A METHODOLOGY FOR THE DOCUMENTATION AND ANALYSIS OF URBAN HISTORIC RESOURCES

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Abstract
The incorporation of historical data, issues and perspectives into the theory and practice of urban planning has yet to be fully embraced by the planning profession. Though scholars, practitioners and professional associations have long attempted to do so, planners still struggle to develop effective tools for the documentation, analysis, synthesis and presentation of historical information. Current practice often relies on the use of historical preservation strategies that are primarily oriented toward legislation and policy rather than physical planning.

This dissertation formulates and demonstrates a methodology that attempts to combine preservation planning strategies developed by the National Park Service with concepts from planning theory and practice in order to better enable physical planners to confront historical conditions and concerns. The methodology is embodied in the form of a survey instrument that is demonstrated by way of three digital cartographic models. The survey combines concepts from planning theory, preservation planning and mainstream practice in order to instruct, govern and classify collected data. The three models demonstrate the utility of this survey by using it to depict degrees of historic building significance and to represent the architectural compatibility of character-contributing features such as materials, patterns and styles. These models are applied to a mixed-use urban environment in the Washington Square area of Philadelphia. Results indicate that the survey instrument is effective and that the models yield interesting results.

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A METHODOLOGY FOR THE DOCUMENTATION AND ANALYSIS
OF URBAN HISTORIC RESOURCES

Nicholas L. Stapp

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in

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ABSTRACT

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Nicholas L. Stapp

Dr. C. Dana Tomlin, Supervisor of Dissertation

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I Introduction

1.1 Overview

Cities are increasingly demanding that planning and design take history, including character, culture and meaning, into account. A number of factors are contributing to this demand, including demographic shifts, which leave existing residents eager to preserve the neighborhood; energy and climate challenges, which require creative reuse of existing infrastructure; economic challenges, which can alter the character of an area; and globalization pressures, which can threaten the individuality of a city (Hack in Hack, Birch, Sedway & Silver 2009: 103).

Professional associations such as the American Planning Association (APA) and the International City/County Management Association (ICMA) have also voiced a desire for the integration of history as a resource for planning and design decisions. For example, the APA has formulated a policy discussing the role and use of historic resources,1 and both the APA and ICMA have created standards and techniques for practice that refer to the importance of considering history when planning (APA Website 2009; Steiner & Butler 2007; Hack, Birch, Sedway & Silver 2009).2 Yet, while both associations acknowledge the importance of a historical perspective, neither provide a practical planning-focused method for the integration of history into mainstream

2 See Literature Review for a more detailed discussion.
practice. Instead, both the APA and the ICMA recommend the use of preservation planning strategies when considering historic resources in site planning and design.

While a useful first step, the use of preservation planning strategies does not allow for the full integration of the resources of history into the planning and design process. Its focus on documentation, legislation and policy leads to a static view that isolates a particular building or neighborhood frozen at a particular time. In contrast to the snapshot approach used by preservationists, planners require a flexible approach that allows the urban form to be examined over time.

A growing number of scholars have recognized that a historical perspective can offer a much richer understanding of the planned environment (Lynch 1960: 119; Lynch 1972: 49, 60, 242; Cullen 1996: 9-11; McHarg 1992: 79-93; Rapoport 1977: 12-14; Relph 1976: 24, 35, 122, 146). These scholars have created new fields of study and developed experimental methodologies that rely on the use of information associated with people, activities, designs and buildings from the past as well as the present to understand the factors that contribute to the structure of the urban form. Despite being well received, their advances have not yet found their way into the mainstream planning process.

This dissertation is therefore an attempt to create practical methods to integrate the resources of history into the urban planning process. It develops a flexible survey instrument that can be used to gather, classify and evaluate historical information about buildings, blocks and neighborhoods at given moments in time. It further develops models to demonstrate how the instrument might be used to query the historical characteristics of an area and guide decisions on planning, preservation and
development. The successful demonstration of the survey and its models, based on fieldwork in the area of Washington Square, Philadelphia, suggests that it has wide applicability for integrating history into planning practice.

1.2 Thesis and Intellectual Contribution

This dissertation hypothesizes that a methodology rooted in theory and practice, designed to document and analyze historic characteristics associated with the built environment, could provide the practical solution needed by planners to more fully integrate these resources into mainstream practice. Specifically, it employs a customized survey derived from National Park Service (NPS) categories and three scenario-based models designed to illustrate the utility of the survey. The survey combines concepts from planning theory, preservation planning and mainstream practice to guide, regulate and classify collected data. The three models depict urban scenarios showing the built environment over time, the degree of significance a historic building possesses and the architectural compatibility of character-contributing features such as materials, patterns and styles.

This study tested and evaluated the survey and models on the mixed-use environment surrounding Washington Square, Philadelphia to measure the ability of the data to communicate meaningful historical information in a practical manner. This associational process transformed buildings into layered bundles of information that individually and/or collectively revealed distinct character-defining traits. The approach may revolutionize the site planning and design process by allowing planners to manage
a city’s character as it develops; adjusting, strengthening, introducing or removing influences from the past in order to meet the needs of the residential population.

1.3 Methodology

The survey and models were developed with a multi-phase methodology. Planners and planning-related literature increasingly employ multi-phase methodology in creating and analyzing spatially sensitive, technically dependant data. Application of this methodology permitted the survey and models to be created in four phases: design, implementation, demonstration and evaluation.

In this project, the design phase included developing the preliminary survey, including a list of classifications identifiable in the field; identifying scenario-based models to illustrate the utility of the survey; calibrating the survey for usefulness, practicality, and appropriateness; and preliminary field testing of the survey and methodology.

In the second phase, implementation, finalized versions of the survey and the models were proposed. Based on feedback from the design phase, the final version of the survey included an abbreviated set of classifications and a refined data-gathering technique. The demonstration phase showed the utility of the survey to mainstream practice and the effectiveness of the models in communicating meaningful historical information. Finally, the evaluation phase examined the design, functionality and applicability of the survey and the scenario-based models for mainstream practice. The
evaluation phase identifies successes, failures and anticipated and unanticipated outcomes and included the evaluation of the methodology by a professional practitioner.
II Literature Review

Over the past forty years, planning scholars’ attitudes about the urban form have evolved from an insistence of physical planning toward a public-oriented planning. This philosophical transformation has affected both thought and practice, so that contemporary planners’ understanding of the city and its environs draws insights from anthropology, architecture, geography, landscape architecture, political science, preservation, psychology, and sociology. Planners have moreover also begun to take account of users’ perspectives by exploring time, motion, place, ecology, and the aesthetic in addition to their traditional concerns with the physical form of the city. This scholarly diversity is reflected in the vast assortment of theories and analytical techniques used to capture and represent these new types of data.

This dissertation’s focus on the uses of resources derived from history draws on this increasingly diverse field of study. This literature review explores the works of key scholars’ whose notions of space, place, and community are especially relevant for this work.

2.1 Rethinking the Urban Form

The 1960s were a critical time for the American planning community, as political pressure, social unrest and economic demands would ultimately force it to shift from its traditional focus on physical planning of the city and region to planning for the community.
Although a variety of social and political factors affected the theory and practice of planning in the 1960s, major population shifts, the civil rights movement, widespread activism and the large-scale modification of cities and the countryside were particularly critical (Birch in Krueckeberg 1983: 142).\(^3\) Until this point, planning theory had consisted primarily of a handful of theoretical approaches, many of which were rooted in the Utopian ideals of the “old planning system” (Hall 2002: 359). Of these highly regarded (and sometimes still used) theoretical approaches to planning, the four most important were Marxism (1848—Marx & Foglesong & Harvey)\(^4\), Rational-Comprehensive (1900)\(^5\), Spatial (1927)\(^6\) and Incrementalism (1950—Lindblom & Meyerson and Banfield)\(^7\). Rational-Comprehensive and Spatial planning theory were particularly popular, most likely because their techniques were most applicable to the physical planning of land. The efficiency and logic of these approaches added to their appeal for planners, with much of their application applied to projects for local, state and federal governments.

None of these theoretical approaches took into account the consideration of historic features of the neighborhood, city or region. Historic preservation activities, which might include surveying, documenting and listing historic resources to protect

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\(^3\) The Civil Rights Act was passed in 1964, making it illegal to discriminate by race, creed or national origin in public places.

\(^4\) Based on the writings of Karl Marx, this theory argues that, in principle, the enhancement of society will only occur if institutions that manipulation of the labor force are eliminated, replacing them with social institutions which serve all.

\(^5\) Commonly thought of as the “general theory of planning,” rational-comprehensive planning applies rational decision making to planning to reveal solutions to identified problems. The four basic principles are goal setting; identification of policy alternatives; evaluating the means against ends and the implementation of decisions with feedback loops and repetition of steps.

\(^6\) This theory proposes that planning is an intermingled collection of spatial information representing social and physical space. This approach became popular within comprehensive and regional planners.

\(^7\) This theory proposes that planners should adopt a pluralist view of society that includes community involvement, activism and the distribution of decision-making abilities. This theory grew from the continued alienation of the planning movement from society (specifically urban society).
against their demolition and development (Mason in Hack, Birch, Sedway & Silver 2009: 132), were generally led by members of the public, rather than the planning community. Few planners associated the notion of preservation with the built environment, with their approach instead shifting toward a theory and practice of social and economic planning (Hall 2002: 359, 366). The irony is that there is an intrinsic connection between the social and economic characteristics of the city and its historic and residential character.

The two were particularly related in the years immediately following World War II, when the federal government was under tremendous pressure to launch nationwide planning and construction campaigns of houses, federal highways and municipal facilities. The sheer volume of development made some loss in historic character nearly inevitable. In addition, during the Great Depression and then the war, many existing cities had neglected infrastructure, housing, municipal facilities, mass transit and recreational facilities. The federal government led many initiatives to repair, redevelop and modernize the country by funding local, state and federal planning agencies to undertake these renewal campaigns. Many cities were in dire need of resources to remedy their social, economic, political and structural issues and were more than willing to participate in many of the governmental programs. For example, cities like Houston, Pittsburgh, Denver, Chicago and New York all participated in various governmental

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8 The Housing Act of 1949, The Housing Act of 1954 and Berman vs. Parker all contributed to the surge in housing demands. Another major contributing factor was the unprecedented demand for durable consumer goods (cars and houses). The Federal Highway Act of 1956 was also a major contributing factor to the social upheaval already felt in urbanized areas across the country, making it easier for those who could afford it to move to the suburbs.
combined with political upheaval and criticism from the public, this high volume of activity forced the planning profession to rethink its role, ultimately rebranding itself as an advocate for the public.

Three prominent theoretical models appeared in the wake of this tumultuous philosophical transformation: the planner as democrat; the planner as informal coordinator and the probabilistic planner (Hall 2002: 365). These models offered different techniques that ultimately diverged to reveal the new focus of the profession: to “contribute to the public well-being by developing communities and environments that meet the needs of people and of society more effectively” (Hall 2002: 366, 367). This new perspective allowed planners to step away from traditional methods of theory and analysis to develop new theories and techniques that would contribute to and promote residential well-being while also allowing them to explore the non-traditional city to determine what makes a city unique, interesting and meaningful. Specifically, planners began to recognize a wide variety of new urban resources: history, character, place, the aesthetic, culture and residential perception.

2.2 Influential Pioneers of Theory and Application

In 1943, sociologist and ethnographer William F. Whyte’s *Street Corner Society* proposed a new theoretical methodology to analyze the complex, stratified layers of urban social existence. This scholarly work chronicled the lives of an Italian-American

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9 A high percentage of cities in America participated in these governmental programs at varying degrees.
community living in a depressed part of the North End in Boston (Massachusetts) over a three-year period. One of the primary research objectives of this study was the identification of characteristics associated with the social structure of the community in an attempt to determine what actions (social, financial and political) might help the community rise from its depressed situation (high rates of crime, unemployment, poor infrastructure and political corruption), theorizing that change would only be successful if it was directed toward the real needs of the residential population instead of generically imposed upon them by the government. Whyte’s research methodology evolved as the study progressed, originally starting as a quasi socio-anthropological study (relying on interviews and analysis) and gradually becoming a study that combined traditional data resources (census, crime statistics and housing/welfare records) with non-traditional resources like residential observations and participant-observation. Whyte’s work was revolutionary not only for its content, but also for its flexible approach to methodology that drew on insights from a number of different disciplines and developed as the project was lived. Whyte’s work created the notion of community involvement in decision-making, recognizing that the social qualities of a community are as valid a resource for study as other more traditional resources.

A central contribution of Whyte’s work is its recognition of the connection between the social characteristics of the residential population and its relationship to their local environs—an observation not fully realized by the planning community until much later. In addition, Whyte’s research methodology was unique because it incorporated the notion of time, site familiarity and peripheral site data. Whyte thought it critical to examine data over time, theorizing that this approach would reveal new
insights into research questions, while also revealing answers to questions that would otherwise be difficult to resolve (Whyte 1993: 303). Another methodological development centered on the notion of site familiarity. Whyte theorized that successful site research can only be achieved after the researcher becomes intimately familiar with the site before any research is conducted (Whyte 1993: 303). A final noteworthy methodological advance theorized that the use of peripheral data (recorded data not directly related to the research objective) provides the researcher with the ability to understand the “larger structure of the community” (the so-called big picture) by relating his work to the city in which the community resides (Whyte 1993: 324). Whyte’s methodological approach was revolutionary for its time, essentially creating the field of urban sociology.

In *The Image of the City* (1960), urban designer and planner Kevin Lynch followed the premise of planning for the betterment of the community by promoting the theory of “imageability.” As Lynch defined it, imageability is “that quality in a physical object which gives it a high probability of evoking a strong image in any given observer. It is that shape, color, or arrangement which facilitates the making of a vividly identified, powerfully structured, highly useful mental images of the environment” (Lynch 1960: 9). Lynch proposed that it was possible to document and analyze information contained within the minds of city residents—their mental image—when considering distinctive and memorable elements from their environs. Used correctly, this form of analysis offered a means to perceive the legibility of the city through the eyes of its residents (Lynch, Banerjee and Southworth 1990: 239). Lynch suggested that some perceived environments are more legible than others, proposing they can be organized
into either sequential or spatial patterns for analysis to reveal routes, buildings, locations and natural elements which contribute to the residential perception of place (Appleyard 1970: 114). Lynch theorized that identifying concentrations of these image-contributing elements would allow the planner to map areas containing the community’s most and least significant perceptual resources, thereby creating a plan that retains an organized environment while deemphasizing less significant resources. For Lynch, this approach creates a stronger sense of place, permitting residents both new experiences and a level of comfort (Lynch 1960: 9).

Lynch’s methodology combined traditional data recording techniques (field survey and mapping) with non-traditional resources and techniques (residential surveys/interviews and cognitive mapping) to produce a new form of graphical representation that combined the physical location of the study area with residential perceptual information. Lynch tested this new planning paradigm with five elemental components (paths, edges, districts, nodes and landmarks) that he theorized served as the syntax that people use to orient themselves in cities (Lynch 1960: 47–48) (Figure 2.1). This revolutionary methodological process displays some of the hallmarks of earlier planning theory (Spatial and Incremental theory), but also proposes the use of non-traditional resources. Moreover, his insistence on visual representation demonstrates the viability of these non-traditional resources not only to the planning community but also to the public at large (Lynch, Banerjee and Southworth 1990: 247). This early work encouraged the planning community to think beyond the boundaries of traditional

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10 In addition, Lynch also theorizes that cultural elements, architectural character and materials, building use and streetscaping are valid considerations for future consideration when examining the urban form (mentioned in the appendices of The Image of The City (Lynch 1960: 165–170).
practice and demonstrated that exploration of the intangible urban realm can make a valid contribution to planning thinking and practice.

Figure 2.1 The visual form of Boston, illustrating Lynch’s five elements (source: Lynch 1960: 145, 147).

One year later, the architect and urban designer Gordon Cullen made a monumental contribution to the architectural and planning communities with *The Concise Townscape* (1961), which examined the art of the built environment and its relationship to a city’s residential population (Cullen 1996: 13-16). This revolutionary study used a new approach to the relationship between space, the aesthetic, and the resident to explore the aesthetic meaning of the urban form (Cullen 1996: 9, 10). Cullen theorized that the urban landscape consisted of a series of related tangible (aesthetic) and intangible spaces (meaning of the aesthetic) and proposed that the architect/planner will produce a more meaningfully design if they understand the relationship between the
two. Cullen’s technique of “serial vision” identified and categorized aesthetic components of the city, documenting the dynamic interplay between the collective form and the space it occupies. Cullen’s approach emphasized the importance of the personal and collective visual experience, theorizing that this form of information plays a central role in creating a vital, vivid and successful city.

As did *The Image of The City, The Concise Townscape* explores the experiential relationship between the resident and the city, classifying this relationship into three categories: optics, place and content (Cullen 1996: 9–12). Cullen describes *optics* as the concept of “serial vision” in which movement at a “uniform speed” through a city both embraces an “existing view” and hints at possible “emerging views” down a winding road or through a courtyard (Cullen 1996: 9) (Figure 2.2). *Place* is “concerned with our reactions to the position of our body in its environment” (Cullen 1996: 9). This locational awareness allows the resident to identify and sympathize with the environment and facilitates meaningful navigation through the “here” and “there” structures of the city (Cullen 1996: 10). *Content* refers to the aesthetic of place that contains visual organization through “colour, texture, scale, style, character, personality and uniqueness” (Cullen 1996: 11). Cullen theorized that these classifications help to better understand the urban form, and, moreover, that their use demonstrates the potential of non-traditional resources (architectural detail, natural features, enclosures, relationships and scale) for informing a plan-making process that is sensitive to residential desires and respectful of the character of the space (Cullen 1996: 57–86).
The most outspoken proponent for an attitudinal shift within the planning community was journalist, activist and urban visionary Jane Jacobs, who argued for an inherent link between city residents and their environs in her publication *The Death and Life of Great American Cities* (1961). Jacobs eloquently described how a city consists of a collection of complex layers that make neighborhoods unique and argued that, by ignoring these resources, planners fail to advocate for the common good of the public. Largely in reaction to nationwide urban renewal initiatives from the period, Jacobs strongly criticized both the planning community (specifically the rationalist planners) and the disruptions their plans caused to cities throughout the United States. In this groundbreaking work, Jacobs condemned planners for their reliance upon past planning techniques, their ignorance to the multi-layered nature of the tangible and intangible city
(its neighborhoods, streets, sidewalks and aesthetic) and their disinterest in the relationship between the city and its residents (Jacobs 1993: 4). Jacobs embraced community involvement at every level in the plan-making process, forcing theorists and practitioners to revise their concepts of what components are important to a city. As did Lynch, Jacobs theorized that the community and the places they live—together—are what makes streets, neighborhoods and cities unique and livable. This work, and the public’s response to it, greatly influenced many members of the planning community, forcing them to consider the ramifications of current planning practice, and ultimately stimulating the adoption of a new public-oriented philosophy towards planning.

Yet a third book published in 1961, Lewis Mumford’s *The City in History*, questioned the validity of traditional planning methods for understanding the structure and function of cities. This monumental book reflected upon cities from a historical perspective, relating these observations to the state of the city in the 1960s. Throughout the text, Mumford presents an account of the global city in evolution, theorizing that humans (the planning community) should look backwards to move forwards by applying lessons from the past to address the present. Mumford observed that humans and cities are inherently tied together and that this relationship should not be severed. He similarly noted that the built environment of cities is inevitably shaped by time and the preferences of the residents. When combined with insights from Jacobs and Lynch, Mumford’s position contributed to the argument in favor of a form of community-centered planning that would encourage residential involvement while also urging professionals to be sensitive to the multitude of resources that contribute to a city’s cultural sense of place.
In 1969, landscape architect and planner Ian McHarg provided one of the most significant contributions to modern site analysis since William F. Whyte with the publication of his *Design with Nature*. Like other planners from the period, McHarg was affected by the social, economic, political, industrial and developmental pressures of the time, witnessing the wide-scale mistreatment of urban residents, urbanized areas and the countryside. Cities were dirty, dangerous, poor, ghettoized and largely ignored. Suburban developments, in contrast, appeared everywhere, consuming rural open and forested lands in order to create supposedly safe havens for fleeing middle- and upper-class urban residents. McHarg argued that decentralized suburban planning was “an unrealistic dream” created to avoid facing the ailing state of the industrially polluted city. What was needed instead was a methodology that considered the landscape (and all its attributes) in advance of development to determine the area’s most and least suitable for development. This approach, he argued, would not only maximize developmental potential by identifying land most suitable for development, but would also preserve and/or protect locations less suitable for development by reserving them for natural or agricultural purposes (McHarg 1992: 35–40, 105).

McHarg therefore presented a revolutionary landscape planning methodology that relied on a combination of both traditional and non-traditional site resources, including cultural, recreational and ecological information. The technique, a foundation of modern day GIS, documented site features such as soil composition and drainage, geological formations, slope, habitats, areas of scenic value, surface drainage and erosion on transparent sheet maps that could then be overlaid to produce a series of composite images of color-coded high and low values (Figure 2.3). The resulting visual
analysis allowed the professional to determine many useful site-planning features including the carrying capacity of a site or region, suitable locations for development and areas for landscape preservation (McHarg 1992: 35–40, 105).

Figure 2.3 Illustration depicting McHarg’s technique to classify the landscape (source: McHarg 1992: 114).

In 1972, Kevin Lynch’s *What Time is This Place?* expanded his earlier theory of imageability to include the phenomenon of time. Here Lynch argued that “a desirable image is one that celebrates and enlarges the present while making connections with past and future” (Lynch 1972: 1). A handbook of sorts, this work is designed to educate the public and professionals on the character of space when making developmental changes to urban (and rural) space. Like the work of McHarg, Lynch’s later work was in many ways a direct response to suburbanization and urban renewal initiatives. Lynch uses case study examples to demonstrate how time (or the near and far past) is an integral part of daily residential life defining the character of the street, neighborhood and city.
Lynch broadly categorized image-building characteristics (culture, the aesthetic, meaning and the past) into one master category of “time,” which he argued could be used to define the character of a building, street, neighborhood, district and city. The concept of time could additionally be used to provide texture and vividness to the present by reminding residents of past people, cultures and memories. For Lynch, time acts as a scaffold to which residential memories are attached; this framework in turn constructs the perceived image of the city (Lynch 1972: 241). Lynch emphasized that planners should be familiar with the intangible values of the city, stressing that history, residential perception, meanings and memories are just as important as physical resources from the built environment. Of particular interest is his metaphor of time as a type of container that holds information associated to the past and present place. The simple act of association provides the planner with a non-linear understanding of the city, allowing her or him to move through time to reveal buildings of significance, locations of specific meaning or emotion-generating aesthetics.

In many ways, Lynch’s later work is similar to that of Donald Appleyard’s *Styles and Methods of Structuring a City* (1970). Appleyard was a professor of urban design at the University of California, Berkeley with whom Lynch had worked on earlier studies on environmental perception, motion and community planning. Of particular interest is Appleyard’s description of how the notion of association is used by residents when relating to parts of the city—something Lynch explores in *What Time is This Place?*. Appleyard describes association as three methods: “the *associational* method which depends on the differentiation, association, and patterning of functional, social, or physical character; the *topological* method, which depends on continuity and juncture of
movement and character; and the *positional* method, emphasizing spatial placement, direction, and distance” (Appleyard 1970: 115). Lynch appears to utilize, in part, Appleyard’s associational method to describe how time (the past) and the resident are interconnected.

In 1976, geographer and planner Edward Relph’s *Place and Placelessness* attempted to introduce a new interpretation of the descriptive environmental concept known as “the phenomenon of place” into scholarly debate. In many ways, this work complimented many of the observations made by Lynch, Cullen, Mumford and others by acknowledging the inherent relationship between people and place; however, it distinguishes itself from earlier works by focusing on the “day-to-day” activities and experiences of the “lived-world” to develop “an alternate approach to understanding environment” (Relph 1976: Preface 1). To achieve this, Relph categorized place into what he described as “four themes:” space and place; essence of place; identity of place and sense of place. “Space and place” examines the relationship, range of experiences and concepts attributed to the phenomenon. “Essence of place” explores the differing “components and intensities of place experience.” Relph argued that “there are profound psychological links between people and the places which they live in and experience” (Relph 1976: Preface 1). “Identity of place” investigates the “identity of places and the identity of people with places” (Relph 1976: Preface 1). “Sense of place” considers “ways in which sense of place and attachment to place are manifest in the making of places and landscapes” (Relph 1976: Preface 1). These classifications are designed to categorize place by space, time and meaning (a new addition to the scholarly discussion on place). In addition, Relph creates subcategories for some of the themes to create a
targeted methodology for application. For example, *space and place* has eight associated subcategories designed to identify different spatial qualities of place, including pragmatic or primitive space; perceptual space; existential space; architectural space and planning space; cognitive space; abstract space and relationships between the forms of space. This referential methodology, similar (although more detailed) to the one created by Cullen in *The Concise Townscape*, provides a nonlinear method for understanding an otherwise complex concept like the phenomenon of place.

Relph’s pivotal work propelled the study of place to the forefront of planning thought and practice, demonstrating that a stratified interpretation of place allows for different aspects of place (association, essence, identity and sense) to be used individually or collectively to analyze and design public-oriented environments. Its primary contribution is Relph’s transformation of a non-traditional, complex resource into a rational asset to describe (and assign) meaning and significance to the built and natural “lived” environment. Relph’s pioneering work indirectly follows the path that Whyte, Lynch, Cullen and McHarg took to address the need to relate differing environments to people to create distinct, meaningful locations of all scales. However, Relph’s work differs from theirs in that he disapproved of any “scientific approaches to resolve social, spatial and economic problems” (the method adopted by Whyte, Lynch and McHarg), and instead encouraged the creation of a practical methodology that treats experience and meaning along with other, traditional, design resources and not just as second-class “variables capable of manipulation” (Relph 1976: 87–89 & 146).

In 1977 architect, planner and environmental behavior pioneer Amos Rapoport’s *Human Aspects of Urban Form* introduced the concept of culture-specific design. This
groundbreaking work takes a bold step towards planning for the good of the public by relating culture (specifically the characteristics of people as individuals or groups) to space and time to identify qualities associated with physical characteristics of the urban form. The study of this dynamic relationship, Rapoport argued, demonstrates that culture dictates behavior and therefore affects design (Rapoport 1977: 1–3). In addition, Rapoport suggested that “the built environment provides cues for behavior and that the environment can, therefore, be seen as a form of non-verbal communication” and can therefore be used to guide the design process (Rapoport 1977: 3). Rapoport thought that planners need the ability to understand differing residential meanings and behaviors in order to truly design for the public. Rapoport proposed a method to classify space and time from an environmental behaviorist’s perspective, dividing space into “human and non-human space” and time into either linear or rhythmic instances (Rapoport 1977: 12–14). To a certain extent, this methodology relies on Lynch and Appleyard’s notions of perception and association to communicate the meaning and cultural significance of specific urban resources to the planner (Rapoport 1977: 24–25). This revolutionary approach allows the planner to document and analyze a city’s “…present stimulus information, present context information as well as stored stimulus information; also acting are the perceiver’s current and stable characteristics and previous experience, as well as hopes, ambitions, fears, values and various other “real” and “imagined” elements” (Rapoport 1977: 26).

2.3 NPS: Bringing Preservation into Planning
Preservation planning is the integration of historic preservation principles, for example, documentation of historic structures and legislative action to protect historic locations, into urban planning. The use of preservation planning overlaps with urban planning in many areas, including adopting a public focused approach to planning and the use of resources like tax credits, tourism and historic structures to stimulate economic development (Mason in Hack, Birch, Sedway & Silver 2009: 132). The National Park Service (NPS), a branch of the United States Department of Interior, uses preservation planning routinely to protect and preserve the “natural and cultural resources and values of the national park system” (NPS Website 2008: Mission).11 The NPS, which manages 5,771 historic buildings, 8,505 historic monuments and statues and 391 National Park System Units (parks, national monuments, seashore sites, battlefields and other recreational and cultural sites) produces many publications that describe its use of preservation planning in practice (NPS Website 2008: Quick Facts).12

The majority of the NPS’s publications are aimed at informing the public, federal agencies and professional practitioners on the motivations, activities and operations of the NPS. Nevertheless, one publication, A Guide to Cultural Landscape Reports: Contents, Process, and Techniques (1988), has found much wider influence. This work attempts to simplify an otherwise complex process—the creation of a “cultural landscape report” (CLR).13 Although the creation of a CLR is not directly relevant to this dissertation, the work identifies the practical approaches most commonly applied

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12 [http://www.nps.gov/aboutus/quickfacts.htm](http://www.nps.gov/aboutus/quickfacts.htm)
13 A cultural landscape is “a geographic area, including both cultural and natural resources and the wildlife or domestic animals therein associated with a historic event, activity, or person, or that exhibits other cultural or aesthetic values. The four general kinds of cultural landscapes are ethnographic, historic designed, historic vernacular and historic site” (Page, Gilbert and Dolan 1998: 129).
when examining the historic and cultural attributes of place. The methods described
were developed by drawing on more than thirty governmental sources related to historic
preservation, historic landscapes, conservation, planning, architectural history, policy,
natural systems and recording techniques. 14

The Guide presents various qualities associated with the past as practical
resources, demonstrating that its value is as significant as any other traditional resource.
Many of the concepts are current and forward looking, broad in description and flexible
enough for experimental use on environments that contain significant historic and
cultural information. Of particular interest to this dissertation are three methodological
approaches related to landscape characteristics, conditions of the cultural landscape,
and historic significance, each of which are designed to identify and categorize historic
and cultural qualities from the built and natural environment for the purposes of
preservation, planning and site management. The use of these methodologies in this
dissertation provided two distinct benefits. First, they provided a demonstrable
methodology to bridge resources related to the past with traditional resources. Secondly,
the NPS approach demonstrates that their function is similar to existing site planning
tools for the purposes of site documentation and analysis.

The concept of landscape characteristics is similar to a planner’s
characterization of land use. This methodology consists of applying a collection of
categories designed to identify the individual and collective historic character of a
landscape within a site plan (Page, Gilbert and Dolan 1998: 53). Defined as “the tangible

14 This work brings together insights from several relevant NPS publications, including National Register
and intangible characteristics of a landscape,” the authors of the report advise that the term can be “applied to either culturally derived and naturally occurring processes or to cultural and natural physical forms that have influenced the historical developments of a landscape or are the products of its development” (Page, Gilbert and Dolan 1998: 139).

As developed by the NPS, this methodology provides a framework to quantify elements of the landscape into thirteen character-defining categories: natural systems and features; spatial organization; land use; cultural traditions; cluster arrangements; circulation; topography; vegetation; buildings and structures; views and vistas; constructed water features; small-scale features and archaeological sites (Figure 2.4). Category assignment identifies the primary use, presence and arrangement of site features of the landscape under which associated individual features specific to the primary use are grouped. For example, the landscape characteristic “vegetation” may include a nested set of sub-features that describe specimen name, life-cycle and survival specifications. The classification is meant to be flexible, applicable to features “ranging from large-scale patterns and relationships to site details and materials” (Page, Gilbert and Dolan 1998: 53).
Similar to Lynch’s approach to understanding the relationship between residential perception and location, this methodology highlights relationships between features of historic or cultural value and their spatial location. A planner’s use of this methodology allows a quantified, categorical and structured focus on a landscape’s past, providing her or him with an intimate understanding of the evolutionary nature of environmental change within the urban landscape (Lynch 1972: 238–239).

Although generally successful in application, the NPS approach was both too narrow and too broad for effective use on the urban setting. Use of the NPS categories in the field demonstrated that only three of the original categorizations (buildings and structures, spatial organization, and cluster arrangements) were relevant and applicable for urban historic resources. At the same time, the categories proved too limited to
capture the characteristics associated with a community’s understanding of space and place. For this reason, the NPS’s approach was modified to include qualities associated with character, image and place, with associated sub-classifications related to buildings, people, activities, memories and events. These modifications transformed the methodology from one designed to preserve the past for historical purposes into one that emphasizes the collective urban character for present and future purposes, a concept championed by Lynch and other theorists of the contemporary city.

The second concept, *conditions of the cultural landscape*, is similar to a planner’s approach for evaluating the condition of the built and natural environment. This methodology is used to evaluate the physical condition of historic and cultural landscapes for the purposes of identifying “disturbances and deterioration” over time (Page, Gilbert and Dolan 1998: 67, 68). This observational method is designed to gauge detrimental activity over a prolonged period of observation and apply prescribed solutions when appropriate. For example, the planner may survey a site and identify a collection of historic buildings whose upkeep, purpose or modification is affecting the cultural character of a neighborhood. The planner assigns a mixture of evaluations ranging from good, fair, poor and unknown to document the conditions in text and color-coded map format (Figure 2.5). The ultimate goal of this evaluative methodology is to identify and evaluate the current condition of qualities that contribute to the historic and cultural character of the site. Although Lynch and Rapoport acknowledge the

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15 A rating of *good* indicates that “no immediate corrective action is required to maintain its current condition,” *fair* indicates that “minor disturbances are visible” and “if left to continue without the appropriate corrective action will cause the landscape to degrade to a poor condition,” *poor* is assigned when “the landscape displays signs of major disturbances and is in need of immediate corrective action” and *unknown* indicates that there is “not enough information in order to make an informed evaluation” (Page, Gilbert and Dolan 1998: 67).
importance of identifying these character-contributing qualities, a methodology of this type does not exist within present planning practice.

Figure 2.5 Survey form for evaluating the condition of the cultural landscape as illustrated by the NPS (source: Page, Gilbert and Dolan 1998: 68).

Use of this methodology is appropriate for urban areas; however, the scope of the approach was modified to solely focus on features from the present built environment that contribute to the cultural and aesthetic character of the site. The evaluative process utilized the rating of good, fair, poor or unknown; however, their application was used to determine the condition of physical features (architectural style, façade composition and building use). The planner may use this modified methodology to map the strength and condition of elemental pieces of a neighborhood’s character over time to protect and strengthen it.

The final concept, historic significance, is designed to identify significant associations related to a variety of historic features and episodes, including events,
people of importance, distinctive characteristics of design and unique landscapes (Page, Gilbert and Dolan 1998: 71). Historic significance is “the meaning or value ascribed to a structure, landscape, object, or site based on the National Register criteria for evaluation. It normally stems from a combination of association and integrity” (Page, Gilbert and Dolan 1998: 137). As originally designed, this methodology was intended to determine whether a particular site should be designated on the National Register of Historic Places (NR).\textsuperscript{16} Although NR designation is not directly relevant to this dissertation, the mechanism for determining significance yields interesting results when applied to urban historic landscapes. The methodology requires that an applicant satisfy at least one criterion of four; applicants satisfying more than one criterion have a stronger case for designation. The four criteria are defined as: “1) associated with events that have made a significant contribution to the broad patterns of our history; 2) associated with the lives of persons significant in our past; 3) embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction and 4) have yielded, or may be likely to yield, information important in prehistory or history” (Page, Gilbert and Dolan 1998: 71). This methodology is useful for determining the level of significance that a building or monument has on a local, regional or national scale, but its associational strength has no other purpose than determining NR designation.

\textsuperscript{16} NR designation provides many benefits including tax incentives, protection from developmental pressures, assistance for historically sensitive renovations and protection as a historically significant feature in perpetuity.
A modified version of the NPS’s historical significance methodology provides the planner with a unique approach that not only determines the strength of historically significant buildings (on many scales), but also provides a practical mechanism for design by allowing the planner to determine the true historic and cultural value of historic buildings. For example, buildings determined to have low historic value might be likely candidates for development. Similarly, the methodology enhances the decision-making process by creating talking points for community involvement. Use of the methodology allows residents to work with planners to determine, review and customize the data, resulting in a true collaborative interpretation of what makes an area significant. The modified methodology utilizes the classifications and definitions created by the NPS as they adequately categorize qualities associated with culture, history, meaning and aesthetic. The difference lies in the determination of significance. As with the NR designation, the modified methodology calculates the number of satisfied criteria on a building-by-building basis to determine strength. This modified methodology provides planners with the ability to understand the strengths and weaknesses of historical significant phenomena on a macro- and microscale. Such an experience can positively influence the site planning process by conveying a vivid and meaningful sense of place to both the planner and the community through communication and design (Cullen 1996: 194, 195; Lynch 1960: 119; Lynch & Hack 1984: 5; Rapoport 1977: 26; Relph 1976: 1, 146).

2.4 The Use of Historic Resources in Planning in 2009
Both the APA and the ICMA recommend that planners consider the use of various kinds of historic resources in practice. Both organizations have created policies regulating use, standards guiding use and examples demonstrating application.

In 1987 (last updated and ratified in 1997), the APA produced a policy titled “...Guide on Historic and Cultural Resources,” which explains that “the scope of historic preservation practice has broadened to protect a greater array of cultural resources including historic districts, buildings, structures, sites, public works, transportation corridors, archaeological sites, heritage areas and corridors, cultural landscapes, objects and related built forms. Planners conduct these activities as part of a comprehensive planning framework that combines the benefits of preservation with other community planning objectives” (APA Website 2009).17 In addition, the policy states that “[p]lanning and preservation work hand-in-hand to ensure the conservation of housing stock in residential neighborhoods, economic development and revitalization (including the preservation and revitalization of downtowns), protection of historic landscapes, and preservation and growth management of rural villages, and conservation of farmland” (APA Website on Policy Guides 2009).18

The policy describes various threats to urban and rural historic resources and proposes “a full integration of preservation and planning practice,” stating that “planners must assume a greater responsibility to use the range of preservation techniques and options” to prevent further loss of America’s historic resources (APA Website 2009).19 The policy sets out fourteen principles for practice, many of which focus on funding and

18 ibid.
19 ibid.
legislation. Of the fourteen principles, one stands out as most relevant to this dissertation. Principle eleven states “[the] APA and its chapters recognize that neighborhoods are dynamic objects that evolve rather than remain fixed in time; therefore, they support preservation strategies that respect the heritage, context, design and scale of older neighborhoods while recognizing the evolution of those neighborhoods’ built form” (APA Website 2009). The importance of this principle lies in its acknowledgement of the past as a resource for understanding the context and character of the setting—one of the fundamental themes of this dissertation.

It is unfortunate that the APA has not updated this policy to reflect current trends of theory, practice or analysis. Although well intentioned, the policy appears as either an afterthought or as a formality, whose relevance to the profession has yet to be proven. The policy primarily relies on legislation and policy to affect change. Although effective as a catalyst for change (as demonstrated in practice by preservationists and the NPS), this legalistic approach to application tends to restrict and distract the planner from the site-planning process. The use of these methodologies may result in the creation and protection of a district or a neighborhood whose character is distinct, but these actions simply place a glass dome over a section of a city, potentially frustrating both the planner and the community, rather than reflecting the potential of historic resources to improve the lived experience of a city.

In 2007, the APA produced Planning and Urban Design Standards (Student Edition) to “provide reference to the standards met by the profession and present the standards all should work to achieve” (Lewis and Klein in Steiner & Butler 2007: viii).

20 ibid.
The book guides planners and planning students through the various areas of practice. Many sections in the book acknowledge the importance of historic and cultural resources in planning practice and suggest their incorporation either through additional research or by using typical preservation planning strategies. In general, the book relies on a combination of preservation planning strategies (legislation and policy) and common-sense design to incorporate features from the past into planning. However, the book fails in a few sections by either briefly mentioning its use (without providing details or guidance for use) or by completely omitting its use from areas where they obviously belong. For example, the section on comprehensive planning categorizes the use of historic preservation for downtown and neighborhood revitalization initiatives, but excludes it from any other part of the comprehensive planning process (Steiner & Butler 2007: 8, 9 & 12). Similarly, the section on housing plans briefly mentions preservation and its role for downtown and neighborhood revitalization, but provides no guidance beyond the use of preservation planning strategies (Steiner & Butler 2007: 24).

The section on building types advises the planner to “be sensitive to….regional styles and traditions” through observation, while also suggesting the use of zoning regulations and design guidelines to address developmental “mass that is out of scale with neighborhood or community character” (Steiner & Butler 2007: 121). Related to these recommendations is the section on places and districts, which unfortunately omits historic resources from its description of neighborhood composition (Steiner & Butler 2007: 227). While the sections on boundary identification and form guidelines provide no guidance other than to advise the planner to be aware of “neighborhood identity,”
(Steiner & Butler 2007: 230) and “neighborhood fabric” (Steiner & Butler 2007: 231) when planning.

The section on historic districts advises planners to be familiar with the federal designation process and suggests that the creation of a historic district is an important tool of “preservation-based revitalization” (Steiner & Butler 2007: 233). This important section does little to advance the use of historic resources in planning beyond standard preservation planning methodologies that rely on structural inventories, archival research and historic narratives to identify the character a building or district (Steiner & Butler 2007: 234).

The section on infill development identifies the merits of neighborhood character and advises planners to consider the “harmonious relationships between the proposed and existing structures” by respecting existing functions, visual relationships, streetscapes and façades when planning (Steiner & Butler 2007: 260). In addition, the section on strategies for infill development advises the planner to consider the “scale of existing frontages, sidewalks, streets, and building façades, and the massing of the surrounding area” (Steiner & Butler 2007: 261). Unfortunately, these two sections omit residential input from the evaluative process.

The section on urban analysis refers to “history” as one of the “elements of urban analysis,” embracing the preservationists’ view of the past (rooted in legislation and policy), while also emphasizing the importance of understanding “physical patterns” from the past to interpret the character of the present (Steiner & Butler 2007: 265, 266). In addition, this section advises the planner to explore historic “patterns of development” to understand the social and physical evolution of a community (Steiner
Another notable element of urban analysis is “character,” which the book associates to “topography, views, open space, activity nodes, architectural character, streetscape, and the natural environment” and advises the use of aerial photographs, combined with “line work” to document these character contributing elements (Steiner & Butler 2007: 266). Similarly, the book suggests that an analysis of “architectural character” can not only identify significant buildings, but can also “provide insight on a community’s values, and help determine the types of buildings residents would like to see in the future” (Steiner & Butler 2007: 267). While a helpful concept, the discussion unfortunately omits any analytical methodologies beyond landmark designation and the use of axonometric sketches of typical buildings, facades, and elevations to document architectural character (Steiner & Butler 2007: 267).

The section on preservation, conservation and reuse contains a piece on preservation techniques and strategies for “historic structures” (Steiner & Butler 2007: 395). Similar to most sections in this book, the planner is offered tools of legislation and policy for the protection and treatment of historic structures. The book specifically cites the Secretary of Interior’s Standards for the treatment of historic structures as a procedural guide for preserving, rehabilitating, restoring and reconstructing historic structures within an urban setting (Steiner & Butler 2007: 396). The section continues by explaining that “the decision to preserve a historic structure is an urban design decision, as are the decisions relating to how the façade looks” and advises planners to consider “use, compatibility, scale, windows, materials, style, street walls and materials” to determine their integration (Steiner & Butler 2007: 398).
Planning and Urban Design Standards successfully describes the complexity and diversity of the profession. The book covers a wide range of topics and touches on many areas relevant to this dissertation (character, aesthetic, sensitive placement/volume and residential meaning). Unfortunately, the book falls short by not including (or at least referencing) past and present approaches that associate historic resources to buildings, streets, neighborhoods, character and cities. Place and place awareness is an integral part of mainstream planning thought and practice and therefore should be a standard part of a planner’s curriculum.

In 2009, ICMA published Local Planning — Contemporary Principles and Practice, a reference guide for practitioners that focuses on current “theories in use.” A section written by preservationist and planner Randall Mason, titled “Reclaiming the History of Places,” describes the current practice of preservation planning and its parallels with mainstream planning, suggesting that both struggle to weigh special interests against “…economic gains, political dynamics, and urbanistic results (i.e., those on an urban scale as opposed to a building scale, which is more typical in historic preservation)…” (Mason in Hack, Birch, Sedway & Silver 2009: 128). This piece echoes many of the sentiments of Lynch, Cullen, Relph, Rapoport and the NPS by observing that “the connection between history and place is essential to how we experience cities” (Mason in Hack, Birch, Sedway & Silver 2009: 127). Mason explains that understanding the relationship between “historical narratives and physical environments” is vital to successful plan-making and explains that preservation planning provides planners with many “ideas and tools for grappling with this key dimension of urbanism” (Mason in Hack, Birch, Sedway & Silver 2009: 127).
The practice of preservation planning bears many of the hallmarks of NPS policy and practice, relying on tools dedicated to listing buildings or historic places, regulation based on cultural significance and governmental incentives designed to “stimulate the market to conserve and reuse historic structures” (Mason in Hack, Birch, Sedway & Silver 2009: 128–130). Mason argues that preservation planning techniques, although useful for the protection of significant buildings and adaptive reuse initiatives, tend to be used surgically instead of as a standard part of the plan-making process, stating that preservation planning strategies are selectively used “to leverage development and generate community benefits (economic and otherwise), instead of just regulating properties and preventing development” (Mason in Hack, Birch, Sedway & Silver 2009: 132). In addition, he suggests that marginalizing preservation planning goals to a single chapter of a comprehensive plan can be detrimental to the site-planning process (Mason in Hack, Birch, Sedway & Silver 2009: 132). Mason highlights the evolution of the field from one that surveys, documents, lists and regulates historic resources (similar to the present day practice of the NPS) into one whose goals overlap with planning to use resources like rehabilitation tax credits, tourism and historic sites as non-traditional mechanisms to encourage economic development (Mason in Hack, Birch, Sedway & Silver 2009: 132).

Mason concludes by explaining that the field faces two primary challenges. First, he acknowledges that although preservation planning provides many useful strategies for community planning and economic development, the field has not achieved full acceptance (Mason in Hack, Birch, Sedway & Silver 2009: 133). Partial acceptance, Mason suggests, is in part caused by the preservationists’ desire to further evolve the
field to integrate cultural qualities into practice, a non-traditional concept in present urban policy debate. A possible second reason affecting its adoption is the lack of new methodologies that bridge historic and cultural resources with present planning practice. Preservation planning primarily relies on policy, legislation and individualized preservation/restoration of the built environment; perhaps the methodologies need to evolve in order for the profession to overcome this challenge (Mason in Hack, Birch, Sedway & Silver 2009: 133). The second challenge centers on the fifty-year preservation threshold. The preservation threshold is designed to permit individuals or groups to argue for preservation if the age of a building is fifty years or older. Mason points out that preservation planning will become more important in the near future due to the impending aging of a large volume of post-World War II buildings. Mason states that this challenge will unfold in the near future as the threshold is satisfied city-by-city and suggests that a greater effort has to be given to the “full acceptance of historic preservation as a part of the standard planning toolbox” in preparation for this challenge (Mason in Hack, Birch, Sedway & Silver 2009: 133).

2.5 Conclusion

In the latter half of the twentieth century, theorists began to explore the relationship between the city and its residents to design more holistically for the public. Scholars designed a number of experimental methodologies to explore a variety of new areas relating to residential culture, time, perception, motion, ecology and the aesthetic—qualities considered by many planners as elemental to comprehensive design. Although
many of these methodologies have not yet been adopted by mainstream practice, their use influenced the creation of many important specialized fields whose focus specifically examined aspects of the urban form not traditional to mainstream practice. Of the many fields, the closet parallel to the goals of this dissertation are preservation planning. Preservation planning strategies have been successfully implemented worldwide, positively effecting comprehensive planning with policy and legislation. Although preservation planning has many strengths, its main weakness lies in its inability to impact the site planning process with practical, hands-on tools for survey and analysis.

Issues related to character, setting and place are becoming increasingly important to current and future renewal and sustainability initiatives. The desire by residential populations for new designs to contain elements of meaning, culture, accessibility, proximity and character are leading to mini-renaissances within many cities and neighborhoods at all scales (Knack 2008). Residential communities are voicing their concern for the erasure of the past while also advocating for features from the past to be incorporated into design and planning projects. Lynch and other pioneers demonstrated that the intangible urban form contains many valuable resources to

21 An example of the importance of place is Richard Meier’s museum for the Ara Pacis in Rome, Italy, opened in 2006 to showcase the military triumphs of the Roman emperor Augustus. The museum has been heavily criticized around the world for being “too modern,” out of scale to the setting and inappropriate in design to the character of the neighborhood. The debate of inappropriateness has escalated to a point that there is a movement within Italy to dismantle the new museum (http://www.timesonline.co.uk/tol/news/world/europe/article3854713.ece; http://www.nytimes.com/2008/05/01/arts/01arts-ROMESMAYORPL_BRF.html?scp=1&sq=ara+pacis&st=nyt).


23 Frank Gehry experienced resistance from local communities in his Grand Avenue project in Los Angeles. His plan was accused of isolating neighboring ethnic communities and ignoring the area’s historic and cultural past (http://www.nytimes.com/2007/01/28/arts/design/28ouro.html?pagewanted=all).
decipher urban meaning, character and perception, but no methodology presently exists
to systematically incorporate these kinds of data into a format that is practical, tactile
and similar to other planning resources. Despite the vast amount of theory and literature,
there is a distinct gap in understanding how the past benefits future site planning
initiatives. This dissertation proposes a solution by demonstrating how urban historic
resources can be documented and transformed into a practical and informative asset to
the site planning process.
III  Survey Design and Implementation

The approach designed for this dissertation merges concepts from planning theory, mainstream practice and preservation planning to create a methodology to document and analyze the historic characteristics of buildings presently standing in Washington Square, Philadelphia. The goal of the project was to create a practical mechanism for integrating the resources of history into the planning process. A survey instrument was developed to guide, regulate, and classify historical data on urban structures. The utility of the collected information was then demonstrated through the use of three analytical models depicting three different planning scenarios. This section addresses the early design and evolution of the survey instruments through field testing and evaluation by two planning practitioners.

3.1  Early Survey Design

The survey is designed to guide, regulate, and classify historical data on urban structures. The overall design incorporates theoretical concepts from planning pioneers with practical techniques from mainstream planning, preservation planning and the NPS to create a list of classifications to be expected in the field. These classifications were refined and enhanced after discussions with two planning practitioners, Mark Davison and Eliot Foulds whose practical advice and experienced recommendations helped to transform the survey into a streamlined instrument ready for use in the field.
It was anticipated that the surveyor would go out into the field, survey in hand and observationally record all survey classifications on a building-by-building basis. The objective at this phase of the research was to determine the kinds of data yielded when using the survey in the field. It was assumed that both experimentation in the field and review of the collected data would addresses many open-ended questions regarding usability, synergies between data and the amount of judgment required in assigning values to given classifications. Three assumptions were made at this early stage of the study: first, that the descriptions of the classifications were easy to understand; second, that a professional planner would have to experience to make value based judgments and third, that use of the survey would yield data rich enough to address a variety of planning concerns.

The first iteration of the survey consisted of sixteen classifications (some with multiple sub-classifications), on the assumption that some classifications would be eliminated through early field testing. The original classifications were as follows:24

1. **Building Use**: categories included office, commercial, residence, mixed use, industrial, institution and NPS.

2. **Building Type**: categories included historic rowhouse, modern rowhouse, highrise, midrise, lowrise and detached.


24 See Appendix A for the annotated map version of the survey.
4. **Character** (NPS Original Concept: Landscape Characteristics): refers to the thirteen categories created by the NPS to identify characteristics from the cultural landscape, including: natural systems and features; spatial organization; land use; cultural traditions; cluster arrangements; circulation; topography; vegetation; buildings and structures; views and vistas; constructed water features; small-scale features; and archaeological sites.

5. **Image Elements**: refers to Lynch’s five elements of syntax to be applied to spatial and built environments:
   - **Paths**: “the channels along which the observer customarily, occasionally, or potentially moves” (Lynch 1960: 47).
   - **Edges**: “the linear elements not used or considered as paths by the observer” (Lynch 1960: 47).
   - **Districts**: “the medium-to-large sections of the city, conceived of having two-dimensional extent, which the observer mentally enters “inside of,” and which are recognizable as having some common, identifying character” (Lynch 1960: 47).
   - **Nodes**: “points, the strategic spots in a city into which an observer can enter, and which are the intensive foci to and from which he is traveling” (Lynch 1960: 47).
   - **Landmarks**: “another type of point-reference, but in this case the observer does not enter within them, they are external…a rather simply defined physical object: building, sign, store, or mountain” (Lynch 1960: 48).
6. **View**: refers to the perspective looking outward from the front door of a building. These categories, inspired by Cullen, included other buildings; green space; vacant space or tree.

7. **Streetscape**: documents the condition of the streetscape, recording whether it is themed, partially themed or not themed.

8. **Vacant**: Yes or no category, referring to a vacant building or lot.

9. **Façade Composition**: documents the materials used to construct the façade of the building. Categories included limestone, brick, granite, brownstone, stucco, wood, concrete and mixed materials.

10. **Façade Date**: Features were recorded as either historic (unmodified, original façade) or modern (modified façade from its original condition).

11. **Cultural Condition** (NPS Original Concept: Condition of the Cultural Landscape): an evaluative category, based on NPS designations, designed to record the condition of the cultural landscape.
   - **Good**: “Indicates the cultural landscape shows no clear evidence of major negative disturbances and deterioration by natural and/or human forces. The cultural landscape’s historical and natural values are as well preserved as can be expected under the given environmental conditions. No immediate corrective action is required to maintain its current condition” (Page, Gilbert and Dolan 1998: 67).
   - **Fair**: “Indicates the cultural landscape shows clear evidence of minor disturbances and deterioration by natural and/or human forces, and some degree of corrective action is needed within three to five years to prevent..."
further harm to its historical and/or natural values. The cumulative effect of the deterioration of many of the significant characteristics and features of the cultural landscape, if left to continue without the appropriate corrective action, will cause the landscape to degrade to a poor condition” (Page, Gilbert and Dolan 1998: 67).

- **Poor**: “Indicates the cultural landscape shows clear evidence of major disturbance and rapid deterioration by natural and/or human forces. Immediate corrective action is required to protect and preserve the remaining historical and natural areas” (Page, Gilbert and Dolan 1998: 67).

- **Unknown**: “Indicates that not enough information is available to make an evaluation” (Page, Gilbert and Dolan 1998: 67).

12. **Historic Significance**: (NPS Original Concept: National Register Criteria for determining significance). This concept was modified for this dissertation to evaluate the strength of historically significant phenomena.\(^\text{25}\)

- **High**: Indicates all four NPS criteria are present.
- **Medium**: Indicates that two to three of the NPS criteria are present.
- **Low**: Indicates that one to two of the NPS criteria are present.
- **None**: Indicates that none of the NPS criteria are present.

13. **Philadelphia Historic Commission**: identifies whether or not a building carries PHC designation. Recorded as either yes or no.

\(^{25}\) See the literature review section 2.3 for the National Register Criteria as defined by the NPS.
14. **National Register**: identifies whether or not a building carries NR designation. Recorded as either yes or no.

15. **Notes**: a location for descriptions, physical observations and commentaries.

16. **Height**: refers to the approximate height of a building recorded in the field.

As originally designed, the collected data would be organized in Microsoft Excel (a spreadsheet software program). The Excel database was then imported into an ArcGIS database to create a tabular infrastructure connected to GIS-based two dimensional maps of digitized drawings of building footprints from the study area.

Before initial fieldwork was conducted, two practitioners were interviewed to determine if the selected preliminary survey criteria were practical, useful and appropriate for use in an urban setting. The practitioners were asked to rate the overall design of the methodology, the use of GIS as a vehicle to demonstrate the methodology and the utility of the survey classifications. The first interview was conducted with Mark Davison, Master Planner and Historical Landscape Architect for the Oregon Parks & Recreation Department. The second interview was conducted with Eliot Foulds, Team Leader and Historical Landscape Architect at the Olmsted Center for Landscape Preservation.

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26 Mark Davison holds an MLA in landscape architecture from the University of Pennsylvania and BLA in landscape architecture from Manchester University and has been working in the field of historic and modern landscapes since 1995. Davison is one of the recognized leaders in the U.S. for introducing innovative design and mapping techniques into the world of preservation planning.

27 Eliot Foulds holds an MLA in landscape architecture from the University of Virginia and has been working in the field of historic and modern landscapes since 1992. Foulds is a highly recognized specialist within the NPS and the historic landscape community.
Both Davison and Foulds thought that the selected classifications were relevant for this type of study; each, however, offered suggestions for subtle improvements. Davison stressed the important of evaluating not only the presence of historical integrity, but also its strength. Foulds, who has worked for the Olmsted Center for Landscape Preservation, a division of the NPS since 1992, cautioned against the overly cumbersome and bureaucratic aspects of the NPS categories. Nevertheless, he felt the selected NPS criteria were applicable to most landscapes, including the urban setting. Both planners expressed enthusiasm for the potential of a model that could link historical classifications to the planning process, but warned that a new planning resource would only be successful if it addressed current issues in a format familiar to current practice. Davison, in particular, stressed the importance of creating visual representations of such “abstract” concepts as history and culture, as these kinds of representations help to communicate meaning both to constituents and to the contractors who are implementing design. Both planners agreed that ArcGIS was the logical choice because it was common place in non-profit and for-profit agencies

3.2 Early Survey Application

Site selection was paramount as its use grounded the methodology to reality by identifying actual characteristics and scenarios observed in the field. The only prerequisite for successful site selection is that it contains diverse architecture within an urban setting. The methodology is flexible enough for use on a site of any age and of any scale as long as this requirement is met. Flexibility was a conscious design decision...
from the outset, as it was assumed that features from any scale (a street, neighborhood, district or city) or any location (Philadelphia, London or Rome) can provide interesting details about locational character. The site selected for this study, although small, was selected because it is presently undergoing changes in character due to development pressures, its architecture is diverse enough to yield enough data to create the methodology without conducting an exhaustive study of the built environment and it was familiar to the author.

3.2.1 Study Area Specifics

The area chosen for study in Philadelphia was the immediate neighborhood surrounding Washington Square. The study area of approximately 37 acres is bounded by the north side of Spruce St., east side of 8\textsuperscript{th} St., south side of Sansom St., east side of 6\textsuperscript{th} St., south side of Chestnut St. and the west side of 5\textsuperscript{th} St. (Figure 3.1).
The architecture and character of the study area is typical for Philadelphia’s early urban history, consisting primarily of red brick and ashlar block buildings woven into William Penn’s rigid Colonial grid (Figure 3.3). Two unique features of the area are the open spaces of Washington and Independence Square and the built and perceptual significance of Independence Hall. A large percentage of the buildings in the study area contain architecture steeped in local, regional and national history, representing a variety of most architectural styles. Initial field reconnaissance revealed that a high percentage of the extant buildings were from either the Federal or Victorian periods and represented the full spectrum of historic urban usage (Figure 3.2).
The neighborhood surrounding Washington Square can trace its origins to 1682 when William Penn drafted the plan for the city of Philadelphia (Weigley 1982: 7; Nash 2002: 24, 25) (Figure 3.3). Penn’s plan consisted of a grid design with five planned squares anchoring the design. Four of the squares were designated public parks (Washington, Franklin, Rittenhouse and Logan), while the fifth square (Center Square) was intended for municipal use. Many of the neighborhoods surrounding these squares experienced considerable mixed-use growth during the early and latter parts of the Colonial period.
The neighborhood surrounding Washington Square evolved as Philadelphia grew, with the composition of the neighborhood changing to reflect local and city-wide socio-economic, political and industrial activities. For example, the square was originally conceived of as a dedicated green space; however, its use quickly changed into a cemetery for the city’s poor and unknown, victims of epidemics, Revolutionary War soldiers, criminals, and African slaves. Other uses included industrial activity (pottery production) and grazing ground for farm animals. These activities were halted in 1816 when the square was officially turned into a public park. In 1825 it was renamed Washington Square in honor of America’s first president. This diverse history, combined with the city’s eventual expansion, affected the residential and architectural composition of the neighborhood.
Early Federal-period buildings were primarily small multi-story row houses whose use was both mixed and residential. Later Federal buildings were bigger, more ornate and sometimes freestanding. By the early nineteenth century, the neighborhood contained a diverse and compact mixture of Federal architecture whose built and perceived character was similar to that of many European cities. Many of the early buildings in the neighborhood represented the socio-economic status of the residential population, with grander houses fronting main arteries (Walnut and Spruce Streets) and smaller, less ornate structures located on secondary streets and alleys (RDA 1964: 3).

The middle and latter parts of the nineteenth century saw a significant population shift as the neighborhood transitioned into one of industry and low-income housing. Most of the middle- and upper-income residents left the area during this time for the Rittenhouse Square area. Victorian-period architecture reflects these shifts in population and use, with multi-unit residences, mixed-use buildings and industrial structures populating the neighborhood.

In the years leading up to World War I, the Washington Square area became primarily a low-income area dominated by commercial and industrial activities. Neglected by both its residents and the city, the neighborhood suffered from high rates of crime, illness, unsanitary conditions, structural dilapidation and ghettoization. The area continued to decline until the end of World War II, when the city of Philadelphia formed the Redevelopment Authority (RDA) in an attempt to address these issues. As we have seen earlier, the federal government felt significant pressure to launch

28 http://www.phila.gov/rda/about.html
nationwide planning and construction campaigns for housing, federal highways and municipal facilities during and immediately after World War II. The RDA was especially active in the neighborhoods surrounding Washington Square from 1957 to 1970. The RDA approached urban renewal in a progressive and aggressive manner. The RDA’s evaluative process started with a “curbside” survey of individual buildings to determine the physical and historic condition of the structure. The survey was followed by archival research in municipal records to identify ownership, age and brief history (if available). Owners were notified by the city to renovate and restore buildings (with incentives) or to relinquish the property to the city under eminent domain. Properties owned by the RDA were either resold (under the premise that the new owner renovates and restores it) or were demolished to make way for new construction.

The RDA, in conjunction with the Philadelphia City Planning Commission (PCPC), proposed the demolition of large parts of the neighborhood surrounding Washington Square in 1957 with the Washington Square Redevelopment Area Plan. The plan proposed to “develop a residential section of unusual character, combining outstanding historical buildings with extensive public parks,” existing connections to

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29 The Housing Act of 1949, The Housing Act of 1954 and Berman vs. Parker all contributed to the surge in housing demands. Another major contributing factor was the unprecedented demands for durable consumer goods (cars and houses). The Federal Highway Act of 1956 was also a major contributing factor to the social upheaval already felt in urbanized areas across the country, causing many people (who could afford it) to move to the suburbs.

30 An important proponent behind the urban revitalization of Philadelphia (specifically Society Hill and its environs) was Edmund Bacon. Bacon was the Executive Director of the Philadelphia Planning Commission from 1949–1970. Bacon was an urban visionary, whose projects and determination influenced many cities and professions.

31 The goal of these surveys was to quickly observationally record a small collection of classifications. The surveyor’s observations included photographs and brief notes, resulting in either restoration or demolition. It is unclear if the surveyors were professional or academic planners, architects or preservationists.

32 All of these activities displaced the existing low-income population.
“interstate highway systems” and new modern buildings diverse in “variety and complement[ary to]… historic sections” make the area ideal for development (PCPC 1957: 3). The plan called for demolishing large urban areas immediately south and east of Washington Square, redesigning streets, rezoning (from commercial/industrial to residential and institutional) and constructing low-, mid- and (more importantly) highrise residences. The plan was approved for the most part, permanently impacting the character of the neighborhood.

The impact of Philadelphia’s urban renewal initiatives is best illustrated by examining two detailed historic maps and a present day (2008) satellite image from the area immediately south of Washington Square (Figure 3.4).33 The first map, from 1916, displays the traditional post-Colonial form of the neighborhood, with densely packed structures of mixed and industrial use filling all city blocks (Figure 3.4 [1]). The second map, from 1950, shows the impact of PCPC and RDA activity, with large swaths of the built environment erased from the neighborhood (Figure 3.4 [2]). The third image, from 2008, displays the present condition of the neighborhood, with very little historic fabric intact and much of the character permanently modified (Figure 3.4 (3)). Overall, the total number of structures in the area under consideration dropped from 274 in 1916, to 197 in 1950, to 171 in 2008.

33 Sanborn Fire Insurance maps were selected because they provide a level of accuracy, detail and pertinent features that cannot be matched by any other urban plan.
Figure 3.4 This figure illustrates the kinds of information that detailed chronological maps can provide in an urban planning study.

By 1964, the character of the neighborhood had been completely altered. Most of the physical form of the southeast corner of Washington Square was erased for the construction of contemporary highrise luxury condominiums, Hopkinson House (see...
figure 3.4 for the impact of this project); for over a dozen new single-family residences and a large surface parking lot (Figure 3.5). Interestingly, the *Washington Square Redevelopment Area Plan* states that potential residents were difficult to find for these new residences, with many new residents stating that they prefer “historically certified houses or older houses capable of rehabilitation” over new highrise construction (RDA 1964: 28). Other than this redevelopment activity, the neighborhood had remained essentially the same until 2001 when construction began on the St. James, a 45-story luxury condominium on the northwest corner of Washington Square.

Figure 3.5 Aerial photograph from 1965 depicting the dramatic changes to the southeast and south central part of Washington Square. The area in yellow shows a surface parking lot and the area in orange shows the new Hopkinson House, newly created vacant lots and new single family housing (source: Historic American Buildings Survey No. PA-1489).

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34 Hopkinson House is a 35 floor building built 1962 and designed by Stonorov & Haws in the modernist style.
The area surrounding Washington Square is presently in a state of flux. The neighborhood contains many nationally significant historical resources that are managed either solely by the NPS (Independence National Historical Park) or jointly by the NPS, the Fairmount Parks Commission and the City of Philadelphia (Washington Square). In addition to the new highrise at the northwest corner of the square (St. James), developers are planning a midrise residence on the eastern central side of the square between the Philadelphia Athenaeum and the J. P. Lippincott building (two historically significant structures). The area is primarily residential, with some retail (mostly Jeweler’s Row), commercial (office space at the Curtis Center and Penn Mutual) and specialized activity (restaurants, coffee shops and NPS services). Visitors perceive the neighborhood as youthful, with an interesting blend of historic and modern amenities. Both automobiles and pedestrians circulate through the area, including both tourists and residents. Although Washington Square is of value to the immediate area, it is an underutilized resource compared to other public spaces in the city, such as Rittenhouse Square.

3.2.2 Identifying Areas for Improvement

Early field testing was essential for determining the applicability of the classifications and streamlining data gathering techniques. The objective of the field visit was to test the survey classifications by recording a small sample of data. The north side of Walnut Street, between 7th and 8th streets, was used as a test area. The test area contains a mixture of historic and modern buildings, diverse in type, use, style, composition and height (Figure 3.6). Classifications for nineteen buildings according to the sixteen
categories were recorded in a field journal, for a total of 152 unique entries (Figure 3.7).\textsuperscript{35}

Initial testing revealed the survey to be too cumbersome for use in the field. For example, valuable time was spent drawing buildings, double-checking drawn features, making room for annotation on the journal and anticipating room for the addition of future classifications like building height.

Figure 3.6 Photographs of the buildings and streetscape recorded in the first application of the survey in the field. From left to right, the first two images are looking north on Walnut Street between 7\textsuperscript{th} and 8\textsuperscript{th} streets, while the third image is looking west on Walnut Street from 7\textsuperscript{th} to 8\textsuperscript{th} street.

\textsuperscript{35} An error was encountered during the first site survey, in which twenty-two buildings were recorded when in fact there were only nineteen buildings. This type of observational error is fairly common when the site survey process relies on hand-drawn observations rather than maps. This issue was remedied in the final version of the survey with the creation of accurate GIS-based maps of the study area.
Initial analysis of the collected data identified three main areas for improvement. First, the use of pre-created GIS-based maps of the study area would both simplify the survey process and reduce the potential for error. Secondly, it immediately became clear that many of the classifications were not applicable for the planning scenarios envisioned for this project. Finally, it was determined that two of the NPS concepts (condition of the cultural landscape and the National Register criteria for determining significance) would be critical to the models as they provided a mechanism to weight historic features recorded in the field.

Improvements such as these resulted in a revision to the survey. Eighteen of the original classifications were reduced to a set of eight classifications identified as integral to creating the scenario-based models. This action allowed for a more focused effort to be given to the production of the overall methodology. The classifications in the finalized survey were: 1) architectural style, 2) height, 3) cultural condition, 4) historic
significance, 5) façade composition, 6) façade date, 7) Philadelphia Historic Commission designation and 8) National Register designation.

3.3 Survey Implementation

A set of maps were created in ArcGIS to represent the study area in 2008 (when the survey was conducted). The maps were on a block-by-block basis to ensure legibility and the inclusion of such details as building footprints, roads, alleys and curbs. These seven printed maps were then annotated with abbreviations that corresponded to the data-collection classifications (Figure 3.8). In an attempt to further simplify the data-collection process, all annotations were recorded in the order they appear in the database. In addition, the date, orientation, and reference number for each quadrant was documented on each map at the time of the survey.

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36 Appendix A includes copies of all of the annotated maps from the field. Appendix B shows the data from the select classifications as it appeared in the GIS database.

37 Creation of the base map creates an entry in the database associated with each drawn feature on the map. Each database entry appears in the order in which it was digitally drawn. Many buildings were not drawn systematically in a side-by-side manner due to the limitations of the software to digitize data.
Figure 3.8. The improved field survey map, with recorded classifications for each building in the quadrant.

Although the final version of the survey collected much of the same information as the initial version, the data-collection process has been made more intuitive. The end result was a process for targeted research that will allow a contextual framework for future data to be associated to recorded resources. Enhancement of the methodology was facilitated by the knowledge that all data would ultimately be used within a GIS-based environment. This knowledge, along with a refined set of survey classifications not only affected the organization, type and composition of the data, but was also instrumental in creating the final version of the analytical models.
IV Model Design and Implementation

One of the primary objectives of this dissertation was to produce a set of models that demonstrated the utility of the survey as an instrument for integrating the resources of history into planning. The study focused on historic resources that were physically present within the current built environment. This included resources related to aesthetics such as materials, patterns and styles as well as other forms of historic resources such as designated buildings of significance, structural volume and height. Historical resources represent unique kinds of information that can be used to better understand concepts related to urbanized character and place. Analysis of these phenomena provides the planner with the ability to gauge the existence, strength and prevalence of historically significant resources, while simultaneously encouraging her or him to design in a sympathetic and sustainable fashion.

4.1 Three Urban Planning Scenarios

Three models were designed to depict three unique, yet purposeful, urban planning scenarios. The first animates the changing built environment over time. The second identifies and evaluates historically significant buildings. The third identifies and evaluates selected historic architectural features for compatibility analysis when planning. The selected scenarios were identified as areas missing from present practice but capable of yielding information beneficial to planners in practice. A key element to
the success of these scenarios is their ability to visually communicate information in a manner familiar to both planners and the public.

The first model illustrates the build environment’s change over time. The concept behind this model proposes that a planner must look backward in time to experience the volume, scale, and aesthetic of the past to understand the present. Traditional techniques use static methods for simulated time travel; this model converts a combination of historical (Sanborn Fire Insurance maps) and contemporary (ArcGIS maps) into a digital, three-dimensional animation that visually depicts change over three eras: 1916, 1950 and 2008.

The second model identifies concentrations of historically significant features within the present built environment and evaluates them for their observed strength of significance. Historically significant buildings can often be overlooked because their characteristics are neither readily apparent nor understood. This model uses the classifications from the survey to create a map that represents high and low concentrations of historically significant buildings. This model was based on the classifications related to architectural style, degrees of significance and the governmental designation of a historic property.

The third model identifies and evaluates the present aesthetic setting to determine the compatibility of materials and architectural style. This model examines field-recorded data related to the façade and architectural style of a building (including age and composition) to determine groupings of one or more of these classifications. This type of model can be used to guide the design process to promote the retention of the existing aesthetic and to identify character-defining concentrations of structures.


4.2 Methodology

The first model was created in both ArcGIS and Adobe Flash; the second and third were created solely in ArcGIS. ArcGIS was selected both because it is the industry-standard GIS software and because it provides a collection of tools that analyze spatial and temporal data within a simplified multi-dimensional environment. ArcGIS also provides an environment for all users (beginners to advanced) to create their own tools, extensions and models. This project especially relied on two components of ArcGIS: the database and the built-in functionality of a native visual programming environment called ModelBuilder. ModelBuilder allows users to graphically connect existing ArcGIS geoprocessing tools in flowchart format to create a new, repeatable process called a tool or model. Any model created in ModelBuilder can be used repetitively, and completed models can be exported in a format that can be redistributed to other ArcGIS users.

The first model was designed to animate the built environment over time to illustrate how the height and density of buildings can impact the character of the setting. While the second and third models are based solely on data collected in the survey, the first additionally draws on information derived from historical maps from 1916 and 1950. The process began by using ArcGIS to digitize two-dimensional structural maps from all three periods to create three separate maps depicting the buildings’ two-dimensional footprints. These maps were then associated with the ArcGIS database version of the survey, allowing the survey classifications to be associated to the building footprints from 1916, 1950 and 2008. Each drawn building was rendered three-
trans-dimensional in ArcGIS by assigning heights either recorded in the field or documented on historic maps. The three-dimensional renderings were imported into Adobe Flash (an animation software program) to create a digital file that seamlessly animated buildings from 1916 to 1950 and 2008.

The second model was designed to identify, evaluate and map historically significant buildings. An analytical function that evaluates select data from the survey was created within ArcGIS to identify and rate significance and map this significance onto specific structures. The model produces a color-coded map of the present built environment that identifies the presence and strength of historically significant phenomena.

The third model was designed to identify, evaluate and map select historic architectural features from buildings to identify patterns, materials and styles traditional to a neighborhood (Figure 4.1). ArcGIS was used to create an analytical function that evaluates select data from the survey to identify and rate materials, patterns and styles of building materials and associate them with mapped locations. The model produces a color-coded map of the present built environment that identifies and evaluates materials, patterns and styles of buildings for the purposes of compatibility analysis and character identification and image preservation.
Construction of the scenario-based models relies on select classifications from the survey in the following combinations:

<table>
<thead>
<tr>
<th>URBAN SCENARIO</th>
<th>SURVEY CLASSIFICATIONS</th>
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</thead>
<tbody>
<tr>
<td>Model 1</td>
<td></td>
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<tr>
<td></td>
<td>Height</td>
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<tr>
<td>Model 2</td>
<td></td>
</tr>
<tr>
<td>Significance</td>
<td>Cultural Condition</td>
</tr>
<tr>
<td></td>
<td>Philadelphia Historic Commission</td>
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<tr>
<td>Model 3</td>
<td></td>
</tr>
<tr>
<td>Compatibility</td>
<td>Façade Composition</td>
</tr>
</tbody>
</table>

Table 4.1 Table showing the survey classifications used to construct the final models.
4.2.1 Model 1 - Change-Over-Time

The completed model depicting change over time was designed with elements from ArcMap, ArcScene (plus extensions) and Adobe Flash (Flash) to create a device that displays spatial data (study area buildings) and temporal data (maps of buildings from 1916, 1950 and 2008) in an animated, multi-dimensional format.

First, ArcMap is used to examine and confirm that all digitized buildings have structural heights and are assigned to their appropriate historic period. Next, the three digitized maps were brought into ArcScene, an ArcGIS application that allows many kinds of GIS data (2D/3D/vector/raster) to be viewed in many dimensions. Buildings were extruded to their recorded height by altering items within the “layer properties” menu for each map. Within the tab titled “extrusion,” the properties were modified to “extrude features in layer,” with an extrusion value/expression set to reflect the field titled “height” in the map database. This action instructs the software to push the two-dimensional polygon vertically to the value in the height field. This action quickly produces a three-dimensional rendering of the buildings for 1916, 1950 and 2008 (Figure 4.2).
Figure 4.2 (1) displays the non-extruded data of the southwest corner of the study area in 1916. (2) shows the same data extruded to its height recorded from the 1916 map.

Although ArcScene provides tools for animation, the results produced with this software were choppy and crude, with buildings fading in and out rather than seamlessly tying each period together. The animations were therefore produced instead in Adobe Flash, the industry standard for creating animations. As ArcGIS files are not compatible with Flash, the three-dimensional maps were exported as static graphics rather than database information. The optimal ArcGIS view was captured and saved at a high resolution (1400x1050 pixels; 72 dpi). Four images were imported into the Flash environment: three extruded maps representing 1916, 1950 and 2008 and a satellite
image from 2004 to provide locational context (Figure 4.3). Although there are many components to Flash, the general structure of the environment includes the “stage,” where data is viewed; the “timeline,” where data is controlled; and “properties,” where properties, filters and parameters related to the file are manipulated.

![Three-dimensional views exported to Adobe Flash. (1) represents 1916, (2) shows 1950, (3) depicts 2008 and (4) is a satellite image.](image)

The four images were imported into the Flash environment and scaled to fit the space (550 x 400 pixels). The order, appearance, and length of time of display for each image was manipulated within the timeline. The completed tool animates three-dimensional depictions of buildings from three historic periods. Based on selected classifications in the contemporary and historical survey, the animation retains its original GIS scale and orientation.

### 4.2.2 Model 2 - Historic Significance
The second model uses data from five survey classifications (architectural style, cultural condition, historic significance, NR and PHC) to create a function that represents historically significant phenomena in a practical and accessible format. Five ArcGIS tools (make feature layer, feature to raster, reclassify, Euclidean distance and cell statistics) are used consecutively twenty-nine times to identify and evaluate significant buildings in the study area (Figure 4.4). 38

This model is additionally unique because it creates and relies on the use of three unique classifications to execute the function. The three classifications identify governmental designation, historic significance and historic strength. These newly created classifications—used as sub-models—are elemental to the successful execution of the final version of this scenario.

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38 Euclidean distance uses Pythagorean Theorem to measure the distance between two points on a plane.
The tool is designed to generate two maps, one that relates historic significance to the built environment and one that displays the density of phenomena and the distance between them. For the purposes of description, the map creation process is divided into seven segments. The first three segments describe the creation of the density map; segments four through seven describe the creation of the significance map.

In the first segment, three ArcGIS tools were used to create four raster files representing select values relating to the following survey classifications: cultural condition, PHC, NR and historic significance (Figure 4.5 [1]).39 The first tool in the

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39 This version of historic significance comes from the data-collection survey and represents a true interpretation of the created description.
“chain” transformed the source map into a file whose properties were isolated and appended to create a customized feature layer. For example, the tool was used to filter all features except Federal buildings with PHC designation, producing a very specific map. This was achieved by viewing the properties of the tool and including the expression “ARCH_STYE” = “Federal” in the optional “expression field.” The next tool was feature to raster, which transformed the output of the previous tool into a raster format. This process, which created four rasters, is the first step in using many tools specifically designed for manipulating and analyzing raster datasets. The next tool reclassifies such descriptive raster values as “Federal” or “yes/no” into numeric values. This model assigned the value 1 to features of the highest value, resulting in the following reclassifications: cultural condition—good=1, fair=2, poor=3 and unknown=4; PHC (of Federal architecture)—yes=1 and no=2; NR (of Federal architecture)—yes=1 and no=2 and historic significance (of Federal architecture)—high=1, medium=2 and low=3. This process produced four rasters that displayed the specific information ranked from high to low (Figure 4.5).
The second and third segments included three functions: Euclidean distance; reclassify and cell statistics. This combination of functions, applied consecutively four times, produces a map depicting the location, density and distance between features of historic significance. The first tool analyzes the output of the previous tool (the reclassification of descriptive values into numeric values) to produce a map that displays the Euclidean distance away from the source value of 1 (Figure 4.6 [1]). The next tool reclassified the Euclidean distances and reversed the values to create a file that documents the distance to the source value of 1 (Figure 4.6 [2]). The third and final action applies the cell statistics tool, which collectively computes the statistical mean of the output data from the four reclassified files and the application of Euclidean distance.
four times to produce a map that identifies the density of significant features and the
distance between them with gradations of color (Figure 4.6 [2], [3]). The application of
these six ArcGIS tools completes the first part of the model in ModelBuilder.

Figure 4.6 The second and third segments of the distance/proximity analysis in Model 2,
(1) shows application of Euclidean distance, (2) illustrates the application of reclassify
and cell statistics to produce (3), the final graphical representation of distance and
proximity of significance.

The fourth segment combined data from the historic significance and cultural
condition classifications to determine historic integrity (one of three unique sub-models
created for this technique). Four tools contributed to the formation of this sub-model: make feature layer; feature to raster; reclassify and cell statistics (Figure 4.7 [1]). The make feature layer was jointly applied to filter historic significance and cultural condition from the source database (2008 Buildings). The outputs of this tool were converted to raster datasets and reclassified to show the following values: cultural condition—good = 1, fair = 2, poor = 3 and unknown = 4 and historic significance (of Federal architecture)—high=1, medium=2 and low=3. The cell statistics tool was applied to the reclassified files to determine the mean of the values, creating a map of the built environment depicting the different strength of historic integrity of Federal buildings from the study area (Figure 4.7 [2]).

![Figure 4.7](image)

Figure 4.7 The segment of Model 2 producing historic integrity. (1) shows the model and (2) displays the representation, with black features showing high levels of integrity and shades of gray showing lower levels.

The fifth segment combines data from NR and PHC to determine governmental designation (the second of three unique sub-models). Four tools were used to create this sub-model: make feature layer, feature to raster, reclassify and cell statistics. Similar to
the fourth segment, this process used the make feature layer tool to exclude all data except Federal architecture that had NR or PHC designation. The converted rasters were reclassified to show: PHC (of Federal architecture)—yes = 1 and no = 2 and NR (of Federal architecture)—yes = 1 and no = 2. The cell statistics tool was applied to determine the mean of the values, creating a map of the built environment illustrating Federal buildings with historic designation of different strengths (Figure 4.8 [2]).

![Figure 4.8 The segment of Model 2 producing historic designation. (1) displays the model and (2) shows the representation, with black showing buildings with both NR and PHC designation and gray showing features only with PHC designation.](image)

The sixth segment combines the outputs of the fourth and fifth segments to produce a sub-model that shows the strength of the historic presence (the third of three unique sub-models). This model combined the output of governmental designation with historic integrity by using the cell statistics tool to determine the mean of the values to create a map of the Federal buildings displaying values of high (both NR and PHC = 1), medium (NR = 1, PHC = 2 or NR = 2, PHC = 1) and low levels (NR = None, PHC = 1 or NR = 1, PHC = None) (Figure 4.9).
The seventh and final segment creates the second map of historic significance by assigning value to all the Federal buildings in the study area. The model uses a similar chain of functions to those described earlier in this section (feature to raster, reclassify [Federal = 1], Euclidean distance [distance to 1], reclassify [distance away from 1] and finally cell statistics) to produce a map which identifies historically significant Federal buildings and assigns levels of significance. This determination is based on many factors including governmental designation, historic integrity and historic strength (Figure 4.10 [2]).
Figure 4.10 The segment of Model 2 producing historic significance. (1) displays the model and (2) shows the representation, with yellow buildings representing the highest level; blue, medium; green, low and purple, none.

The completed model analyzes select data from the survey to produce a map that depicts the location of buildings from one or many historic periods determined to be significant as well as the density and distance between clustered significant phenomena.

4.2.3 Model 3 - Architectural and Character Compatibility

The third model produces a map that identifies such concentrations of character-contributing features as historic building materials, patterns and architectural styles. The model uses data from three survey classifications (architectural style, façade composition and façade date) to execute the analysis in ModelBuilder. Five ArcGIS tools (make feature layer, feature to raster, reclassify, Euclidean distance and cell
statistics) are used consecutively fourteen times to identify and evaluate commonalities of materials, patterns, dates and styles of buildings in the study area (Figure 4.11).

Figure 4.11 Model 3 as diagramed in ModelBuilder, documenting six unique functions.

The tool is designed to generate two maps, one that relates compatible aesthetic features from the present built environment and one that shows the density of phenomena and the distance between them. For the purposes of description, the process has been divided into four segments. The first three segments describe the creation of the density map; the fourth describes the creation of a map that identifies features related to buildings in the study area.

The first segment uses two ArcGIS tools to create three raster files representing select values relating to the following survey classifications: façade date, façade material and architectural style. The first tool converts the source file (map and survey data for 2008) into a raster by executing a feature to raster command. Use of this tool produced three unique rasters depicting façade type, façade date and architectural style (Figure 79).
4.12 [1]). For example, figure 4.12 illustrates the first segment of the model that converts the source map into a raster and then reclassifies it. The first step in the process pulls one piece of information from the source database (façade date) and converts it into a raster creating the file “fcddate2008” (Figure 4.12 [1]). The new raster maintained the associated values recorded in the survey database (“historic, modern or mixed”) and removed all other associated data.

The second tool in this segment reclassified these values (on a cellular level) and replaced them with new values in three unique ways: 1) isolation of values; 2) assignment of identical values and 3) assignment of a range of values. The raster file “fcddate2008” contained three values, one titled “historic” (historic facades), one titled “mixed” (façades with both historic and modern components) and one titled “modern” (façades with no historic value). “Historic” was assigned a value of 1; “mixed,” 2 and “modern” given a value of “nodata,” which tells the tool to ignore all data assigned with this value (Figure 4.12 [3]). These changes make “historic” the source field and “mixed features” a secondary classification. A similar process was applied for façade type and architectural style. For façade type, all values except “brick” were assigned “nodata” (Figure 4.12 [2]). For architectural style, “Federal” received a value of 1, while all other values were assigned “nodata” (Figure 4.12 [4]).
Figure 4.12 (1) displays the first segment of Model 3 in ModelBuilder, illustrating the reclassification of façade type (2), façade date (3) and architectural style (4).

The second segment of the model applies the tool for calculating Euclidean distance to measure the straight-line distance between the source values, which for the purposes of this application was every reclassified cell with a value of 1 (Wade and Sommer 2006: 71-72). This process ran consecutively on the reclassified façade date, façade type and architectural style files. The final output resulted in the creation of three new raster files which documented the distance to the source in color-coded radial patterns (Figure 4.13 [1], [2], [3]). This tool assigns nine new values by default that denoted varying distances between the colored bands.  

40 The distance between the bands varies and is entirely dependent on the parameters (cell values, cell size and scale) of the data.
Figure 4.13 The second segment of Model 3 illustrating Euclidean distance in ModelBuilder on the left and the results of this analysis on the right. (1) and (3) represent façade date and type, while (2) represents Federal architecture.

The third segment of the model brings the three chains of analysis together, culminating in the creation of a multi-colored raster that identifies concentrations of character-contributing architectural features while also plotting the distance between them. This segment uses two ArcGIS tools to complete the process, namely the
reclassify and cell statistics tools. Reclassify, as described above, allows cell-based values to be modified. Application of the tool allows the nine Euclidean distance values to be simplified and reversed. For example, Euclidean distance transformed the cell values of “fcddate2008” into a series of measurements denoting distance between the reclassed values, representing colored band 1 with the distance value of 0–24.797886 ft. and colored band 2 as 24.797886–62.82131 ft. Reclassify simplifies these numbers, transforming colored band 1 into the value 1 and colored band 2 to the value 2. This process was applied to all nine distance values. These values were then reversed using the “reverse new values” option within the reclassify tool, transforming the value into a raster that measures the distance away from the source to other source values. Successful execution of the cell statistics tool requires these values to be reversed.

The cell statistics tool completes this segment of the model by calculating a per-cell statistic on each raster by using the optional tab titled “overlay statistic” (for the purposes of this tool set to “maximum”) to calculate the largest value of the inputs. Six rasters converged on the cell statistics tool, pulling output files from the three Euclidean distances and three reclassifications, resulting in the identification of concentrated hot spots of compatibility and their proximity to each other (Figure 4.14).
Figure 4.14 The third segment of Model 3 in ModelBuilder showing the final operations for this segment and the final part of the model identifying compatibility.

The final segment of the model runs simultaneously in the ModelBuilder environment with the above-described segments. This segment applies the cell statistics tool to the reclassified data produced in the first segment of the model to create a map that represents façade type (brick), façade date (historic & mixed) and architectural style (Federal) as building footprints. The new raster identifies high values (all values of 1) as dark gray buildings and lower values (values of 1 and/or 2) as shades of gray (Figure 4.15).
Figure 4.15 The final segment of Model 3 in ModelBuilder displaying the cell statistics operation to produce an overlay of buildings used for the analysis.

The completed model analyzes select data from the survey to produce a map that depicts the location of buildings from one or many historic periods determined to be architecturally, stylistically and organizationally significant as well as the density and distance between clustered identified phenomena.
V Demonstration

This dissertation is premised on the practical use of urban historic resources in site planning and design as a means of integrating consideration of character-contributing characteristics into mainstream planning practice. Current methodologies rely heavily on the use of policy and legislation to incorporate historic resources into practice. This practice is cumbersome, relatively alien to practitioners and rarely inspires design. A new methodology that builds on past scholarship and existing practice to create a new associational methodology to classify, document and analyze historic characteristics of the built environment was developed to make the use of urban historic resources a practical part of mainstream practice.

This chapter demonstrates the application of the finalized survey and model in the area immediately surrounding Washington Square, Philadelphia. Of the survey classifications, a total of eight were used to execute the functions of the models. The first model demonstrates change over time of buildings from three historic periods (1916, 1950 and 2008). The second model shows the identification, valuation and density of significant Federal-era buildings. The third model demonstrates how a specific architectural style (Federal era), façade material (brick) and façade condition can be identified for the purposes of determining compatibility of style, material and aesthetic for new planning projects. Each model description uses imagery from the actual models in operation to demonstrate functionality. Additional images compare the maps produced by the models with modern photographs and historical paintings of the study area.
5.1 Model 1—Change-Over-Time

Modern planners have found it difficult to model change over time. Works by Lynch, Appleyard, McHarg and others have demonstrated the desirability of having means of visualizing the changing landscape over time as well as ways to document and display a city’s temporal heritage (Lynch 1960: 157, 158; Appleyard 1970: 115; Lynch 1972: 240-242; McHarg 1992: 79-93). Cullen addressed this issue through the concept of serial vision, which tracks movement through urban space in a series of drawn scenes (Cullen 1996: 9). The approach taken in this dissertation supplies a means for documenting and displaying change over time, while acknowledging the importance of Cullen’s concepts for experiencing urban character. Motion through time can be thought of as similar to motion through space, revealing traits related to character from the past as well as the present. The successful implementation of this model demonstrates that resources from the past (historic buildings) can assist the planner by offering a means to visualize a neighborhood’s character of scale and density—two areas often overlooked in the name of progress. Additionally, the model is flexible enough to allow animations of other forms of urban information, depending on the needs of the specific situation.

The finalized model combines the precision of ArcGIS with the animation capabilities of Adobe Flash to create a digital film with three-dimensional depictions of buildings from 1916, 1950 and 2008. The two historic periods (1916 and 1950) were selected because they represent both high and low points in the study area’s history. In 1916, the area was at its peak density; in 1950, the area was undergoing intense urban
renewal initiatives. The animation uses building footprint data digitized from highly detailed (Sanborn Fire Insurance Company) historic maps of the study area to illustrate the impact that RDA activity had on the Washington Square area. This kind of coarse-grained information displays the evolution of the built environment over time, orienting viewers to character-contributing traits related to urban scale and density.

Operation of the model demonstrates the smooth transition between three chronological periods as buildings from different eras appear and disappear as time progresses (Figure 5.1). Five scenes from the animation display the functionality of the model. Figure 5.1 (1) displays buildings from 1916; in figure 5.1 (2) the buildings from 1916 fade out; in figure 5.1 (3) buildings from 1950 fade in; in figure 5.1 (4) buildings from 1950 fade out; in figure 5.1 (5) buildings from 2008 fade in, becoming the final image of the animation.\textsuperscript{41}

\textsuperscript{41} The entire animation consists of 160 frames and is 13.3 seconds long. The user has the ability within the Adobe Flash environment to slide the temporal sequence backward and forward.
Figure 5.1 “Serial vision” illustrating movement through time. This figure displays each scene in the animation, moving sequentially from (1)–(5), with transitions at (2) and (4).

Each temporal sequence contains a text field that identifies the year displayed. In addition, a modern (2004) ortho-rectified satellite map is positioned underneath each sequence for context. The final animation depicts the three-dimensional urban landscape
morphing from one period to the next in a manner that is informative, meaningful and true to the spatial and temporal properties originally assigned in ArcGIS.

The completed model provides a framework for the animation of other historic resources, allowing planners to pursue the finer-grained qualities of the historic urban landscape. For example, the planner could witness the erection and demolition of buildings by representing the dispersement of volume and/or the height of the buildings, giving a visual sense of scale and, in some cases, commercial and residential trends. In addition, color-coding could easily demonstrate such trends over time as residential patterns, aesthetic evolution, commercial use and neighborhood perception. Animations of change over time also provide talking points for future discussion. Has the site always been so densely developed? Does a thirty-five story building break the traditional scale of the setting? How did the devastation of a block affect the character of its immediate surroundings?

The effectiveness of this model relies heavily on the hypothesis that historic characteristics from the built environment can be both useful and practical for mainstream practice. Animation is a powerful medium for displaying change. Character is a time-dependent resource whose multi-faceted parameters can only truly be displayed over time. Exposing the planner and the community to historic characteristics from the built environment over time allows the planning and residential community to engage and orient themselves with traditions that have helped to shape the present environment.

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42 Sanborn maps document unique and highly detailed kinds of information related to residential patterns (apartments, single residences), commercial use (type and activity of businesses) and the material and height of buildings.
5.2 Model 2—Historic Significance

Historic significance is difficult to define and even more difficult to classify. Lynch and Cullen attempted to classify significance through association, suggesting that aesthetics and events of meaning assign significance to buildings or locations (Lynch 1960: 164-168; Lynch 1972: 173, 199; Cullen 1996: 10). The NPS’s interpretation of significance (a classification system rooted in historic preservation, planning and landscape architecture) is one attempt to bring some specificity to the concept. This project merges the NPS’s categories with concepts from planning pioneers and planning professionals to create a methodology for identifying concentrations of historically significant features within the present built environment and evaluating their observed strength of significance. This model produces a density/distance map that represents high and low concentrations of historically significant buildings.

The operation of the model demonstrates its ability to identify both the location and level of significance for buildings of historical interest. The map designates levels of significance with color coding. Buildings colored yellow, for example, are valued as “high,” while buildings with “low” significance are coded green. The presence of higher-value structures strengthens the character of a street, block or neighborhood, while lower-value structures erode character. The planner can use this model to identify areas of strong and weak significance and implement designs that respect existing strengths.

The first example of the model demonstrates the kinds of information yielded by a “high” valuation. Figure 5.2 displays the function and operation of the final map as a
device for analysis and communication in both the field and the office. The figure illustrates three important pieces of data pertaining to one building in the study area (the Reynolds-Morris House). The first piece of data identifies a Federal-era building with a “high” value (the highest valuation) (Figure 5.2 [1]). The second piece of data shows the valuations associated with the building from the database part of the survey (Figure 5.2 [2]). The model aggregates the appropriate survey classifications (cultural condition, architectural style, historic significance, PHC and NR) to determine the valuation of significance. The third element of Figure 5.2 displays the building at the time the survey was conducted in the field (Figure 5.2 [3]). The simple inclusion of modern and historic images of the site provides context, orients the planner to the aesthetic qualities of the selected building and introduces a sense of reality to a process that is otherwise abstract. Historically significant buildings are instrumental in forming the character of a neighborhood; identifying them allows the planner to respect scale, materials, and orientation while also working with the community to integrate these types of buildings into the larger design.
Figure 5.2 Example of a “high” value from Model 2 displaying historic significance. (1) displays the map of significant buildings; (2) displays the associated survey data and (3) is a photograph of the significant building (the Reynolds-Morris House).

The second example demonstrates the types of data yielded from a valuation of “medium.” Figure 5.3 (1) displays a building whose value is highlighted and plotted on the distance density map. Figure 5.3 (2) displays the mixed values (high and low) associated with data recorded in the survey, resulting in an evaluation of the house’s historical significance as “medium.” The selected building was given a value of medium by the model because it did not have National Register designation. Photographs from the site show the building as it presently stands (Figure 5.3 [3]). The building is identified in a historic painting of the streetscape (Figure 5.3 [4]). Due to the difficulty
of attaining governmental designation, it is quite likely that a high percentage of character-contributing buildings will carry this valuation. The importance of a medium valuation is subject to change, becoming more or less significant depending on forces affecting the neighborhood. For example, the planner can use this type of map to identify areas with high concentrations of significant buildings as less attractive for development than areas with low concentrations of significant buildings.

Figure 5.3 Example of a “medium” value from Model 2 showing historic significance. (1) displays the map of significant buildings; (2) displays the associated attribute data; (3) is a photograph of the building in situ and (4) is a historic painting by Frank H. Taylor of the area including the significant building (source: HABS Survey of Washington Square Area, PA-1489-5).
The third example demonstrates the kind of information provided by a value of “low.” Figure 5.4 (1) shows a building of low value in the study area, while figure 5.4 (2) identifies the classifications from the survey used to determine its level of significance. Observations recorded in the survey identify a combination of positive and negative attributes (intermediate valuation for cultural condition and historic significance, lacking governmental designation) used in calculating the value. Images of the building as it presently stands shows that the lower half of the Federal building has been dramatically altered to accommodate commercial and residential use (Figure 5.4 [3]). Planners can collaborate with residents and preservationists to develop a strategy for addressing buildings identified with low significance. Low valuations may be caused by deterioration through neglect, dereliction, vandalism and negative neighboring activities, or they can reflect the presence of newer structures. This valuation allows planners to openly discuss the future of these buildings when planning, allowing historic resources to become a part of the decision-making and design process.
Figure 5.4 Example of a “low” value from Model 2 depicting historic significance. (1) displays the map of significant buildings; (2) displays the associated attribute data and (3) is a photograph of the building in situ.

The final example demonstrates the lowest value given by the model—a value of “none.” Figure 5.5 (1) shows the building in proximity to other buildings of significance, while Figure 5.5 (2) shows the values recorded in the survey affecting its valuation. The model weighs the negative entries versus the intermediate and high entries to calculate a value of none. Figure 5.5 (3) displays the building in its current state (2009), with its historic interior fully gutted and its entire first floor façade dramatically modified to accommodate one half of a coffee shop. Planners can use this type of information to identify locations for development.
Figure 5.5 Example of a “none” value from Model 2 displaying historic significance. (1) displays the map of significant buildings; (2) displays the associated attribute data and (3) is a photograph of the building in situ (on left).

The completed model produces a map that displays the densities and varying levels of historically significant phenomena throughout the study area. The map shows degrees of significance in relation to other buildings and displays a density/distance map that highlights the proximity to other significant buildings (Figure 5.6).
Figure 5.6 The final map after running Model 2 in ModelBuilder displaying Federal-era buildings at different degrees of significance. (1) identifies the tool in ArcToolbox. (2) is the visual representation of significant buildings in reference to the study area circa 2008. (3) shows the table of contents in ArcMap.

The effectiveness of this model relies heavily on the hypothesis that historic characteristics from the built environment can convey meaning through their association with people, events and other activities from the past. This model offers planners the opportunity to blend preservation planning skills with field techniques to identify and evaluate buildings of significance on all scales. Armed with a significance map, the planner can have a positive influence on the design process in three unique ways. First,
the model can be used to locate concentrations of significant buildings, thus identifying areas where this aspect of a neighborhood’s character is strong and influential. Second, the model identifies all buildings of significance, providing the planner with talking points with the residential community when determining a program that is appropriate and sensitive to areas with high values or concentrations of the recorded phenomena. Third, the model provides the planner with the ability to discover areas appropriate for development by identifying spaces free of significant buildings.

5.3 Model 3—Architectural and Character Compatibility

The complexities surrounding the identification of place-based aesthetic resources have often plagued planners, architects, landscape architects and preservationists, to the extent that place-based aesthetics are frequently either excluded or misinterpreted. This project offers a practical solution to this problem by first identifying for an architectural style, then identifying the material composition of the façade and finally assigning a date to the façade. In Washington Square, brick buildings built in the Federal style contribute to the area’s sense of place (Figure 5.7). This model uses the classifications from the survey to create a map that represents the distance between buildings with select architectural styles. Survey classifications used to determine significance include architectural style, façade composition and façade date.
The implementation of the model demonstrates its ability to identify the location of buildings with specific architectural styles (Federal for this example), while also providing the capability to determine the material composition and age of the facade. Execution of the model produces a map that displays three important sets of information: buildings from the selected style (Federal period), a color-coded assignment identifying Federal-era buildings with either an original brick façade or a building whose façade has been altered within the last century and an underlay map that depicts the distance between identified buildings (Figure 5.8). The planner can use this model to identify clusters of the most prevalent characteristics relating to style and
associated materials as a design aid, influencing the design to be compatible and sympathetic with the existing urban landscape.

Figure 5.8 An example of how Model 3 identifies Federal-era buildings whose façades have been dramatically altered. (1) shows the altered buildings in relation to unaltered buildings. Numbers (2), (3) and (4) show the various kinds of alterations.

The completed model produces a map that identifies such concentrations of character-contributing features as historic building materials, patterns and architectural styles. The model uses data from three survey classifications (architectural style, façade composition and façade date) to execute the analysis in ModelBuilder (Figure 5.9). The tool displays the density of areas which have a strong presence of one particular architectural style, identifies the material most prevalent to the area and informs the
planner where a façade might be fully or partially original. Figure 5.9 displays the density of Federal buildings (in red) and the distance between them, with areas of less interest (with no examples of Federal buildings) displayed in shades of cyan/blue. The footprints of select buildings (Federal) displaying the age, material and style appear at the top of the map.

Figure 5.9 The final map after executing Model 3 to display Federal-era buildings with brick façades. (1) identifies the tool in ArcToolbox. (2) is the visual representation of compatibility analysis in reference to the study area circa 2008. (3) shows the table of contents in ArcMap.

The effectiveness of this model relies heavily on the hypothesis that historic characteristics from the built environment contribute to the present visual character of a neighborhood. This model offers planners the opportunity to quickly and effectively
analyze existing buildings from any period to determine whether the materials and uses of newly proposed projects are compatible with those of the present built environment. Although frowning on reproduction, Cullen emphasized the importance of material continuity, suggesting that aesthetic continuity is the key to successful and meaningful design. A map of compatible materials, styles and their condition provides the planner with the necessary resources to positively influence the design process in three unique ways. First, the model can be used to determine groupings of one or more of these phenomena, quickly locating clusters of buildings whose façade or style (or both) are the same. Second, the model identifies all buildings from a particular style, allowing the planner to determine prevalent architectural styles and details when preparing the design. Third, the model provides the planner with the ability to potentially identify sections of a neighborhood where residential resistance might be encountered. For example, an area with a high concentration of Federal-era buildings with intact façades, might be more likely to resist urban planning initiatives than an area with few buildings from one particular period or material.
VI Evaluation

The methodology created for this dissertation allows planners to more fully integrate the past into site planning and design. Preservation planning, the present methodology for incorporating history into planning, advances a statics view of the past, making it difficult for the planner to integrate qualities from many historic periods into practice.

The methodology was evaluated both by its use in the field and the lab and by submitting all materials (survey, data, and models) to a planning professional for review. The evaluations identify the strengths and weaknesses of the methodology by exploring its theoretical foundations, mechanical operation and applicability to mainstream practice.

6.1 Survey Evaluation

The survey was designed to address the concern that planners lack a systematic methodology for classifying and documenting historic resources in the urban context. Although the works of Lynch, Rapoport, and the NPS have made many strides toward integrating this type of information into mainstream planning, no one system has yet been adopted. This may be due in part due to the abstract nature of the subject matter. However, planners wishing to incorporate historical resources into their work have also faced the misconception that history has no place in mainstream practice. This inability to recognize the potential of history partially stems from a failure to categorize historic
resources as practical, categorizable assets that can be treated in a similar manner to traditional planning resources.

Overall, the survey successfully addresses the perceived problems of vagueness and ambiguity by creating a classification system that merges concepts from historic preservation with techniques from planning theory and practice to create a simple yet effective technique. This technique was derived from a modification of the NPS’s existing classification system, originally designed to identify cultural landscapes and determine significance. These concepts were explicitly designed to catalog and protect the vast collection of national parks and landmarks. For this survey, however, it was critical to modify these categories to make them more relevant to the process of management, protection and, most importantly, planning.

Earlier versions of the survey were cumbersome. The original number of recorded classifications (sixteen) was too large for fieldwork and model creation. Eventually ten categories were identified as useful for creating urban planning scenario models. The data-collection technique was moreover modified to improve speed, accuracy and compatibility with GIS-mapping software.

The survey is flexible enough to withstand future improvements. For example, a more sophisticated procedure for real-time data entry via a web-based or static portal would further simplify the data-collection and analysis process. Mark Davison, the planning professional asked to review the survey and models, agreed that developing a more user-friendly data-collection device would be essential to promoting the survey’s widespread use. Such a function could be achieved by creating an interactive digital version of the survey in a format that uses global positioning system (GPS) technology.
to spatially locate the recorded feature (building) via a handheld device such as a smartphone or laptop. This advance would instantly associate recorded data (text, video and photograph) with a geospatial object and introduce GPS imagery for archival and analysis purposes.

6.2 Model Evaluation

Overall, use of ModelBuilder was successful, with the exception of the model demonstrating change over time. Its use simplified the programmatic creation of the models and the graphical user interface (GUI), particularly the flowchart style, made complex concepts easier to understand and explain. An additional benefit of ModelBuilder is that it allows a completed model to be “packaged” for redistribution by providing the ability to create customized documentation and tutorials describing the operation of the newly created model.

Despite all of these benefits, ModelBuilder had some flaws. First, not all ArcGIS tools are available within the ModelBuilder environment. This complication forces the user to either make do with the available ArcGIS tools, create customized scripts or use external applications for functions beyond the capability of ArcGIS/ModelBuilder. The model depicting change over time, for example, was finalized externally in Adobe Flash because ModelBuilder does not include an animation tool.

Adobe Flash provided many advantages for animation-based models. This software program is specifically designed to create stand alone and web-based animations and interactive applications. It can easily import/export vector line data from
ArcGIS but was unable to import the proprietary three-dimensional file format produced in ArcScene. This incompatibility was overcome by exporting a three-dimensional view as a static image for each historic period.

6.2.1 Model 1—Change-Over-Time

This model was designed to demonstrate an urban planning scenario that shows a neighborhood changing over time. The goal of this model is to orient the planner and the community to the character-contributing features associated with scale, volume and density of the built environment. The model successfully addresses many of the problems identified in past and present methodologies. Both Lynch and Cullen, for example, experimented with static sequencing to represent time (Lynch 1972: 135, 173, 185, 187, 199; Cullen 1996: 9). Similarly, both Davison and Foulds cite the need to animate maps over time, as present practice uses hard copies of maps from different historic periods two-dimensionally on a side-by-side basis (Interview with the Author 2008).

The primary weakness of the model is the inability of ModelBuilder to integrate the ArcGIS animation tool into the ModelBuilder environment. This action requires a planner to use data from the survey in ArcMap (the primary application of ArcGIS) to create a three-dimensional representation of the buildings with ArcScene. This information is then exported to external applications (Flash) to create the animation. A secondary weakness is the coarseness of the information presented in the completed model. While the use of historic maps was the best (and simplest) dataset to demonstrate
the concept, their use limited the animation to only a few historical snapshots rather than the desired dynamic phenomenon.

The model successfully imparted the desired experience and provides a useful platform for future exploration. For example, it is conceivable that building uses, residential patterns and structural materials could be illustrated through animation, providing planners with the ability to track (and communicate) these changes over time and in three dimensions. In addition, the temporal framework could be expanded or contracted to represent different periods of time, targeting the impact of particular events or illustrating the formation of a neighborhood’s character. Another future consideration includes the use of multi-dimensional, web-based technologies, coupled with the use of GPS enabled handheld devices in the field, to record and experience an urban area in real time. It is conceivable that this type of functionality will become a part of the planning process, affecting both the practice of design and the decision-making process.

6.2.2 Model 2—Historic Significance

This model was designed to demonstrate an urban planning scenario that shows the location and strength of presence possessed by historically significant buildings. The goal of this model is to orient the planner and the community to character-contributing features such as people or events of significance associated with one or many buildings. The model successfully addresses many of the problems identified in past and present methodological approaches. For example, both the NPS and Davison and Foulds identify the assignment of significance as an observation-based action reliant on
interpretation, legislation and policy. Although this approach provides many benefits, it limits the numbers of buildings likely to be determined significant, allows bias to seep into interpretation and ultimately continues present preservation planning practices by freezing time by transforming a building or location into a landmark, or a neighborhood into a district.

The primary weakness of the model centers on the inconsistencies between ModelBuilder and ArcGIS. For example, many of the ArcGIS tools were either only partially available for use in ModelBuilder or simply missing altogether, forcing the user to identify an alternative solution with the available ArcGIS tools. A second weakness is the somewhat subjective nature of the classifications. Although critical to the completion of this model, many of the classifications were modified to filter out subjectivity when possible. For example, the NPS concepts were applied less strictly than the Federal government mandates and other subjective categories such as historic façade were simplified to mean that façade material and composition are original to the building at the time of construction. A final weakness focuses on the selection of one historic period to execute the model. It would have been more interesting to compare recorded phenomena over many historical periods to determine if a building increases or decreases in significance, based on the significance of other neighboring or local buildings.

The model successfully imparts the desired information and provides a useful platform for future exploration. The component for determining significance, for example, could be altered to reflect any location or scale of a site. In addition, the level of significance could be more closely tied to residential decision-making, creating a
truer representation of the current residential sense of place. Also, the sub-model for determining historic integrity could play a stronger role not only in this model, but also in the others. This concept of historical integrity, foreign to most practitioners working outside of preservation, could be modified to identify the integrity of a neighborhood’s character. This function has the ability to identify elements that erode, distort or enhance neighborhood character. The planner could use this information to repair, refocus and complement place-based characteristics. This approach would assist the planner in focusing on the bond between the resident, the built environment and the past to create a vivid, rhythmic and memorable urban environment.

6.2.3 Model 3—Architectural and Character Compatibility

This model was designed to demonstrate an urban planning scenario that shows the location and condition of character-defining architectural elements for the purposes of determining compatibility with future projects. The goal of this model is to orient the planner and the community to materials, patterns and styles from extant historic buildings associated with forming a neighborhood’s character. This action provides a platform for the community to identify physical hallmarks that make a neighborhood unique, while also alerting and guiding the planner to design in a sensitive and compatible manner. The model successfully addresses many of the problems identified in past and present methodological approaches. For example, both Cullen and Lynch identify the importance of the historic aesthetic but provide little by way of methods to integrate observations into planning (Lynch 1960: 159; Cullen 1996: 11). Present
practice relies primarily on observation by the professional in the field, coupled with preservation planning techniques for inclusion. Although these approaches provide many benefits, over-reliance on observation allows bias towards a particular style, material or pattern to cloud judgment. The compatibility model provides the planner with a simple and efficient technique to identify streets where buildings of a particular style, material or pattern are more prevalent than others. This process informs both the planner and the community of the location of important urban elements that are normally overlooked.

The primary weakness of the model lies in its creation. As noted above, ModelBuilder supplies only a limited number of ArcGIS tools. A second weakness might be the subjective nature of the classifications for determining style. Although a consistent list of styles was created for the buildings found in the study area, it would have been better to adhere to a particular standard (AIA or APA style guide) for categorization. A final weakness focuses on the selection of one historic period to execute the model. Although this is a primary operation of the model, it would have been interesting to transpose the classifications to make the material classification the primary organizing element and the style/pattern classification secondary.

The model successfully imparts the desired information and provides a useful platform for future exploration. The component for determining compatibility, for example, could be modified to identify specific details (paving, planters, shutters, lighting, doors, etc.) within a neighborhood instead of specific building styles. Desired characteristics could be tied more closely to residential decision-making, creating a truer representation of the current residential sense of place.
VII Conclusion

Contemporary planning demands the consideration of historic resources associated with character, culture and meaning, but planners lack the practical tools to incorporate these qualities into mainstream site-planning practice. Although preservation planning provides documentation, policy and legislation as tools for integrating historic resources into planning, their use is not sufficient to allow the planner to understand the many histories that contribute to the character of a neighborhood.

This dissertation demonstrates the possibility of more fully integrating the resources of history into the practice of planning. By developing a methodology that associates character-contributing features to the built environment, this dissertation provides the foundation for planners to explore other historic qualities that contribute to the formation of character. This methodology has the potential to advance the practice of planning because it provides planners with a practical methodology to identify, strengthen or restore qualities associated with the character of an urbanized area. The ability to classify and document historic resources is especially important now, because cities are changing at a rapid pace. Using this methodology, planners will have the ability to identify, maintain and integrate qualities from the past more fully into practice, allowing planners to become custodians of urban character and promoters of planning and design that is rich in culture, context and character (Lynch, Banerjee and Southworth 1990: 250).
Appendix A

Map Version of the Survey — Buildings from 2008 (showing all classifications)
## Appendix B

Database Version of the Survey — Buildings from 2008 (classifications used)

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<td>Philosophical Hall - 1789</td>
<td>26</td>
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<td>Mixed Use</td>
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<td>Office and Photography Business</td>
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<td>Row-Historic</td>
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