, those reductions are likely minor. In theory, having front doors closer to walkable streets, parks close to homes, and regulating plans requiring convenience shopping near homes can reduce transportation costs (perhaps leaving more money to pay for housing), but in practice those factors will probably not allow working households to do without a car; the benefits will be in miles driven for short trips replaced by walking.

There is potential synergy between form-based zoning tools and the goals of historic preservation, as form-based zoning could both supplement and in some cases replace current historic district and building controls, most of which focus on architectural details rather than building location on its site or the scale of the neighborhood. Using building type controls to define approved types in historic areas could reduce the likelihood of inappropriate development by regulating basic building shapes, locations on lots, and relationships to streets in ways that most historic district standards do not address. Public space standards could also contribute significantly to protecting historic site elements, cultural landscapes, and community aesthetics and character. Regulating plans could likewise contribute to historic preservation goals by requiring that the historic pattern of building types be retained— something that most historic district standards do not address. If some of these issues are addressed in form-based codes, then historic commission review can focus on the architectural details and character without worrying that the basic pattern of buildings will be compromised. However, none of the six code revisions reviewed in Chapter 2 was aimed at these goals.

There are a few instances where form-based zoning could conflict with efforts to address the four planning goals. Those include building design requirements that make buildings less convenient for the elderly, building type requirements that limit building heights in ways that make elevator provision for the elderly and the disabled cost prohibitive, and architectural step-back or detailing requirements that significantly increase housing costs.

A USER'S GUIDE TO SELECTING FORM-BASED TOOLS

In light of the wide array of approaches possible, the question facing many communities considering form-based controls is not whether to apply them citywide but where to apply them, how to draft them, and which tools make the most sense given the desired changes in urban form. As always, the key is matching the zoning tools to the land use and development challenges at hand. To do this well, communities considering form-based controls should be able to answer the following questions.

- *Is the community intending to apply form-based controls across the entire jurisdiction or target them to specific areas?* It is surprising how often this basic question is not asked at the start of the discussion, often leading to significant miscommunication about what types of controls are needed. In general, city- or countywide systems are much more complex (given the wider variety of buildings, streets, frontages, and contexts that they have to address) and often have to be made more flexible and less pre-scriptive than those targeted to specific places that have clearly defined or intended urban forms. In general, the smaller the area being targeted, the more detail the standards can include and the more form-based elements can be successfully addressed. To date, very few medium-sized and large communities have adopted city- or countywide form-based codes that include most of the six form-based elements discussed in this report.

- If the intent is to apply form-based controls to specific areas of the com-munity, *are the places being targeted greenfield areas or redevelopment areas?* Raw land development and large single-owner redevelopment areas offer better opportunities to establish new urban forms quickly, while developed areas with multiple owners generally change slowly. Once streets and lots have been designed and buildings and infrastructure have gone in, many aspects of urban form have been established. They can be changed, of course, but that often takes a long time and significant public investment. If the major concern is in guiding redevelopment in developed areas with multiple owners, it may not be wise to require those owners to agree on a single regulating plan as part of the form-based control system.

- *Is the intent to encourage new forms of development or to require them?* Again, failure to ask this question early in the process often leads to significant miscommunication and wasted effort. Many stakeholders who can easily agree to guidelines or incentives for different forms of development will balk at standards that require those outcomes. Often, the answer is a mix of both. For example, form-based controls may be mandatory in down-town and transit-oriented nodes but voluntary or optional in other areas. Building and frontage type controls may be mandatory while public space and block and subdivision standards remain advisory. The answer to this question sometimes changes during the course of a zoning reform effort, however. Some efforts that intend to create mandatory zoning standards later opt for advisory guidelines, either because the diversity of the area makes regulatory standards too complex or because of opposition to the proposed controls.

- *Can key departments agree on needed reforms?* Traditional zoning often controls only private land and publicly owned building sites but not streets, parks, and infrastructure, because those are under the control of public works or parks departments. Form-based theory insists that this is a mistake and that good urban form requires coordination between building frontages and street design. Yet bridging that gap requires significant cooperation among planning, parks, and public works staff. If that cooperation does not exist, then any public space types and controls established as part of the form-based system will probably wind up being advisory rather than mandatory. Public streets, parks, and infrastructure need to meet demanding engineering and operational requirements in addition to planning and design goals, and public works and parks departments almost never agree to implement standards that they were not involved in drafting and that do not meet their requirements.

- *Which form-based elements are needed?* None of the communities reviewed in Chapter 2 adopted systems with all six elements of form-based controls. Some included only a few of them. If it is clear that the community's goals or the nature of the area does not require some of the six elements, it may be wise to take them off the table so that attention can be focused on those that are necessary to establish the intended urban form.

- *How large a staff is required for implementation?* Every zoning system, form-based or not, needs to be able to be administered quickly and efficiently by the staff that the municipality can sustain. In general, as zoning codes address more elements of development and design, the amount of time required to review compliance and the number of staff required to process applications on a timely basis increase. Electronic plan-review systems can reduce these impacts, but it is nevertheless important to not adopt controls that require skills or staffing levels that cannot be sustained over time. None of the six case-study communities had been able to reduce staff, and none claimed that it had had to hire more staff in order to implement the controls they drafted.

- *How much support is there for the current system?* Politics always plays a role in zoning reform efforts. The amount of zoning change that a community can accept is often directly correlated to the amount of frustration with the current zoning tools. Unfortunately, experience shows that the most dramatic zoning reforms are often possible only when the current system is perceived as significantly broken. Zoning systems that citizens and stakeholders think are tolerable are almost never replaced by dramatically different systems.

THE BOTTOM LINE

Form-based zoning can do many things well. It has made positive differences in the six study communities, and it has the potential to help planners respond to challenges related to sustainability, demography, affordability, and historic preservation. At the same time, there is no dominant or standard system of form-based zoning in use. Two of the study communities adopted codes closely based on the SmartCode template; four did not. Three undertook a transect-based planning exercise at the start of their process; three did not. Most of the form-based tools were added into existing codes rather than replacing them. And yet all six communities felt that they had acted wisely. The five that have approved new buildings under their form-based controls felt that they were better than those that would have been built under the previous controls. None of the communities expressed regret that it had not adopted a different set of tools, though most of them amended and

improved their new form-based controls following the original adoption. Interestingly, none of the communities adopted regulations addressing all six foundations of form-based zoning.

For all these reasons, it is important that cities and counties considering the adoption of form-based zoning controls determine which of the six types are needed to address their specific planning goals; they should feel free to tailor form-based zoning systems to those goals and needs. For 90 years, planners have picked and chosen from an increasingly wide variety of zoning tools to craft specific solutions for their communities rather than adopting model or uniform codes, and the advent of form-based zoning has not changed that.

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PAS 552. 2008. 82 pp. $15.

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PAS 556. Marya Morris, AICP, ed. 2009. 260 pp. $72

This report is a guide to the development of model smart growth ordinances, including models that may be adapted by local governments to implement special planning policies for multimodal transportation, infill development, affordable housing, and other best practices in planning and development regulation. As used here, "smart growth ordinances" and "smart growth development codes" mean regulations intended to achieve a variety of objectives, including encouraging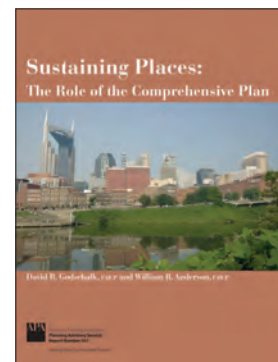 mixed uses, preserving open space and environmentally sensitive areas, providing a choice of housing types and transportation modes, and making the development review process more predictable.
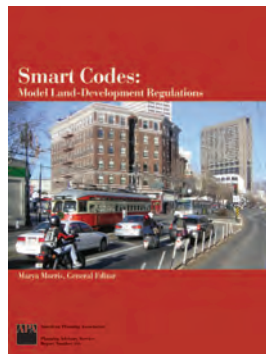
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