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# An Exogenous Approach to Circumventing Demolition by Neglect: The Impact of Agricultural Preservation on Historic Colonial Towns

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# AN EXOGENOUS APPROACH TO CIRCUMVENTING DEMOLITION BY NEGLECT:

# *THE IMPACT OF AGRICULTURAL PRESERVATION ON THE HISTORIC FABRIC OF COLONIAL TOWNS*

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***ABSTRACT***

*The effects of city decentralization and counter-urbanization of the American landscape have resulted in simultaneous negative impacts on both historic structures and agricultural landscapes. Rapid conversion of farmland has helped to facilitate the relocation of both populations and commercial activities in communities across the United States, leaving inner cities replete with functionless, unused, and unmaintained heritage structures. As civic core areas have become shells of their former selves, many once-vital structures have been removed while others have been abandoned and left to decay—a process known as demolition by neglect. While historic preservation efforts have attempted to salvage these historic structures, these efforts have initially focused on the preservation of each buildings individually, based on its historical value and architectural merit, not taking into account its role in a constantly changing contextual landscape. Attempts to counteract this process and the negative effects of fringe developments through land preservation have also gained momentum since the 1970s. In response to growing concerns about the climbing rate of neglected historic structures, this dissertation considers the factors that affect ways to measure and sustain the viability of these structures while also protecting their historical integrity. Using multiple case study comparisons based on indicators obtained from viability and historic integrity models, this study compares the characteristics of demolition by neglect of living heritage sites within colonial towns to determine whether the preservation of peripheral agricultural lands has aided in decreasing the rate of this neglect.*

***DEDICATION***

*….for Sherry Leigh Meadows*

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# Chapter 1

## DEMOLITION BY NEGLECT: CURRENT MEASURES OF PREVENTION AND RESULTANT QUESTIONS

### *Introduction*

Jane Jacob's book, *The Death and Life of Great American Cities* (1961), advanced the notion that historic buildings and neighborhoods made a significant contribution to the economic health, livability, and aesthetic value of cities. Jacob's argument that the physical attractiveness and mixed uses that historic buildings provide to towns also contribute to their overall economic and social success became a major theme of many future downtown plans. The predominant tenent for the management of cultural resources in the United States is the process of documenting and either continuation or reuse of structures and sites, known broadly as historic preservation. The enactment of the National Historic Preservation Act in 1966 emphasized, primarily, the architectural merit and cultural and aesthetic values of these structures. But that rationale carries an inherent weakness: the resulting plans are based on a philosophy that values architectural merit and historic integrity over utility and viability. Thecurrent range of policies to help manage historic buildings or historic districts still only attempts to deal with the problem within these contexts—i.e., by saving each individual building one at a time. Rather than examining external (i.e., related to broader regional development planning) approaches to help manage this dilemma, the current movement in historic preservation simply shifts preservation efforts to a larger scale. Those who were once satisfied with individual buildings and districts now speak of preserving entire landscapes (Francavigilia, 2000).

Large-scale, community-wide preservation has been highly criticized and does not address the cultural landscape as an entity situated within a constantly changing, interrelated system of causal mechanisms.

Parallel to this dilemma in the city core, attempts to preserve peripheral areas, thereby slowing decentralization and sprawl and helping to sustain the inner cities and towns where historic structures are generally located, have become increasingly popular. However, there is currently little understanding of the effect of these land use management strategies on cultural landscapes and, in particular, whether these efforts have helped to slow the decay of historic structures to the point where demolition is cheaper than rehabilitation, a process referred to as "demolition by neglect." The present research study establishes measures to assess and monitor the process of "demolition by neglect" of individual historic structures and applies those measures to three historic colonial towns to examine any correlation between agricultural preservation and demolition by neglect.

***Problem Statement***

The American landscape has been transformed from a place dominated visually by agricultural plots into a land whose image is devoted almost completely to the automobile. As Jackson (1997) stated, "What was once the agro-vernacular landscape has now become the auto-vernacular." Historically, the peripheral belts of American towns were dotted with working farmlands. Construction of transportation networks into the hinterlands of metropolitan areas opened these lands up for development by

connecting them to their urban counterparts. Although these improved transportation connections initially spurred new farmsteads by allowing for easier sale of produce, once the frontier line was established and infill settlement began, the rapid conversion of farmlands began to occur. A five-year study conducted by the Transportation Research Board and the National Research Council on the costs of sprawl (Transportation Research Board, 2002) identifies urban decline and land conversion as two of the primary, interrelated consequences of the sprawling American landscape. Because major concentrations of historic structures are located in urbanized centers, these two outcomes must be addressed simultaneously in order to reverse the process.

The historic resources of our American cities are disappearing at an accelerating rate. Historic preservation efforts have attempted to reverse this trend by enacting various local preservation ordinances. These include financial incentives, interim zoning controls, design review strategies, transfers of development rights, incentive zoning, and the application of floating zones such as historic districts (Collins, Waters, & Dotson, 1991). Unfortunately, because these strategies are internally oriented and do not address contextual change, they seem to be only delaying the inevitable demise of historic structures (Jigyasau, 2003). Our landscape may be the richest historical record we possess, but many of the remaining fragments of our past ways of life are threatened by removal due to decay and neglect. As vitality (people) and viability (function) flee to the peripheries of our towns, the result is a propensity to remove heritage structures that have deteriorated due to a lack of utility. Preservationists have coined the term “demolition by neglect” to refer to this process.

Demolition by neglect (DBN) is defined as the destruction of a heritage landscape or area through abandonment or lack of maintenance (Goldwyn, 1995). This epidemic is a recognized challenge both globally and nationally, as the number of demolition applications being submitted continues to rise (Wallace & Franchetti, 2007). Goldwyn (1995) noted its severity 15 years ago:

> "The State Preservation League of New York held a conference on DBN in 1993, the National Trust for Historic Preservation included this as a topic for a panel discussion and presentation at the 1994 national convention in Boston, MA, and the United States Preservation Commission Identification Project report, released in 1994, listed it as the most difficult situation for local commissions to solve, with only 25% of respondents reporting that they have the authority to protect designated structures from demolition by neglect."

There are two different approaches to protecting the cultural landscape. Historic preservationists often apply the classical understanding of cultural landscape that originated in the 1920s with renowned cultural geographer Carl Sauer. Accepting the National Park Service's formal definition of the cultural landscape as "a geographic area associated with a historic event, activity, or person or exhibiting other cultural or aesthetic values" (Alanen & Melnick, 2000), preservationists seek to retain material remnants of the past and concentrate on the appearance of material culture. This premise still views the cultural landscape as a stable product. By concentrating on historical significance and integrity as cornerstones for designation, preservationists sometimes ignore the larger context within which this material culture resides and, more importantly, the impact of changes within this context.

A newer version of cultural landscape studies has altered the interpretation of historic structures, viewing them as part of a progression rather than simply as artifacts.

The field of cultural geography has changed the meaning of landscape from a noun to a verb (Riesenweber, 2008). The problem with cultural landscapes is not within specific buildings and infrastructure, where historic preservationists attempt to address the quandary, but in the swiftly developing outskirts of our cities to which the structures are inescapably connected. This rapidly expanding, decentralized growth is spreading a homogenous form across the landscape and destroying multiple layers of cultural history in its wake (Yahner and Nadenicek, in press). Edge cities, strip malls, and suburban development pull population and building functions away from historic cores, generally resulting in the eventual removal or demolition of these structures. As long as the fringe areas continue to welcome corporate office parks, along with the residential and commercial development they generate, our historic inner cities will continue to rot at their cores (Daniels, 1999). Preservationists, therefore, must begin to value viability as well as aesthetics.

> "Failing to plan for and manage growth, or leaving the fate of cities to the random collision of economic forces, is likely to result in the destruction of our historic places and in diminished cities. … We must look beyond traditional preservation ordinances and landmark commissions to address those planning forces that have the most influence over their city's future development (Collins, Waters, & Dotson, 1991, p. 8)."

Demolition by neglect has especially impacted living heritage sites, where remains from the past exist in a new living environment (Jigyasau, 2003). Living heritage sites are not preserved as ruins, but are enduring units of history which, despite the continuing evolution of their setting, have managed to retain their historic character in the landscape. The living aspects of cultural landscapes are contingent upon the rituals and practices, skills and crafts, performing arts, vernacular building systems, and

ecological systems that characterize the way of life of the inhabiting population and local peoples, which have evolved over time and are still surviving in similar or modified form (Jigyasau, 2005). It should be noted that the international preservation community uses the term "living heritage site" a term which refers to the preservation of historic buildings, historic structures, and cultural landscapes within active and engaging existing environments. The American preservation community acknowledges this terminology, but does not commonly utilize it. In this paper, the term living heritage site is used in its international context.

As Jigyasau (2005) has explained, living heritage sites have two fundamental dimensions; the first deals with aspects of integrity, and the second deals with their relationship to the living environment in which they exist. It is important to examine both locality and context to fully understand the process of preserving such sites, yet contemporary preservation policy still tends to overlook contextual issues. Most risk factors threatening living heritage sites are progressive, making these historic treasures increasingly vulnerable to the current trend of growth in the United States. These risks extend into all portions of the landscape, but they are especially present in areas where development pressures and urbanization have occurred. These historic areas have not received the attention and support they deserve to maintain their viability, protect their structural integrity and heritage value, and stimulate their local economic base as their populations undergo various incremental processes of transformation (Jigyasau, 2005).

Hence, the current efforts involved in the historic preservation of cultural landscapes demand a new paradigm which will expand the magnitude of the population

that preservation efforts attempt to influence. Preservation efforts need to move beyond saving single objects of historical or aesthetic significance to the broader context of rural and urban planning (Cook, 1996). A systems approach to landscape preservation will require not only the recognition that the cultural landscape is only one part of a living environment, but also assessment of the political, economic, and natural processes that shape it. We must, then, view the entire landscape as a collection of links within an entire dynamic network of interacting processes.

The protection of the cultural landscape is not just a product (i.e., the safeguarding of individual structures), but a process. This process needs better documentation and longitudinal studies that link data together to form stronger theories on how to manage and sustain historic sites. Also, there is a lack of statistical data about the condition of historic landscapes (Jigyasau, 2005). Because historic studies generally deal with archival research, quantified evidence of the effects of landscape change on cultural landscapes has yet to surface. While environmental reports and economic studies for new developments are the responsibilities of local authorities, comparable steps for the systematic recording and documentation of heritage properties have yet to be established.

***Rationale***

This study has two purposes: to establish an index that can measure and document the process of demolition by neglect, and to determine if limiting developmental opportunities on the periphery of cities through the preservation of agricultural lands as a land management scheme actually helps to retain their historic fabric by diminishing the

rate of neglect within these towns. Because farmlands are typically flat, well drained, and devoid of structural elements, they are cheaper to develop than other parcels and are generally easily converted from agricultural land uses to residential and/or commercial uses (Machado, Stoms, & Davis, 2003). Attempts to protect these peripheral lands as part of an overall land use management strategy are also endeavors to protect cities and rural towns from the effects of decentralization and counter-urbanization.

The national decline in functional farmland during the past half-century seems to parallel the decline in historic buildings and structures. American farmlands threatened by conversion and historic structures threatened by demolition frequently appear in adjoining areas across the country (see Images 1 & 2). Over 500 communities in all 50 states are facing risks to their historic structures (National Trust for Historic Preservation, 2008). The northeastern, western, and mid-western regions of the United States, as well as portions of Texas and Florida, are severely threatened by both farmland conversion and teardowns of historic structures. In fact, all states experiencing demolition of historic buildings are also threatened severely by farmland conversion, and nearly 75% of all concentrations of teardowns appear to overlap or lay tangent to the top 20 threatened agricultural landscapes (see Image 3).

The built environment does not exist in a vacuum; it is surrounded by a complex system of elements that support it and form its setting. The setting that encompasses our historic structures not only tells a portion of their story, but also forms the context that dictates their function. Although new construction within historic sites has received much debate, the historic context is not limited to neighboring sites. Development

patterns at the peripheries of our cities and towns also have a huge impact on these communities' inner cores. The ability of preservation standards to support both the viability of sites and their historic character increasingly depends on the establishment of effective processes to examine changes within the larger town or urban context (Alderson, 2006). However, because context is constantly in flux, form and function rarely coincide for very long in any environment (Jackson, 1997). Our present tendency is to give priority to form. Function relocation, however, has been identified as a primary cause of demolition by neglect (Goldwyn, 1995). Thus, the flaw in the existing prioritization is that, when a building's function is dissolved, too often the building's form itself is removed.

Historic preservation of aged structures prioritizes form to the extent that it can overlook the need for a structure to remain functional in its context. Goldwyn (1995) called this epidemic a "loophole" in preservation tactics. This loophole creates a situation where historic structures are placed in preservation programs but not utilized or maintained, thus ultimately resulting in their removal . This loophole stems from a discrepancy between the value imposed upon historic structures by preservationists and the inherent value attached to them by the owners of these structures (Goldwyn, 1995), who do not necessarily see their historic nature as an essential attribute to protect.

Decay of a structure is inevitable; it is the expression of its duration through time. This decay can actually add character to structures and can even be a creative intent of a designer. Demolition by neglect, on the other hand, occurs when an owner lets a building deteriorate until it becomes a structural hazard and then turns around and asserts the

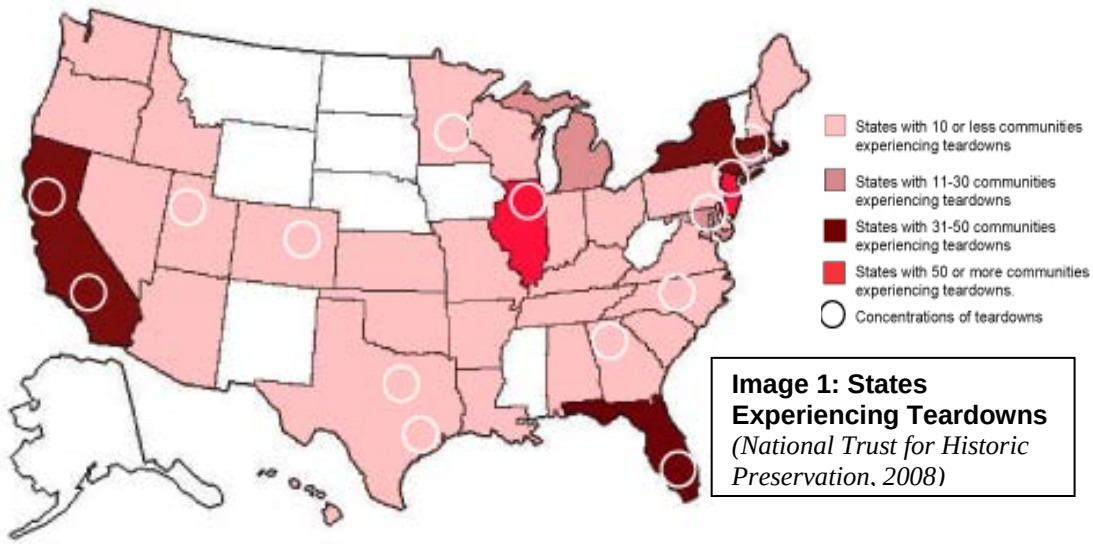


**Image 1: States Experiencing Teardowns** *(National Trust for Historic Preservation, 2008)*

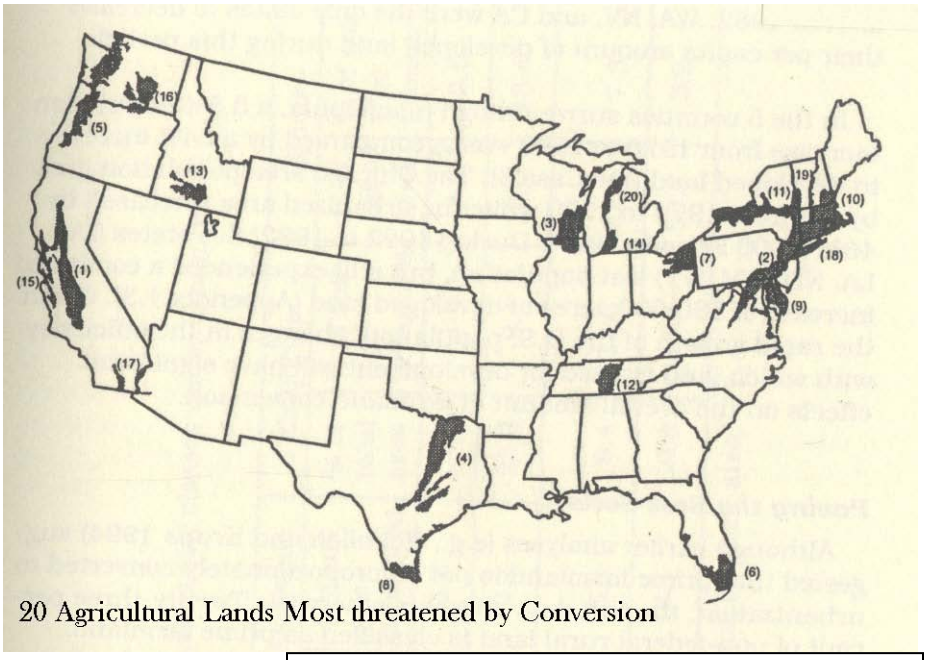


**Image 2: 20 Agricultural Lands Most Threatened by Conversion** *(Olson & Lyson, 1999)*

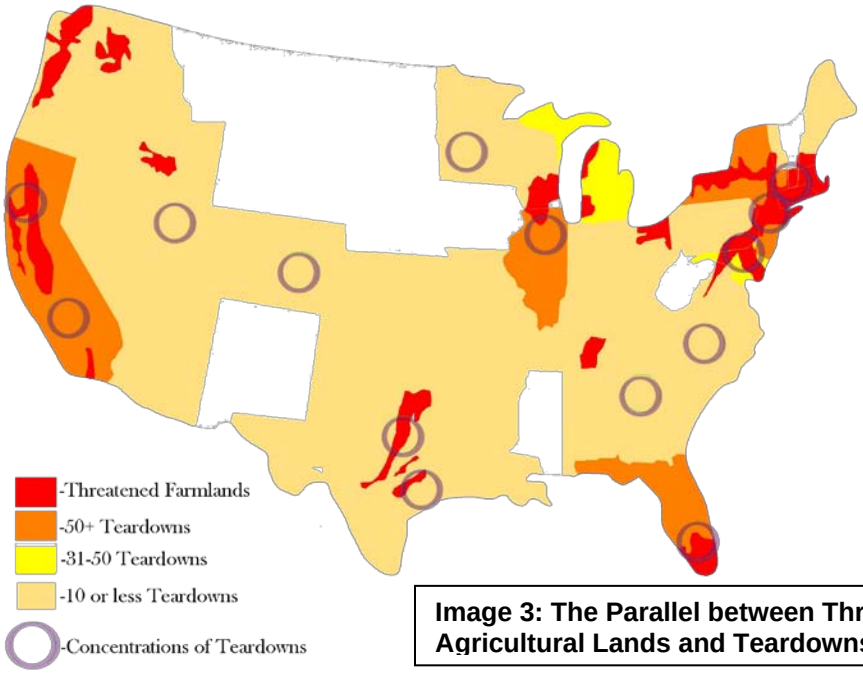


**Image 3: The Parallel between Threatened Agricultural Lands and Teardowns**

building's advanced state of deterioration is the primary reason to remove it. Causes include deferred maintenance, developmental pursuits, absentee ownership, circumstantial outcome, and function relocation, while deferred maintenance and function relocation are the primary causes (Wallace & Franchetti, 2007).

The process of demolition by neglect directly contradicts the traditional philosophy of historic preservation in America (Goldwyn, 1995). For example, preservation policy places a value on factors long considered intangible, such as architectural merit or societal importance. Preservation philosophy demands that property owners recognize and accept this value. Value, however, is contingent upon interpretation and the value that preservationists place on a structure is not always the

same as the value that the owner may have for it. Despite substantial restrictions on the demolition of historic buildings imposed by local historic preservation ordinances, many historic properties are destroyed each year as a result of conscious efforts by their owners to avoid the application of these restrictions (Pollard, 1989). This is primarily due to a contradiction of values and deferred maintenance of these properties.

Our tendency to destroy old forms justifies the preservationist movement to an extent in the sense that these forms are unique and cannot be recreated. However, the landscape is a continuum. Our towns must also be flexible enough to absorb some modernization to cater to the local populace and functional economy. The preservation of buildings can sometimes sever the cord of civic progression, resulting in museumized relics and artifacts within the landscape. This tendency is especially true with regard to living heritage sites.

The primary concern in managing historic core areas has been to develop strategies to restore the original rationale for their existence (Jackson, 1997). Despite this premise, the evaluation of aesthetics is still the foundation of the preservation of historic structures. The viability or ability of these structures to attract future investment into their surrounding areas must also then be included within an assessment of neglect, because their lack of viability, not their lack of historic integrity, is leading to their removal.

Since the passing of the National Historic Preservation Act of 1966, the pace of historic preservation activities has vastly increased (Longstreith, 2008). But because historic preservation has been accused of “freezing landscapes in time” (Cook 1996), it is

not always the appropriate tool to achieve such a large goal, especially on such a dramatic scale. The restrictive laws and guidelines imposed by historic preservation regulations can place too much strain on large-scale landscapes, which need some modern amenities to serve society's current needs. As Cook (1996) wrote, "The preservation of cultural landscapes makes them no longer relevant to their occupying culture, but simply historic remnants of a population whose time has passed." Landscapes are different places based in part on their ability to change (Melnick, 2000). A landscape's ability to remain in flux also sidesteps many criticisms lodged against historic preservation efforts, such as historical pluralism (Clay, 1976); the inaccuracy of historical narratives (Lowenthal, 1998); the impossibility of complete preservation of a landscape due to interaction (Lowenthal, 1985); and the devaluation of non-historic structures (Cook, 1996).

Since the early 1970s, strategies to preserve developable lands on the outskirts of American towns have been used to channel developments into desired locations. This is an "external" approach to combating urban decline by controlling sprawling development patterns. This premise was amplified profoundly by Thomas Hylton's *Save Our Lands, Save Our Towns* (1995), which called for the implementation of massive land preservation strategies on the swiftly developing outskirts of Pennsylvania cities.

Because farmlands are usually the first parcels to be developed by land speculators and private investors, the primary intent in preserving them is to limit the process of decentralization. The emphasis on farmland retention in the last 40 years has brought numerous benefits, such as slowing the effects of suburban sprawl, providing a productive land base for the agricultural economy, maintaining rural character and

amenities, protecting wildlife habitat, and providing an opportunity for groundwater recharge in overly developed areas (Bromley & Hodge, 1990; Duke & Aull-Hyde, 2002; Fischel, 1985; Lynch & Musser, 2001; McConnell, 1989; Wolfram, 1981). Multiple studies have examined the ecological and economic effects of agricultural preservation, but there has been little study of the cultural benefits of preserving farmlands. No studies have determined whether a correlation exists between peripheral agricultural preservation and its impact on the cultural landscape. Also, little attention has been given to the effects of peripheral agricultural preservation on inner cities and towns. Most studies concentrate mainly on lands adjacent to the preserved parcels.

***Research Questions***

*Primary:*

Has the preservation of peripheral agricultural lands helped to decrease the rate of demolition by neglect in colonial town centers?

*Subsidiary:*

1. Does agricultural preservation help to decrease function relocation?
2. Is there a decrease in deferred maintenance of historic structures as the amount of preserved farmland increases?
3. Does an increase in the viability of historic structures require a decrease in the historic integrity of their preservation?

***Hypotheses***

H0: There is no relationship between the amount of preservation of peripheral agricultural lands and the rate of demolition by neglect of the historic fabric within a city or town.

HA: Preserving peripheral agricultural lands aids in decreasing the amount of demolition by neglect of historic structures within a city or town:

- As peripheral preserved farmland increases, there is a lower frequency of historic structures neglected.
- As peripheral preserved farmland decreases, there is a higher frequency of historic structures neglected.

# Chapter 2

# FARMLAND PRESERVATION AS A LAND USE MANAGEMENT TECHNIQUE: THEORY AND IMPACTS

## *Introduction*

Because this study is attempting to correlate the preservation of farmland and a decline in demolition by neglect, it is important to understand the theoretical evolution of historic preservation and how the proposed paradigm shift in preservationist philosophy suggests that the cultural landscape should be studied as a system. The rift between historic preservation theory, which views the cultural landscape as a stable product, and cultural geography, which interprets the cultural landscape as a system, needs to be hybridized to produce a systems theory which helps to retain both the historical integrity and the viability of historic buildings and structures.

## *The Need for a Paradigm Shift in Preservation Philosophy*

Although both cultural geography and historic preservation stemmed from Carl Sauer's coining of the term cultural landscape, the theoretical evolution of each discipline has dichotomized with one field interpreting landscape as a system (cultural geography) and the other interpreting landscape as a singular entity (historic preservation). The field of cultural geography has changed the meaning of landscape from a noun to a verb (Riesenweber, 2008). The epistemological evolution of cultural landscape studies changed its interpretation from being viewed as a stable artifact (Historic preservation) to a being seen as an ever changing continuum (cultural geography). Historic

preservationists often utilize the concept of cultural landscape that originated in the 1920's from Carl Sauer. Accepting the National Park Service's formal definition of the cultural landscape as "a geographic area associated with a historic event, activity, or person or exhibiting other cultural or aesthetic values (Alanen & Melnick, 2000)," preservationists seek to retain material remnants of the past and concentrate on the appearance of this material culture. This premise still views the cultural landscape as a stable product. By concentrating on historical significance and integrity as cornerstones for designation, preservationists can sometimes ignore the larger context which this material culture resides within and more importantly, the impact of changes within this context. However, this error is not addressed within most of the criticisms involved with historic preservation.

Edge cities, strip malls, and suburban development pull the population and building functions away from historic buildings, generally resulting in demolition of these structures either by removal, neglect, or a combination of both. As long as the fringe areas continue to welcome corporate office parks, along with the residential and commercial development they generate, our inner cities will continue to rot at their cores (Daniels, 1999).

Preservationists must then begin to value both contextual change and aesthetics. Stated in the original guidelines of the National Trust's Critical Issues Fund (CIF) in 1981 is for historic preservation to "play a responsible role in the processes that will decide the future for historic properties (Collins, Waters, & Dotson, 1991)." The CIF has actually begun to encourage efforts to weave preservation values into land use

management and zoning policy in order to limit demolition of historic structures. Hence, the current efforts involved in the historic preservation of cultural landscapes call for a new paradigm which will expand the magnitude of the scale in which it can be utilized to help salvage historic structures. As Cook (1996) believes, preservation efforts need to move beyond saving single objects of historical or aesthetic significance to the broader context of rural and urban planning. A systems approach to landscape preservation will require not only the recognition that the cultural landscape is only one part of a living environment, but also assessment of the political, economic, and natural processes that shape it. We must, then, view the entire landscape as a collection of links within an entire dynamic network of interacting processes. Understanding these processes will then provide preservationists with the knowledge to counteract neglect through precise external management strategies. These systems will then continually acquire new significance which can inform the present (Cook, 1996). The systems approach will require national, state, and local input as well as acceptance from the field that the landscape is a constantly altering continuum. Better management of this entire system along with the aforementioned small scale policies is the only way to prevent the removal of heritage landscapes while still allowing for growth within a living environment.

### *The Theory of New Ruralism*

The foundational premise behind Thomas Hylton's Plan for Pennsylvania (1995) was that, if we can cut off the primary opportunity for development in the outskirts of cities and towns, we can limit the negative effects of sprawl. As discussed in chapter 1,

the most attractive peripheral lands are predominately agricultural lands. What makes a land good for farming also makes it good for development (Machado, Stoms, & Davis, 2003). Agricultural lands usually are flat (0-5 percent slope) and well drained (high permeability and porosity), have low soil erodability, and are already cleared of vegetation. These characteristics make them extremely cost-efficient to develop. Hence, the rationale behind preserving farmlands is that preventing development of the largest source of suburban developable lands will significantly decrease the impact on the towns that these lands encompass. This is, essentially, the idea embedded in the increasingly popular movement known as New Ruralism.

New Ruralism is an offshoot of the urban design theory known as New Urbanism, a concept that attempts to reverse contemporary design patterns by using more traditional civic characteristics such as clustered buildings, pedestrian-friendly circulation, and historic-inspired architecture while connecting such developments within an existing system of urban districts and villages. New Ruralism, conversely, attempts to achieve these standards within rural townscapes by disallowing development within the peripheries of these localities. Krauss (2006) defined the term as "the preservation and enhancement of urban edge rural areas as places that are indispensable to the *economic*, *environmental*, and *cultural* vitality of cities and metropolitan regions." The intent is to establish permanent agricultural preserves as places that both preserve rural life and help to contain and sustain cities.

This theory is the newest attempt to generate a framework for creating a bridge between agriculture and urbanism (Krauss, 2006). Like New Urbanism, New Ruralism

attempts to reverse contemporary patterns of private development by promoting traditional small-town values. Its primary concern is to find the best methods to protect rural lands threatened by urban influences. New Ruralism also draws from past models to test contemporary societies. By drawing on past models, the theory assumes the need for a shift back toward former ways of developing and designing cities. This theory, then, attempts both to reverse the current process of suburbanization and to promote the creation of more traditional-style landscapes. By doing this, its advocates contend, we can hope to rediscover an intimate connection with the land that was once at the heart of American rural communities—our farmlands (Moffat, 2006).

Although no specific discipline has laid claim to this theory, New Ruralism could prove beneficial to both farmland protection and the slowing or prevention of urban decay. The present study thus uses New Ruralism as a cultural lens by which to examine landscape effects. Continuing the theoretical evolution of cultural landscape studies, which now emphasizes the nature of the cultural landscape as a system (Cook, 1996), New Ruralism could prove to be a major advance in the struggle against the demolition by neglect of historic structures.

### *Definitions of Key Terms*

**Cultural landscape** – a geographic area associated with a historic event, activity, or person or exhibiting other cultural or aesthetic values (Alanen, 2000).

**Rural** – lowly populated regions outside of large metropolitan areas (Arendt, 1999; U.S. Census Bureau, 2009).

**Colonial** – referring to early American places whose origins range from the 1600s to the 1800s and which are rooted in mother countries but adapted to the materials and uses of the inherent populace.

**Peripheral** – those portions of landscapes that lie outside of the urban boundaries of cities (Arendt, 1994; Olson & Lyson, 1999; Jackson, 1985).

**Agricultural preservation** – the setting aside of cultivated and tilled or livestock feeding lands as to limit or disallow the development that can occur upon them (Olson & Lyson, 1999).

**Historic integrity** – the ability of a landscape to look similar to how it looked initially or at a historic period due to a rigid adherence to a code of behavior (Howett, 2000).

**Teardown** – the practice of demolishing an existing building to make way for a new development (National Trust for Historic Preservation, 2009).

**Demolition by neglect** – the destruction of a heritage landscape or area through abandonment, lack of utility, or lack of maintenance (Wallace & Franchetti, 2007).

**Viability** – the ability of a structure to attract investment (Ravencroft, 2000).

**Function relocation –** the transfer of the functional use of a historic building to another area, thus leaving the structure functionless and usually vacant (Goldwyn, 1995).

**Deferred maintenance –** failure to maintain a building to the extent that rehabilitation becomes less cost-efficient than new construction; this is a tactic sometimes used to circumvent regulation aimed at protecting historic properties (Wallace & Franchetti, 2007).

**Rate of neglect –** the proportion of a given landscape that has undergone some form of neglect.

**+Historic preservation** – the act or process of applying measures necessary to sustain the existing form, integrity, and materials of a historic property (Birnbaum, 2007).

**Rehabilitation** – the act or process of making possible a compatible use for a property through repair, alterations, and additions while preserving those portions or features that convey its historical or cultural values (Birnbaum, 2007).

**Restoration** – the act or process of accurately depicting the form, features, and character of a property as it appeared at a particular period of time by means of the removal of features from other periods in its history and the reconstruction of missing features from the restoration period (Birnbaum, 2007).

**Reconstruction** – the act or process of depicting, by means of new construction, the form, features, and details of a non-surviving site, landscape, building, structure, or object for the purpose of replicating its appearance at a specific period of time and in its historic location (Birnbaum, 2007).

*Literature Map*

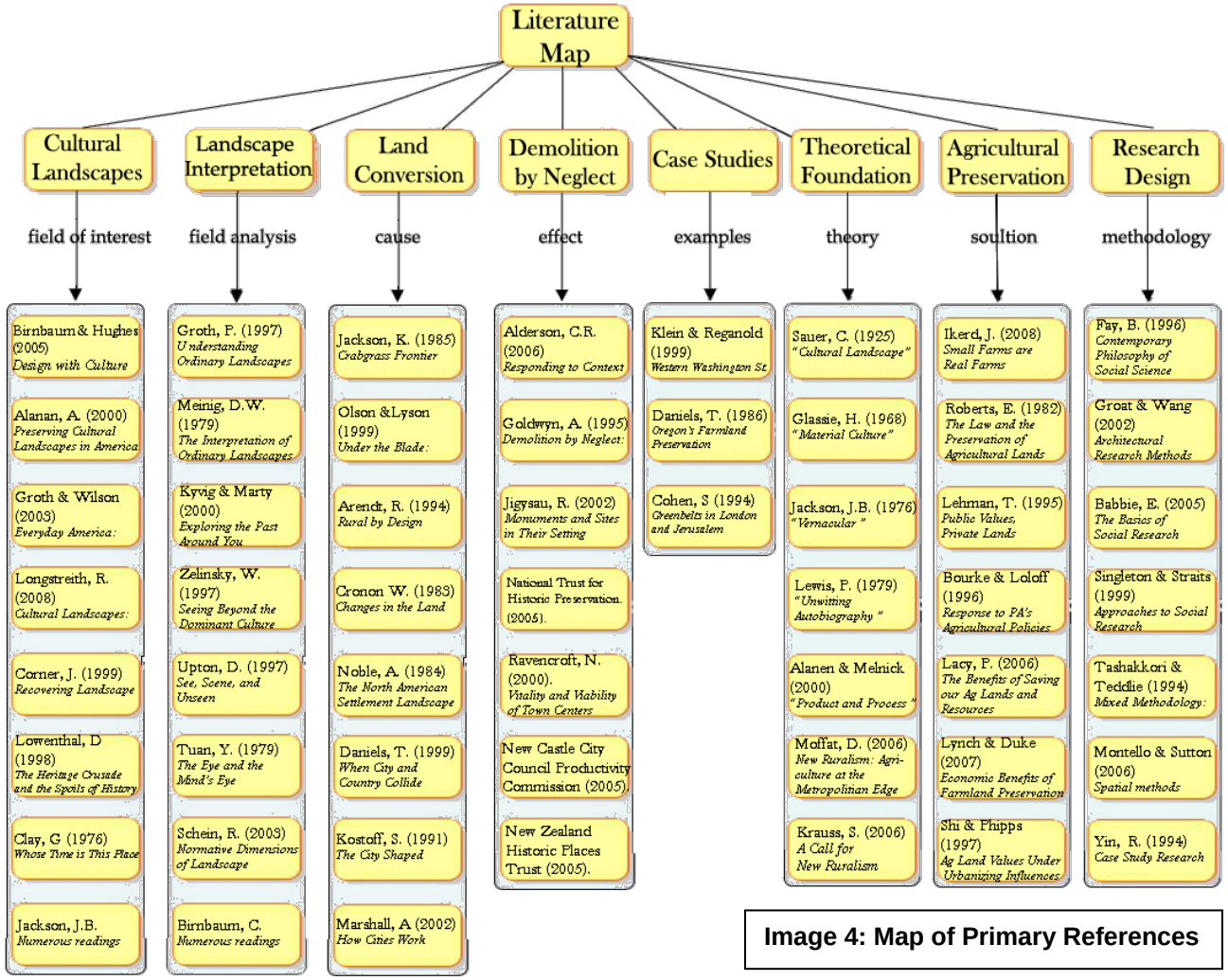


**Image 4: Map of Primary References**

### *The Impact of Farmland Preservation*

Because the theory of New Ruralism has been used in this study, the following analysis is categorized into economic, ecological, and cultural sections consistent with the theory's framework for generating civic vitality. The current literature is replete with economic and ecological studies on the impact of farmland preservation. Research on the cultural impacts of farmland preservation, however, are scarce and tend to primarily deal with the loss of customs which are consistent with the practice of farming, not the impact of the preserving a structures setting on the structures themselves (see Image 4).

#### *Economic*

Contemporary journals are replete with economic studies on farmland preservation. Most studies have focused on changing development patterns, local economies, land values, and taxation. The rationale behind these numerous studies lies in the economic concerns inherent in all land use changes. If a change makes sense fiscally, in most cases it will eventually occur, unless blocked. The irony of this position is that rural character, scenic beauty, and wildlife habitat are the most frequently mentioned objectives of agricultural preservation, but none of these are among the criteria used to evaluate lands for protection (Lynch & Duke, 2007). The cultural and ecological value of preserving farmland is usually interpreted through an economic lens, more specifically tourism revenue. Many studies have shown that preserving the agricultural industry provides open-space attributes and rural amenities that can attract tourists by creating a scenic landscape that stands in stark contrast to its surroundings (Lynch & Duke, 2007). This tourism money, in turn, enhances local economies.

Agricultural preservation is even more economically attractive because farmland preservation programs have been found to benefit the local economy but have no negative impacts on economic development opportunities (Lynch & Duke, 2007). The preserved parcels may limit the amount of land that can be developed, but no studies have concluded that the economic viability of surrounding lands was negatively impacted. In fact, in some areas the opposite has occurred, as developments have tended to cluster around the preserved parcels (Roe, Irwin, & Morrow, 2004).

Whereas the premise of agricultural preservation programs was to limit suburban developments, some studies have shown that they may have created a double-edged sword for themselves (Machado, Stoms, & Davis, 2003; Roe, Irwin, & Morrow, 2004; Shi & Phipps, 1997). On one hand, specific lands have been carved out of the landscape as nondevelopable parcels. On the other hand, the preserved parcels act as a magnet attracting future housing development, because many studies have concluded that people will pay more for houses near preserved farmlands (Bromley & Hodge, 1990). Thus the positive amenities generated by farmland preservation programs also increase the demand for housing near the parcels.

As housing values increase, local taxation revenues also increase. However, expanding populations in the urban fringe also produce a need for public services, and thus tax rates increase in the peripheral lands to pay for the needed new infrastructure (Stocker, 1963). So, although tax revenues increase, they generally only do so because tax rates have increased as well.

Land values follow this same pattern. A study based in West Virginia using gravity models comparing farmlands and urban areas showed that farmland is priced well above its agricultural value (Shi & Phipps, 1997). Gravity models define the extent to which a particular locality can pull capital from surrounding cities and were used in this case to show that, within these boundaries, farmlands were generally sold at their development potential price, rather than their agricultural value. This premium is due to the fact that the very qualities that make some lands productive for agricultural crops also make them suitable for urban growth (Machado, Stoms, & Davis, 2003). In a similar example, in Lancaster County, Nebraska, whereas farmers were paying $1,500 per acre for good farmland, developers were offering double that price for lands within 15 miles of the city of Lincoln (Olson, 1999). Thus, proximity to urban lands also becomes a dominating factor in the land values.

Nickerson and Lynch (2001) tested the effects of development restrictions imposed by permanent easement sales on farmland sale prices. They found that, while land values increased around preserved parcels, the parcels themselves actually had lower values. In other words, the sales price for preserved agricultural lands becomes significantly lower than that of unpreserved lands (Nickerson & Lynch 2001). This result is presumably because, once the farmlands are included within a preservation program, they have no development potential other than for agriculture. So, as land values of adjacent properties increase, the actual value of the preserved parcels themselves decreases.

As previously noted, fringe areas with an abundance of preserved farmland can actually attract residential development. Roe, Irwin, and Morrow (2004) conducted a proximity study using what they defined as key neighborhood characteristics (such as parks, quality, safety, and scenic amenities) and found that these qualities were actually clustered around many preserved farmlands. Moreover, preservation programs can alter buyers' expectations of their properties, because land purchasers are willing to pay more for the inherent stability of nondevelopable and scenic surroundings. It seems as though preserving farmlands, although an attempt to limit development, serves the landscape best by simply funneling growth into specific areas.

*Ecological*

The idea of federal farmland protection policies actually surfaced as one part of the larger environmental movement in the 1970s (Lehman, 1992). Both ideals are threads of the same historical rope. The general concern for more ecological land use patterns, expounded by Aldo Leopold in the 1940's, led to worries about soil erosion and the land-consuming effects of suburban sprawl, as well as about the destruction of vegetated lands and animal habitats due to development. Thus agricultural preservation was originally motivated by ecological concerns. In fact, much of what we know about how populations and communities of plants and animals interact stems from experiments conducted in agricultural settings, which are relatively easy to manipulate (Banks, 2004). The two fields not only have a shared heritage, but have been studied simultaneously to gain new knowledge relevant to both.

This partnership between agriculture and ecology has led to an actual combination of ideologies in "agro-ecology," which connects large areas of vegetation to agricultural lands to create biodiversity corridors known as agro-ecosystems for wildlife movement (Vandermeer, 1995). Generally, in ecological corridor creation humans are not regarded as natural elements absorbed within the envelope of biodiversity, but are seen as unwelcome intrusions. One unique feature of this agro-ecological interconnection is that, with the use of working farmlands, humans become included under the umbrella of biodiversity.

The National Park Service has also used farmland preservation to enhance its parklands. The partnership of agricultural lands and natural areas to form networks of biodiversity has been practiced only since the early 1980s. Many national parks have adopted this practice, using federal, state, and local programs. Cuyahoga Valley National Park in Ohio began leasing historic farm properties to prevent edge developments from infringing on the rural character of the parklands (Jones & Jones, 2008). Park managers had become concerned with safeguarding the rural landscape's scenic quality, as edge developments began to obscure the fringe regions of the park. Long-term leasing of agricultural parcels created a buffer zone around the park, giving it a wall of enclosure that served as a barrier to edge developments.

Another instance where agricultural preservation and ecology have attempted to serve the same purpose is the New Jersey Pinelands National Reserve in southeastern New Jersey, which was designated by Congress in 1978 as the nation's first national reserve (Jones & Jones, 2008). With over one million acres of forest, its primary goal

was to protect the region's natural and cultural resources by using transfers of development rights to protect more than 12,000 acres of farmland. The resulting funneling of development into desired areas not only increased density in specific regions but also helped to achieve other planning goals, such as producing compact, walkable communities where urban services could be located (Jones & Jones, 2008).

These scenarios serve as small-scale examples where peripheral agricultural preservation has preserved the character and integrity of an interior core. Although these interiors were natural, built environment can profit from the application of similar strategies. Agricultural preservation is an ally of ecological sensitivity because both share a common enemy: sprawling development. The ability of landscapes to sustain themselves is, thus, an ecological imperative.

One argument against farmland preservation presented by environmentalists is that farmlands are semi-monocultures that cater only to a specific group of animals, thus decreasing diversity. Many environmentalists argue for the conversion of agricultural lands back to forested areas. The primary means of agricultural regression back into forests is development. As urbanization passes over agricultural land, farm investments and production decline, urban land uses appear on the landscape, and the agricultural lands revert to woodlands (Vogel & Hahn, 1972). Also, the small amount of plant and animal diversity is still more ecologically sensitive than the allowance of development for private gain. Wegner and Merriam's (1979) study of animal movements even showed that the edges of farmlands and woodlands are heavily used lines of mobility for small mammals and birds. Against this objection, other commonly cited ecological reasons for

farmland preservation include flood absorption, air cleansing, water filtration, spatial definition of urban areas, and growth management (Machado, Stoms, & Davis, 2003). Despite these proven benefits, however, another ecological problem remains: farmlands produce high amounts of pollution and other environmental costs. For example, a two-year study of six southeast Wisconsin watersheds determined that runoff from agricultural lands is the most widespread source of phosphorus contamination in streams, rivers, and lakes (Reed & Carpenter, 2002). Agricultural lands are the second-leading contributors to non-point-source pollution, following developed areas. To decrease runoff pollution, it is best not only to locate the agricultural lands in the best places, but to cooperate with environmentalists rather than compete with them. Riparian buffer strips and wetland restorations can also act as natural filtering systems that help to significantly decrease these pollution rates.

The main reason for the high pollution rate is not the amount of farmland utilized, but the amount lost to development. Human population expansion increases market forces that prompt the conversion of farmland into suburban and commercial uses. Since developers do not take soil fertility into account when purchasing land, many of the highest-quality agricultural lands have been built upon or paved over (Hylton, 1995). The problem resulting from this conversion is that lower-quality agricultural lands are forced to compensate for the lost acreage; these lower-quality lands require greater input of chemical fertilizers and water for viable production. Thus, it could be argued that, if we protected more farmland, the problem of agricultural pollution would be restrained.

*Cultural*

Agricultural lands are the result of the collision of the human and non-human. They are portions of nature ordered by human caretakers and living expressions of the natural benefits of cultural stewardship. Inherently, agricultural lands are cultural landscapes. These historic vernacular landscapes not only serve as the setting for many of our historic structures, but also have symbolic underpinnings that stem from the original colonial settlement of the New World.

European agricultural settlements brought a sense of permanence to the nomadic communities that Native Americans had occupied. The mobile Native American cultures either adopted the practice of farming or lost their lands. Hence, agriculture was the stabilizing factor in early community settlement (McNealy, 2001). Also, many early communities produced only enough yields from their agricultural plots to feed their own communities. All early colonial settlements began as self-reliant, self-regulating communities. They even served as the first social realms of early colonial towns. Most American rural colonial farmstead communities were laid out as six-square-mile plots organized around two roadways, with a church and a meeting house at the center, although there were variations within this pattern (McNealy, 2001). Surrounding the core of town development was an agricultural belt. Because the communities sustained themselves through farming, the farmlands were the main place where people worked and socialized. As populations increased and settlements spread outward, new communities sprouted up and were interconnected by farmlands. They served not only

the laboring lands, but also as the first open spaces of cities and places where the populace would interact and socialize.

Today, working agricultural landscapes preserve the classic early American community structure (Olson, 1999). By preserving these workable lands, we also preserve the specific traditions and customs that have come with working them. Moreover, farmland preservation is a land use issue and, as such, is strongly influenced by cultural traditions and laws (Machado, Stoms, & Davis, 2003). Not only does agricultural preservation preserve cultural traditions, but the farmlands themselves are dependent upon cultural values. Thus preserving this use also preserves the interactions and customs related to it.

One of these customs is an integration of people and land with local economies. Noneconomic public benefits such as open space, maintenance of traditional lifestyles, and provision of locally grown food are also preserved along with the unique cultural icon that is the farmer (Roe, Irwin, & Morrow, 2004). Therefore, agricultural preservation protects both populace and property.

Another benefit is the enhancement of historical knowledge. Preserved farmlands serve as parcels of historic occurrences. We cannot fully recall historic events without their settings. One-third of the Civil War battlefields, mostly fought on farmlands, have faced threats from development, and the number is currently on the rise (Olson, 1999). Altering our landscape settings obscures our past, thus corrupting our present and depleting our future. Too often we rely on the preservation of only structural elements, creating museumized relics that obtrude the function of contemporary landscapes.

Because the surrounding context of these structures is left free for alteration, the structures become isolated islands, sticking out as decontextualized artifacts within an ever-changing and morphing society. Only select portions of history are remembered.

A third cultural benefit of agricultural preservation is the transfer of value and knowledge between generations. Farmland ownership is dominated by the elderly, ensuring a high rate of turnover and instability in ownership in years to come. The passing of farmlands to a new generation with different values from its predecessors may exacerbate the rate at which farmlands are developed. In fact, 78% of families who preserved their farms did so not for tax incentives or economic motives, but simply to keep them in the family (Lynch & Duke, 2007).

*Case Studies*

The utility of agricultural preservation as a means to counteract the effects of sprawl is not a novel idea. The practice has been utilized by various local and state governments with mixed results. The following section is an assessment of three cases which have utilized farmland preservation in combination with other land use management strategies as a means of limiting the negative effects of suburbanization of their landscapes.

***Western Washington State (****Klein & Reganold, 1999****).*** With a population density three times greater than the Eastern portion of the state, western Washington State is facing extreme pressure to convert agricultural lands to nonagricultural uses. Absorbing these pressures of development change are 33% of the state farmlands. Between 1974

and 1992, more than 80% of the state's total population increase occurred in Western Washington.

During the same time period, the number of farms in the region declined by 20% while average farm sizes continuously shrank. Of the total decrease in farmland during this time period, 96 percent resulted from the sale of land by actual farm operators, who were forced to sell because they could no longer meet their farmstead's economic requirements. In most cases, the buyers would rent the lands to the farmers at a cheaper rate until land prices increased and they could sell to developers at a profit. A survey of 14 planning departments in western Washington during the study also indicated that increases in land value and property tax assessments were pressuring farmers to sell their properties. Urban expansion, however, also proved to be an indirect cause of decline in agricultural lands. New stringent environmental regulations to counteract the impact on urban expansion required expensive and complex measures to control pollutant discharge rate and animal waste removal, thereby increasing the financial costs of compliance and encouraging farmers to sell out to developers.

Contrary to common assumptions, Klein and Reganold (1999) observed that population increases are not always associated with loss of farmland. For example, in one four-year period covered by the study (1978-1982), both population and farmland increased, and the highest population growth period (1987-1992) did not correspond with the highest farmland decline.

Klein and Reganold (1999) stated that, despite the farmland protection strategies in place, too little consideration had been given to population pressures and, more

specifically, to the economic, political, and cultural forces that influence the discontinuance of farming. Although protecting agricultural lands according to soil quality makes some environmental sense, many other factors in our complex landscapes must be analyzed in order to produce desirable outcomes.

***Greenbelts in London*** *(Cohen, 1994).* In the late 1800s and early 1900s, one proposed antidote to urban ills was to surround towns with a background of open country lands. Better known as "garden cities," a notion put forth by Ebenezer Howard, this concept instituted a green belt around the peripheries of municipalities to combat urban sprawl. This concept had been, much earlier, put into direct operation in London, whose Metropolitan Greenbelt was a result of both economic and land use competition.

Constituting an area of 4,850 square kilometers with an undulating width of 10 to 25 kilometers, this vast circumferential stretch of nondevelopable land dates back to a 1560 decree of *cordon sanitaire*, which represented the earliest practical attempt to separate an English city from its encompassing environs for other than military purposes (in this case, for health reasons).

Green belts have since been considered an effective tool in containing and shaping urban growth. Surrounding a settlement with parcels of nondevelopable land was originally intended, however, not so much to limit urban growth but to provide recreational activities and amenities for the population. It was a means to promote civic health by making the green belt and encompassing respite reachable from any part of the city within a few minutes.

With the overwhelming growth of London and the increase in modes and volume of transportation, the rural periphery eventually succumbed to urban decentralization. In surrounding later-developing cities around London, the goal of the greenbelt became to create order out of this chaotic and uncontrollable growth. The preservation of green spaces and parcels, rather than entire belts of green space, eventually became the device for separating residential zones in many cities. Thus, the answer to creating order was simply to preserve the separation between cities. Application of the greenbelt principle now produced an effort to prevent urban sprawl and counteract the declining status of rural areas due to deindustrialization by saving only scraps and ribbons of lands and giving them the title of "greenbelt." Thus, the principles of the garden city concept became separated and implemented without cohesion.

Agricultural and forested lands were used to create this so-called belt. In fact, for many greenbelt and garden city advocates, the primary task of a greenbelt was the preservation of agricultural lands on the city's periphery. Eventually, the new goal of the greenbelt became the restoration of the old city. To respond to a lack of open space, concentric rings were developed, with the green belt as the third of these rings, outside the inner urban and suburban areas but inside the final outer country ring. These rings, which had originally served as a barrier to urban sprawl and then for the melding of adjacent cities, were now used to curb expansion of built-up areas and retain town character while separating compact rural towns from the metropolis.

Currently, internal consumption within the greenbelt due to development plagues the effectiveness of the band as well as leapfrogging development. The remaining green

belt sections of London are caught in urban accretion and are now entangled with the problem rather than preventing it. Growth has continued to spill out from metropolitan areas and the green belt continues to absorb it. Proposals to double the size of the green belt to 360,000 hectares have been made, although expansions of the green belt still suffer from internal consumption. The primary challenge is coming from private housing, which receives many benefits such as proximity, amenities, low densities, and scenic beauty from the preserved open space. Cohen (1994) concludes that the initial goals of a greenbelt should continue to be valued but should be modified to serve current and future needs.

***Oregon Farmland Preservation*** (*Daniels, 1986*). In 1973, Oregon's legislature adopted a statewide land use planning program with two main objectives: containing urban sprawl and preserving farmland solely for farm uses. Urban growth boundaries designated limits to municipal water and sewer extensions and created areas where only farm use was allowed. The program was applied to 17 million acres of high-quality, agriculturally productive soils.

Oregon's policy goals initially appeared to be met. The subsequent proliferation of hobby farms, however, intruded upon the program's success. Hobby farms, or small-scale farms which are worked simply for pleasure and not for a career, are considered preserved farms but seem to be competing for the same lands as commercial farming operations, thus threatening the long-term viability of these operations. In other words, homesteads are built on preserved farms, but only minimal produce is generated from the land, generally only special crops to be consumed by the owners. Because hobby farmers

obtain nearly all of their income away from the farm, the land is viewed as a commodity, enabling owners to enjoy a rural lifestyle while still retaining the benefits of nondevelopable surroundings. Changing ownership patterns and high land prices imposed by the proprietors of these farms negatively impact the viability of commercial farming and its contributions to regional economic stability.

Hobby farming in Oregon has swayed some of the results in productivity analyses of farmland preservation. For example, both Oregon and Washington far exceeded the national average increase in number of farms of fewer than 50 acres. Oregon, however, added more than 600 of those farms than did Washington, which had a total of 250, suggesting that many of the preserved farms were simply hobby farms. Thus, lands that commercial farm operations may wish or need to work are now agriculturally unproductive and are valued at residential land values.

The widespread preference for rural residency combined with Oregon's farmland preservation strategies which did not begin until the 1980's contribute to the rise of hobby farms. In Oregon, any farm within a farm use zone qualifies for a property tax incentive, with no application required, regardless of size or agricultural production. By not qualifying farms through an appropriate process, local administration has not discouraged the growth of hobby farms. Oregon has kept farmland from being converted to nonfarm uses, though with some unforeseen land use consequences.

Perhaps there is no perfect way to encourage rural settlement outside agricultural zones. Oregon's approach does show that one single method of farmland preservation alone cannot fix the ills of sprawl and conversion. The state itself embraces a number of

complementary techniques: farm tax deferral and right-to-farm laws create incentives for farmers to stay in business, agricultural zones reserve farmland for future use, urban growth boundaries limit sprawl into rural lands, and rural residential zones have been created to contain residential development outside agricultural zones. By these measures, perhaps hobby farms can be preserved without undermining long-term commercial farm operations.

### *Gaps in the Current Research*

Three major gaps exist in the existing research literature. First, no studies have concentrated specifically on the impact on rural towns; most studies have focused on metropolitan regions. Those that deal with rural areas have not specifically studied the townscapes themselves. Second, no study has examined the relationship between urban viability and the extent of farmland preservation. Hence, it is currently difficult to decipher exactly how much preserved farmland is needed to address the effects of urban decline. Third, no studies have addressed the impact of preserving agricultural lands on existing cultural resources, specifically individual historic structures. It is my intent to shed light on these points through the comparison of three living heritage rural boroughs in Bucks County, Pennsylvania with differing acreages of peripherally preserved agricultural lands, so as to test the effect of preserving farmland on the rate of demolition by neglect.

### *Contributions*

It is my hope that this study will make multiple contributions to the field of heritage and cultural landscape studies. First, it will help to determine if there are means other than structural preservation that can protect the cultural resources of our living heritage sites. Second, it creates a model by which to document the much-needed process of demolition by neglect. In doing so, this study offers a set of statistical methods for cultural landscape assessment that could be used for future longitudinal studies or by other towns to generate quantitative data in a field that is lacking such information. Other research studies could then develop statistically comparable findings. Third, although there are some studies on the interrelatedness of town centers and their outskirts, this study should shed more light on the relationship between historic structures and their setting. Fourth, as New Ruralism is a relatively new theory in the field, this study can help to determine whether the theory is a successful framework for studying landscapes. Fifth, at a more site-specific level, it will aid in evaluating the effectiveness of agricultural preservation policies in Bucks County, Pennsylvania. Sixth, the study explores the relationship between aesthetics and the attraction of future investment in historic structures. In doing so, it can help preservationists to see the importance of economic viability as well as historical integrity. Finally, this research looks at the cultural landscape as a system and explores the impact of contextual change on the cultural landscape. At a minimum, it will shed light on the interrelationship between a structure and its setting.

# Chapter 3

# RESEARCH DESIGN AND METHODS: STRATEGIES AND APPROACHES FOR THE PROPOSED STUDY

### *Research Strategy and Methodological Approaches*

Using a historical-interpretive, sequential, mixed-method approach, this study will examine existing qualitative spatial and historical data with quantitative descriptive statistics. The resulting information will be used to test the effects of outskirt land preservation on the level of neglect within three historically colonial towns. After a preliminary historic analysis based on existing archival research, a second qualitative data collection phase is presented, using a survey on the rate of neglect for historic buildings. The survey was created by a synthesis of viability and historic integrity indicator variables. Because there is currently a lack of statistical data about the condition of historic landscapes (Wallace & Franchetti, 2007), findings from this qualitative phase will then be assessed using descriptive statistics to compare results across cases.

The plan of study involved in this research relies on the historic-interpretive research method. Historic-interpretive research projects are defined as investigations into social-physical phenomena within complex contexts, with a view toward explaining these phenomena in narrative form and in a holistic fashion (Groat & Wang, 2002). By assessing information from the past and comparing it with the present, one can begin to draw conclusions from assumptions and interpretations based on existing information. In this study, each single case is seen as a totality of interdependent elements that cannot be separated from their relations from each other (Watts, 2001).

Ontologically, historical-interpretive research typically assumes that knowledge is created by developing alternative interpretations of reality to help the human condition (Groat & Wang, 2002). This knowledge is, however, not linear but dialectical. Agreements and overlaps in conclusions generated from prior research studies will be utilized until data saturation occurs and findings can be estimated. Through this discursive exploration, conclusions can be reached and representations of this knowledge can be projected.

Because the present will be examined as a result of the past, this particular study is primarily post-structurally oriented. Post-structuralism takes the position that new generations only see earlier generations' reifications of culture and society (Strauss & Quinn, 1997). In other words, cultures are not self-regulated and self-contained. Interconnected webs of meanings define eras, not single instances. Each period is, then, replaced by another web whose foundations lie upon earlier meanings. In this sense, each generation adds to the continuum of the human body of knowledge, but is limited to the information that prior populations passed on. However, it is only through this continuum that events can occur. As Brian Fay (1996) has stated, it takes *a* and *b* and *c* and *d* for *e* to happen. It also takes *a* and *b* and *c* and *d* and *e* for *f* to happen, and so on. This also means that an understanding of the preceding variables is necessary in order to understand an event that has occurred.

Post-structuralism stresses that the culture and the self are constructs. Post-structuralism attempts to analyze cultures according to the theory that structures in society follow specific cultural patterns and are organized according to the constant

reification of generational reinterpretation. When applying this epistemological position to a landscape, one recognizes that human actions are guided by concepts and beliefs, and that underlying these concepts are structures of thought that find expression in various forms throughout the landscape known as "material culture" (Kyvig & Myron, 2000). This philosophy can be best summarized by a quotation from architectural historian Spiro Kostoff, who once stated, "We are, indeed, what we have built" (Kostoff, 1991). Landscape, then, is a direct reflection of our cultural values and needs. Post-structuralism suggests that society is a fluid interconnectedness of these cultures, constantly reinterpreting itself and revealing itself through material culture.

The strategy used to carry out these tasks will be a mixed-method approach consisting of both qualitative and quantitative data. This will be a sequential mixed method study, with a second quantitative phase building on an initial qualitative phase (Creswell, 2009). The qualitative portion of the study will consist of a historical overview of the study cases, accompanied by observational neglect rate surveys conducted on individual structures within each case under evaluation, and followed by a quantitative descriptive statistical measurement. The quantitative phase of the study will then make use of the findings from the qualitative phase. A combination of archival research, observational field studies, and assessment of existing statistics will be examined until the convergence of information produces valid data. The reason for combining multiple types of data is to better understand the data collected by means of triangulation of information (Tashakkori & Teddlie, 1998). Using the convergence of data to generate conclusions is typical of many mixed-method research designs.

Because the study will evaluate multiple cases using a large number of measures and explanatory variables, it is a nomothetic exploration (Babbie, 2005). Although case studies are usually inherently idiographic, due to the fact that there is more than one study area under assessment and the status of the dependent variable is reliant upon multiple other variables, this particular study is of a nomothetic nature. Three historic colonial towns, each with different amounts of peripheral preserved farmlands, will be evaluated using the same methods to generate cross-case comparisons.

The proposed study involves a search for abstract universal principles. Because relatively little is known about the relationship between preserving agricultural lands and a city's ability to retain historic structures, the study will be an exploratory one (Singleton & Straits, 1999). There currently is no agreed-upon method of assessing demolition by neglect. Thus, the variables utilized to examine the process, although taken from existing integrity and viability models, are still exploratory in nature. Also, due to the multiple causal mechanisms affecting the process, the study is simply attempting to discover a correlation that could serve as a springboard for future investigations.

This study accepts the assumptions of the theory of New Ruralism and is not an attempt to test the theory or to create another one. However, because the study will test associations and correlations based on interpretation, it will inevitably have to make generalizations to a larger scale by drawing from a smaller portion of that scale. Babbie (2005) calls this type of social research the interpretive case method. In this paradigm, information derived from a micro scale is used to draw conclusions for a macro scale.

Deductive reasoning will also be employed in the study. A regional historical analysis will serve as the foundation for the construction of individual historical narratives for each town under investigation. Within these towns, individual historic structures will then be evaluated to determine their rate of neglect. The use of deductive reasoning is suitable for this study because it evaluates particular phenomena from general to particular, or from cause to effect. Because the hypothesis is a broad generalization, it is important to assess each variable involved within this generalization to determine specific impacts on each variable.

The sequential mixed-method approach will consist of a three-tiered process, with results converging to form conclusions. Phase 1 of the study will be a historic narrative that concentrates on differences in the origins of each town under examination, their agricultural histories, interurban transportation network growth, historic building materials, and population changes. Phase 2 of the study will consist of field reconnaissance and observational surveys of structures within each unit of analysis. Phase 3 will consist of measurement and comparison of results from the prior two phases.

### *Variables and Study Area*

Although many historic-interpretive plans of study result only in a historical narrative and thus have no variables, this study has both an independent and a dependent variable, as well as other important indicating and explanatory variables. The independent variable, or the variable postulated to do the influencing or explaining, is the amount of preserved agricultural land surrounding each study site. The dependent

variable, or the variable being predicted, is the rate of neglect within each rural colonial town. In essence, the study is a cross-case comparison that correlates towns with differing levels of peripheral preserved farmlands and assesses the ability of these towns to retain their historic structures and prevent demolition by neglect. The independent variable is measured by using central place theory to define a hinterland boundary and calculate the amount of preserved farmland surrounding each town, while the dependent variable will be measured within each town by taking samples within each case using proven spatial methods (King, 1984).

In undertaking this extended case method, it is necessary to distinguish between the units of analysis and the indicators, explanatory variables, and measures that lead to this analysis. The specific unit of analysis, or exactly what will be studied, will be each individual rural colonial town. These units of analysis are located in Bucks County, Pennsylvania. The state of Pennsylvania, especially the Philadelphia region where Bucks County is located, is replete with cultural landscapes, and the state has adopted the practice of agricultural preservation to aid in conserving the historic distinctiveness that characterizes its townships and boroughs. Agriculture is both the leading industry and a deeply held symbol of heritage in the region (Bourke, Jacob, & Luloff, 1996). These two characteristics have made Pennsylvania the nation's leader in agricultural preservation in terms of amount of monetary resources devoted to farmland preservation, surpassing Maryland around the year 2006.

Bucks County is under deep suburban developmental pressures. Once a destination in its own right, the county is currently absorbing the exurban developments

of both New York City and Philadelphia. Monuments and historic areas located in places engulfed by urbanization have not received the attention or support they deserve to maintain their vitality and quality, protect their structural integrity and heritage values, and stimulate their local economies (Jigyasau, 2005). Located 45 minutes north of Philadelphia and 1.5 hours from New York City, rural Bucks County is absorbing much of the outskirt developments of the two metropolises. The county itself lost 70% of its farmland between 1950 and 1997, a drop in acreage from over 260,000 to less than 84,000 (U.S. Department of Agriculture, 2005). With an average conversion rate of about 1 percent a year, one could estimate that, as of 2010, more than 80 percent of the county's 1950 farmland has now been lost. The region is ranked number two on a list of the nation's 20 most threatened lands and was also voted one of the top ten "Last Chance Landscapes" by Scenic America (Olson & Lyson, 1999).

Although many other causal mechanisms contribute to demolition by neglect (such as local leadership, ownership attitude, neglect by policy, land use management strategies, political leadership, internal economic needs, grassroots support, economic condition of the towns, external funding, and reinvention of civic image, to name a few) this research is looking for correlation, not causation. Recomendations of the primary causal factors based on the exposed correlation will be made at the study's conclusion. Thus, controlling for these other variables, to the extent possible, should be done through site selection. Studying units of analysis within the same political boundary (Bucks County) with similar sizes, populations, and ages helps to control for these intervening variables. Each unit of analysis also practices similar methods of agricultural

preservation and is considered a living heritage site (see Table 1). Doylestown (Case 1), Quakertown (Case 2), and Bristol (Case 3) are all located within this environmentally threatened county. The little empirical evidence previously presented about the impact of farmland preservation on cultural landscapes is generally available only at the county level; locally specific comparisons are needed as well (Daniels & Nelson, 1986).

Central place theory is a spatial theory in urban geography that attempts to provide a framework by which areas can be studied both with regard to historical factors and location patterns. The theory defines the hinterland area of cities and small towns and exposes the surrounding area by which the city is most affected. This boundary is based upon the size of town, population, and surrounding metropolitan areas. According to the theory, small, rural towns with populations around 9,000 and around 2 square miles in size generally have a surrounding area of 24 square miles of landscape that heavily influences their towns (King, 1984). Hence, a 24 square mile ring was drawn around each borough and the amount of preserved farmland within this area was calculated. These sites were also chosen based on their location within the county, along with the fact that they follow the common pattern of conducting this research on agricultural preservation within Pennsylvania (Bourke & Luloff, 1992). Each rural borough is either listed or pending acceptance on the National Register of Historic Places (National Trust for Historic Preservation, 2008). Moreover, each town practices similar strategies of agricultural preservation, including purchase of development rights. Only Doylestown (Case 1) practices agricultural security areas, a form of agricultural zoning. In summary, the sites share six significant factors:

1. All cases are within the same regional political boundary
2. All cases are similar in population
3. All cases are similar in size
4. All cases are similar in age
5. All cases are living heritage sites
6. All cases practice similar agricultural preservation strategies

| ***Case 1 - Doylestown*** | | ***Case 2 – Quakertown*** | | ***Case 3 - Bristol*** | |
|---|---|---|---|---|---|
| **Population** | 8227 | **Population** | 8688 | **Population** | 9923 |
| **Size** | 2.2m$^{s}$ | **Size** | 2.0 m$^{s}$ | **Size** | 1.9 m$^{s}$ |
| **Founded** | 1745 | **Founded** | 1803 | **Founded** | 1720 |
| **Preserved Farms** | 46 | **Preserved Farms** | 13 | **Preserved Farms** | 1 |
| **Total Acreage** | 3323.38 | **Total Acreage** | 1057.27 | **Total Acreage** | 99.9 |
| **Preservation Strategy** | ASA/PDR | **Preservation Strategy** | PDR | **Preservation Strategy** | PDR |
| **National Register Listing** | Yes | **National Register Listing** | Yes | **National Register Listing** | Pending |

**Table 1: Control Variables**

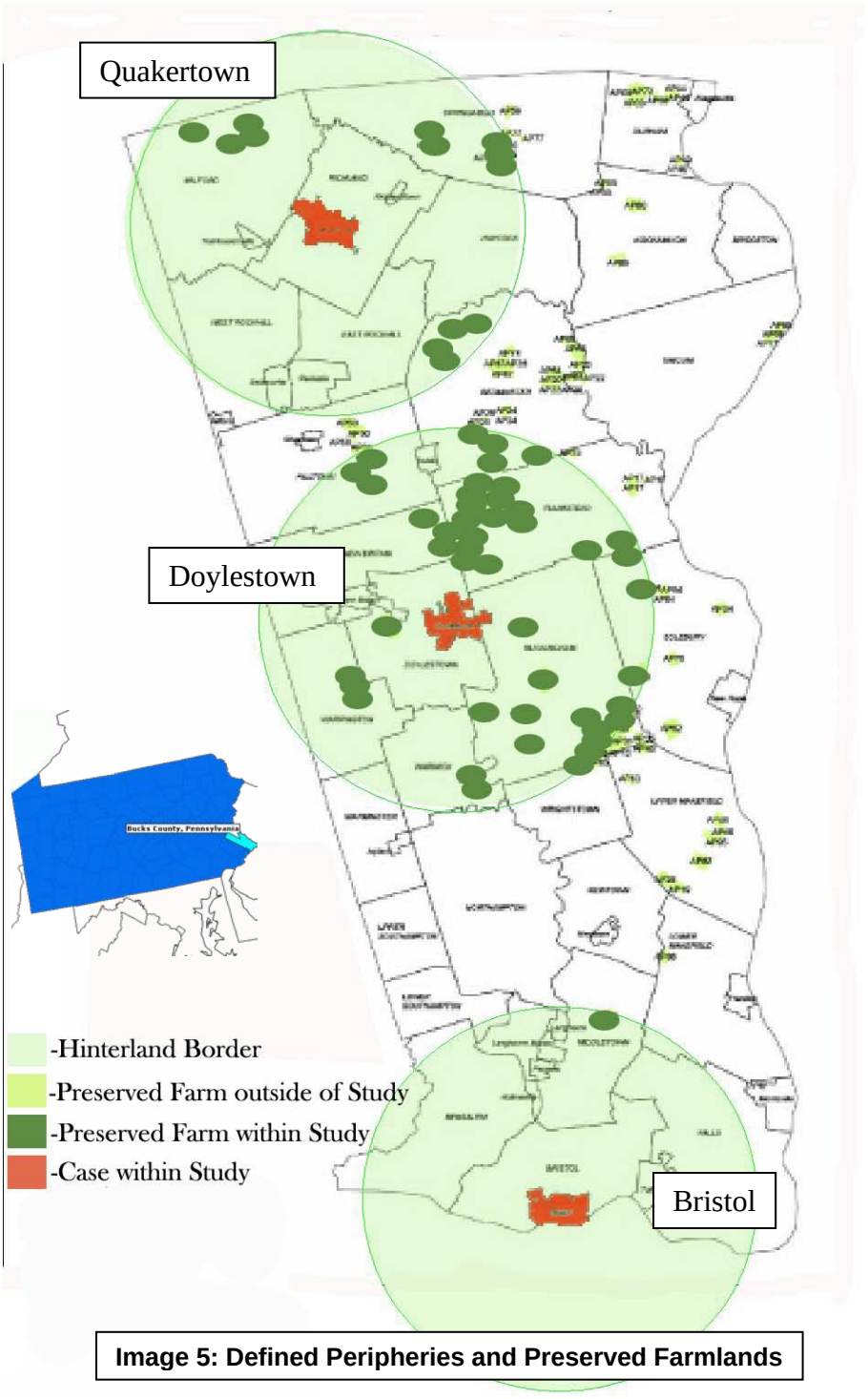


**Image 5: Defined Peripheries and Preserved Farmlands**

Case 1 (Doylestown) has the highest amount of preserved farmland and number of preserved farms, Case 3 (Bristol) has the lowest amount of preserved farmland and number of preserved farms, while Case 2 (Quakertown) has moderate amounts of both. The rate of neglect within each unit of analysis will be evaluated against the amount of preserved farmlands on the periphery of each municipality using a combination of methods including archival research, an observational historic buildings survey, and the examination of resulting statistics. Because preservation philosophy relies purely upon historic integrity and architectural significance, not the structure's ability to attract new investment other variables need to be studied to determine the causes of demolition by neglect. Jigyasau (2005) identifies both historic integrity and viability as dimensions that should be examined with regard to demolition by neglect. There are, however, no agreed-upon variables to use in studying this process. To alleviate this quandary, five explanatory variables were selected to combine existing data gathering models using historic integrity (Berg, 1998; Birnbaum, 1994, 2007; Birnbaum & Hughes, 2005, Dick, 2000; Carr, 2005) and those that use structural viability (Ravencroft, 2000; New Castle City Council, 2005; Cooke, 2005).

Explanatory variables are the ones used to measure a few of the relevant properties and combine the data according to their attributes (Singleton & Straits, 1999). These variables will then be logically divided into three measures for analysis. The explanatory variables used will be building age (the time frame in which the structure was erected), architectural modification (B) (whether or not the structure has been altered), land use change (C) (the consistency of building function), physical condition

(D) (the quality of the condition or appearance of each structure), and assessed value (E) (the fair market value of each structure sampled) (see Image 6).

- *Building Age* [A] (Birnbaum, 1994, 2007; Birnbaum & Hughes, 2005) – The time frame of the construction of each structure sampled contributes to the overall integrity of each case. Each case is a living heritage site associated with the National Register of Historic Places, so there are many historic structures within these boroughs. The hypothesis predicts that, as the amount of preserved farmland increases, the rate of neglect decreases; the assumption will be made that reduced neglect will lead to survival of a greater number of older buildings. Information on building age will be obtained from existing historical data, an observational historic building survey, and comparisons to the Sanborn Fire Insurance Maps to identify the earliest mapping date of each structure. The use of building construction materials and architectural style help to date the building as well (see Appendix 2). This variable will be divided into three measures (a1, a2, & a3):
    - 1970–present (a1): Structures not eligible for national register designation
    - 1940–1969 (a2): The period prior to farmland preservation, which originated in the 1970s
    - Pre-1900s to 1939 (a3): The earliest and latest dates for Sanborn mapping
- *Land Use Change* [B] (Berg, 1998; Ravencroft, 2000) – Consistency in building function is a measure of integrity for historic structures, but can also indicate viability. The ability for a historic structure to retain the same land use over time aids in increasing its historic integrity due to the fact that its current use is the same as its historical use. A change in use generally means a larger increase in

modification of the structure to conform to the new use which decreases its integrity. Therefore, it will be assumed that, as the amount of peripheral preserved agricultural lands increases, there will be a higher number of structures with continuous use and a lower number of functionless structures. Data on building use change will be obtained from observational research on present building functions and comparison with the Sanborn Fire Insurance Maps. The Polk Directory will also be used to obtain past and present functions where further assessment is needed. This variable will be divided into three measures (b1, b2, & b3):

  - Vacant (b1): Structure currently has no function
  - Alternate (b2): Land use within the structure has changed since its origin, but the structure still has a function
  - Consistent (b3): Land use within the structure has remained consistent since its original construction

- *Architectural Modification* [C] (Dick, 2000; Carr, 2005) – This explanatory variable (along with the prior two) is regularly used to assess historic integrity of individual structures and can be utilized in the creation of such documents as National Register Nomination Forms, Historic Structures Reports, and Cultural Landscape Reports. Architectural modification refers to the amount of change involved within each structure under evaluation. Assessment will be made by comparing the historic core shape to the contemporary shape of the structure, based on the use of mapping comparisons and observations to identify any modification to material change. Adaptive reuse and renovation of structures implies viability of the structure. Therefore, it will be assumed that, as the

amount of preserved farmland increases, the number of historic structures undergoing modifications should increase as well. The measures (c1, c2, & c3) for this variable will be:

  - Non-historic (c1): Structure shows no visible historic merit
  - Renovated (c2): Historic core and exterior have been changed slightly
  - Historically significant (c3): Core shape and exterior have remained constant

- *Physical Condition* [D] (New Castle City Council, 2005) – The physical condition of the appearance of each structure is not typically used in integrity surveys, but must be examined to assess neglect. The assumption is that, as decay increases, neglect rates also increase. This variable will be assessed by observational research. Using Cooke's (2007) dilapidation survey, the condition of the exterior features of each structure will be evaluated through a checklist as part of the historic buildings survey. This condition will be divided into three measures (d1, d2, & d3):

  - Dilapidated (d1): Structure has fallen into a state of disrepair or deterioration (0% - 59 % positive attributes)
  - Moderate (d2): Structure not in a state of disrepair, but the process of neglect is occurring (60% - 79% positive attributes)
  - Well conditioned (d3): Structure shows little to no sign of decay (80% - 100% positive attributes)

- *Assessed value* [E] (Ravencroft, 2000) – The market value of each structure reveals the property value of each structure sampled. This value will shed light on the economic impact of peripheral agricultural preservation on inner cities as well as the viability of each structure sampled. These data will be obtained from the Fair Market Commission of Bucks County, which allows the public to obtain

property assessments of a structure by searching for its address. Because there are no parameters for these figures yet, the measures (e1, e2, e3) for this variable will emerge as data are obtained, but the same categorizations into equal intervals will be used for all three cases for comparison purposes.

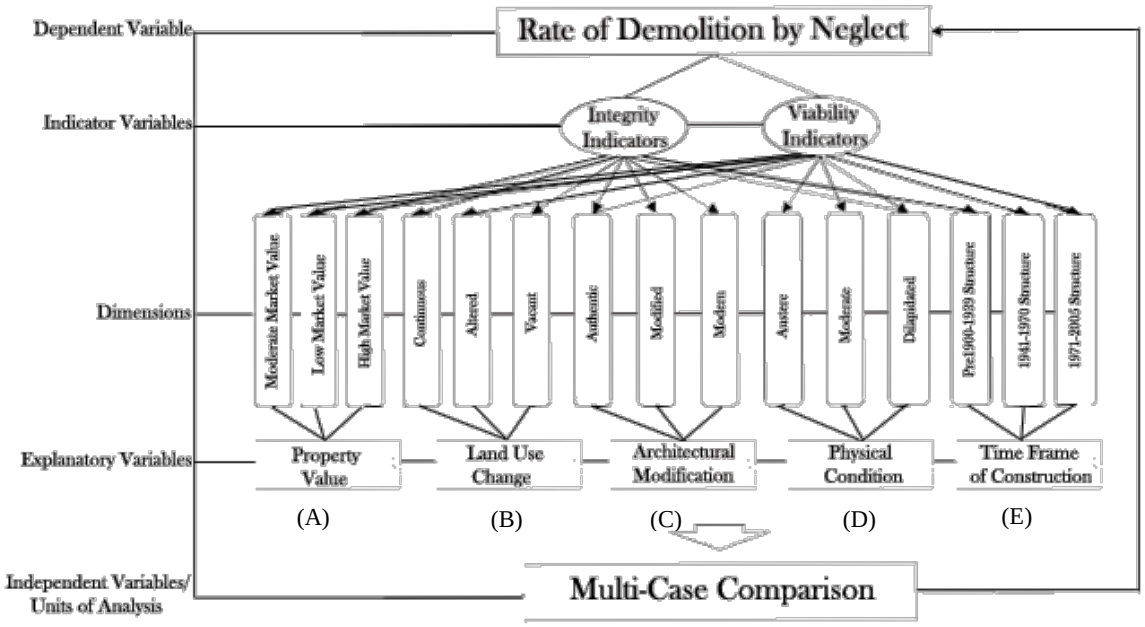


**Image 6: Diagram of Variables and Dimensions**
(Berg, 1998; Birnbaum 1994, 2005, & 2007; Dick, 1999; Carr 2005; NZHPT, 2005; Ravencroft, 2000; South Carolina State Historic Preservation Office, 2009)

### *Data Collection and Sampling*

As already noted, data collection techniques will be based on archival research, observational reconnaissance of historic buildings, and the evaluation of existing statistical data. Typically, social scientists use field research when they are observing a particular social phenomenon and are attempting to understand it. Field research can

collect and synthesize a broad range of qualitative data. Because field research is best suited to the study of social processes over time (Babbie, 2005), the application of this method will be well suited for the proposed study. Babbie suggests that this method should be employed in some fashion when studying any type of settlement.

The first portion of the sequential mixed-method procedure is a historical overview. Data collection for this portion of the study will use existing literature and archives, autobiographies, and historic photographs as primary sources, reinforced by secondary sources such as oral interviews, newspapers, letters, and artifacts. From the regional to site-specific scales, a thorough investigation of these documents will be used to generate a historical narrative explaining how and why these towns were laid out, the influential persons in their evolution, the agricultural history of each case, specific building materials used in the region and their time periods, any existing structures that may merit special attention, and any photographs against which sampled structures could be compared so as to gain insight.

The second phase of the convergence strategy is the completion of historic building surveys. These surveys require archival research, observational field reconnaissance, and the collection of existing economic statistics. The survey work will begin with identification of the sample frame from which the population will be generalized. Figure-ground morphology assessments showing the evolution of each town's building footprint over time (based on information obtained from the Sanborn Fire Insurance maps from the late 1800s to the mid-1900s and aerial photographs from the 1970s to 2005 showing the spatial evolution of these towns through time) will be overlaid

to identify the areas likely to have high concentrations of historic structures. The dates are as follows:

- 1900 - earliest building footprint map available
- 1940 - historical map available, which all towns have in common
- 1970 - the year when agricultural preservation began in Pennsylvania
- 2005 - the latest aerial photograph taken of the three towns

Each map will then be overlaid to determine exactly where the majority of historic structures should be within the towns. This step is important because the overlaying of historic mappings will provide a frame that offers the highest percentage of capturing the oldest structures in the towns, while incorporating information from the century-old Sanborn maps. The areas where the maps from all years overlap will be outlined and serve as the sampling frame, or the set from which the sample will be selected for the study. This sample frame is then made up of potential units for future measurement. Forming a sampling frame that is focused on locating where change has occurred in a particular trend—in this case, the presence of historic structures—is known as non-independent spatial sampling. This method is generally utilized in spatial geographical studies and allows for a specific trend to be studied in areas which that trend is known to occur, thus increasing the validity of the study (Montello & Sutton, 2006).

Within this sample frame, probability sampling will be utilized. This type of sampling helps to remove any prior biases by the researcher while allowing an equal opportunity for all individual study units to be chosen in the research. The drawback of using random sampling methods (rather than non-probability sampling) is that, although all cases have an equal chance of being captured in the study, there is no guarantee that the sample selected will be proportionately distributed among the population of interest.

The primary dilemma in geographical studies is that they attempt to generalize, but are usually limited by necessarily small numbers of cases (Montello & Sutton, 2006). To investigate a large number of cases requires a considerable investment of resources; while an extensive sample is desirable to permit statistical reliability and generalizability, it is not feasible to test every setting due to the immense number of cases available.

Because cities are typically laid out in blocks, cluster sampling, or a type of probability sample where groupings of study units are randomly selected after the geographic areas of interest are chosen, will be used in this study. Clusters of cases will be chosen within the areas featuring characteristics that the study attempts to address. Although time and cost are reduced significantly, this type of sampling method readily introduces bias into the study, because many characteristics are not evenly distributed in areas (Montello & Sutton, 2006). In other words, a group of concentrated characteristics could sway the results of a study drastically. The severity of this bias is reduced if the sample frame covers more than just one or two portions of an area. Thus, large sample areas of 8 to 12 blocks are used as units within the proposed study.

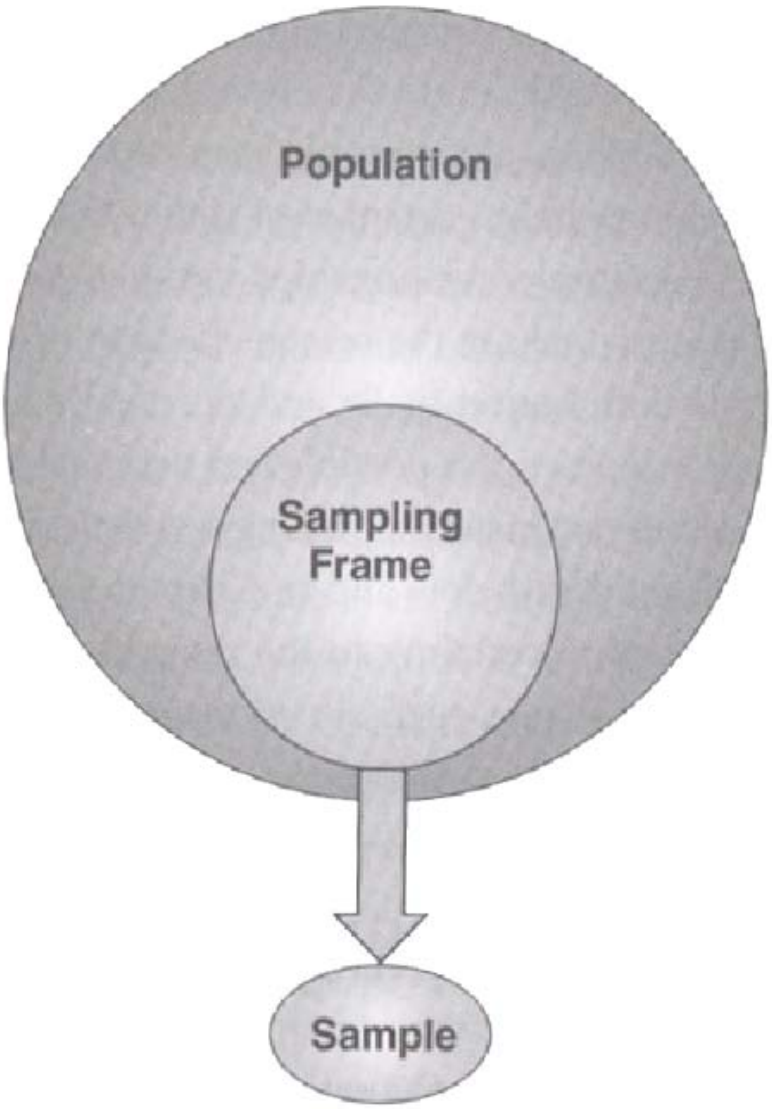


**Image 7: Sampling Technique Diagram**
**(Montello & Sutton, 2006)**

Because spatial sampling studies specific cases in space and time, to study continuously distributed properties geographers sample locations within the fields and measure the properties at those locations. The typical way to conduct this measurement is to organize these continuities into discrete objects, then assess and measure these objects. Existing blocks within the towns will serve as the quadrants for the study, or the polygonal features that break the continuous space into groups (Montello & Sutton, 2006). Point locations are then sampled within these quadrants. To decrease the risk of biased results from cluster sampling, a specific type of cluster sampling, known as multi-stage area sampling (Montello & Sutton, 2006), will be used. In this method, each cluster is further divided into sub-clusters which are randomly numbered and selected, and then the units within these clusters are sampled (see Image 8). Although not based on existing proportions like quota sampling, this type of clustered sampling allows geographers to cover a wider spectrum of characteristics because one grouping cannot skew the overall results. In this particular study, before the specific structures are sampled, each block

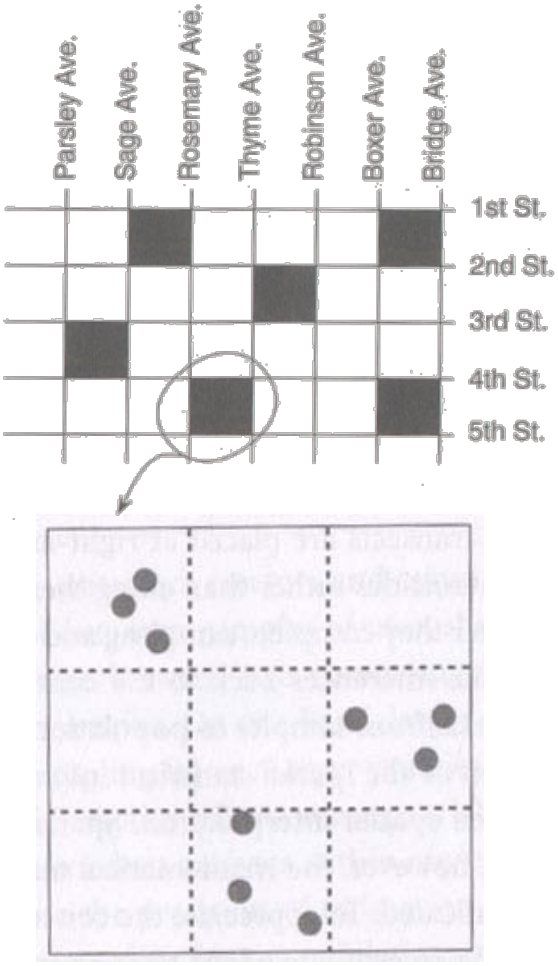


**Image 8: Multistage Area Sampling**
**(Montello & Sutton, 2006)**

will be divided into clusters of seven structures, and then certain clusters will be randomly chosen to be sampled. The number of structures that must be surveyed within these areas will be calculated by totaling the available structures within the sample frame and determining the number of surveyed buildings that would achieve a 95% confidence level and a 10% confidence interval.

### *Data Analysis*

Measuring the data in a historical-interpretive study can also be difficult. To help lessen this difficulty, the process of assigning numbers to the variables of the units of analysis will be employed (Singleton & Straits, 1999). To the best of my knowledge, there has been no attempt to establish a standard system of metrics to measure the rate of demolition by neglect, nor any attempt to quantify the epidemic on this scale. In fact, most studies tend to present simply a qualitative analysis, leaving questions of subjectivity unresolved. Because the data will be quantitatively measured in this study, expected patterns can be tested against the actual data so as to assess the hypothesis.

Analysis of case study evidence is one of the least developed and most difficult aspects of case study research (Yin, 2009). The final phase of this comparative multi-case study will apply a system of metrics to the qualitative data using an existing method of measurement. Thus, each phase builds on information from the previous phase. To carry out the data analysis phase, Yin's (2009) method of multi-case pattern matching will be used. This strategy compares the empirically based interpreted pattern to an existing, predicted one that is congruent with the specified hypothesis. Because no prior

studies provide a suitable pattern for comparison, the results must be compared with predicted patterns.

The analytic pattern matching strategy employed is called “non-equivalent dependent variables” (Yin, 2009). The utility of this method fits the present research project well because the variables used come from other research designs. The term “non-equivalent” means that predictions rise or fall due to the numerical amount of components present or absent in the dependent variable. Theoretical replications of these predictions are then made across cases and tested against the actual data.

The research design, then, contains three phases: a micro scale evaluating each case individually and comparing correlations of amount of preserved farmlands to the created dimensions, a macro analysis comparing correlations of agricultural preservation with explanatory variables, and a cross-case analysis that compares overall neglect rates of each case. These three scales will help to identify the overall correlation as well as the specific variables that have the highest impact on this correlation.

Data obtained from the convergence of the data collection phase will be placed into individual spreadsheets for comparison on each scale of measurement. Overall neglect rates will be compared utilizing a formulaic ratio using totals from the explanatory variables in the macro analysis. The micro analysis assessing each case by dimensions will be evaluated using a nominal scale which assigns 1’s and 0’s to assess whether or not each case contains a particular characteristic. The macro analysis of the explanatory variables will utilize an ordinal scale of 1’s, 2’s, and 3’s to logically rank characteristics within these categories and thereby assess the overall rate of neglect in

each case. Each dimension is placed on a gradient where a score of 1 indicates high neglect, 2 indicates moderate neglect, and 3 indicates low neglect. Each case will then be tested against predicted patterns for each scale of measurement. Results from the data collection phase and totals will be calculated for both explanatory variables and dimensions to determine whether or not the results agree with expected patterns. These totals will then be used to calculate overall neglect rates for each unit of analysis. Disagreements with predicted patterns indicate fallacies in the hypothesis, while agreements with predicted patterns suggest that the hypothesis should not be rejected.

*Expected Patterns*

Micro Analysis

Using a nominal scale, and assigning 0's and 1's to the dimensions, and summing and comparing the totals across cases, the micro analysis will take the specificity of the macro analysis to a more minute level. It will indicate which specific measures are impacted by agricultural preservation and why each result from the comparisons of explanatory variables turns out as it does. Each sampled structure will receive a 1 if the particular dimension is captured and a 0 if it is not. Predictions are then made that as agricultural preservation increases, the rate of neglect should decrease (i.e., integrity and viability increase). Measures that promote a low neglect rate are labeled $a_3$, $b_3$, and $c_3$, and dimensions that promote a high neglect rate are marked as $a_1$, $b_1$, and $c_1$, while the $a_2$, $b_2$, and $c_2$ dimensions capture degrees of both levels. For example, the predicted total of $a_1$ variables for Case 1 (Doylestown) would be lower than the predicted total of $a_1$

variables for Case 2 (Quakertown) because the amount of preserved farmland is greater for Case 1 (Doylestown) than for Case 2 (Quakertown). Similarly, the predicted total of $a_1$ (buildings built between 1971-present) variables for Case 2 (Quakertown) would be lower than the predicted total of $a_1$ (buildings built between 1971-present) variables for Case3 (Bristol) because Case 3(Bristol) has the lowest amount of preserved farmlands.

With regard to building age (variable A), Doylestown (Case 1) is predicted to have more structures dating from pre-1900 to 1940 (a3) ,than Quakertown (Case 2) which is predicted to have more structures dating from pre-1900 to 1940 (a3) than Bristol (Case 3). Case 1 (Doylestown) is also predicted to have more 1940-1970 (a2) structures than both Case 2 (Quakertown) and Case 3 (Bristol). This prediction is based on the assumption that Case 2 (Quakertown) and Case 3 (Bristol) will have lost more historic structures in the post-World War II development boom. Finally, Case 1 (Doylestown) is also predicted to have fewer 1971-2005 structures (a1) than all other cases, and Case 2 (Quakertown) is predicted to have fewer modern structures than Case 3 (Bristol). The predictions assume here that as the amount of peripheral preserved farmland increases, the amount of retained historic structures has also increased.

Land use (B) predictions assume that Case 1 (Doylestown) will have less vacant structures (a1) than Case 2 (Quakertown), which will in turn have lower a1 totals than Case 3 (Bristol), because vacancy increases the rate of neglect. Basically, the predicted patterns assume that, as the amount of preserved farmland increases, the amount of consistent and altered functions will increase while the number of vacant structures will decrease. With regard to alternate land use (b2), Case 1 (Doylestown) is predicted to

have a higher total than Case 2 (Quakertown), which is in turn predicted to have a higher total than Case 3 (Bristol). Although an alternate land use (b2) indicates a decrease in integrity, it also indicates an increase in viability. Thus, an increase in adaptive reuse is assumed to be a catalyst for decreasing neglect. This predicted pattern is the same for land use continuity (b3), because a continuous land use over time indicates a greater amount of both integrity and viability.

Architectural modification (variable C) predictions follow the same pattern as explanatory variable B (land use change). As the amount of preserved farmland increases, it is predicted that the amount of authentic and modified structures will increase while the number of modern structures will decrease. Modern structures (c1) indicate that the structure has no historical merit and therefore modification of its historic core does not affect outcomes. Predictions are then made that Case 3 (Bristol) will have higher modern structure totals (c1) than Case 2 (Quakertown), which will have higher totals than Case 1 (Doylestown). Predictions made for the totals of modified structures (c2) are the opposite. It is assumed that the total number of structures displaying c2 characteristics for Case 1 (Doylestown) will be higher than the total of c2 for Case 2 (Quakertown), which will in turn be higher than Case 3 (Bristol). This assumption is based on the expectation that, to retain historic structures, modification and upkeep must have occurred to prevent their removal. Although integrity decreases, viability increases. Finally, authentic (c3) structure totals are predicted to be highest in Case 1 (Doylestown), and higher in Case 2 (Quakertown) than Case 3 (Bristol), because an unaltered historic structure indicates a high degree of integrity.

Building condition (D) predictions assume that the total of dilapidated structures (d1) will be highest in Case 3 (Bristol) and lowest in Case 1 (Doylestown). This predicted pattern is the same for moderate structures (d2), because of the assumption that moderate structures are also in the process of neglect. Case 1 (Doylestown) is then predicted to have a higher total of structures reflecting the characteristics of well conditioned buildings (d3) than Case 2 (Quakertown), which is predicted to have higher d3 totals than Case 3 (Bristol). This prediction is based on the fact that greater numbers of decayed structures indicate a decrease in viability and integrity while buildings in high-quality conditions indicate the opposite. In other words, predicted patterns assume that, as the amount of peripheral preserved farmlands increases, the number of well-conditioned buildings will increase while moderate and dilapidated totals will decrease.

Finally, with regard to property values (variable E), it is assumed that, as the amount of preserved farmlands increases, so will the assessed values of historic buildings. It is assumed that Case 1 (Doylestown) will have the lowest number of structures falling into the lowest categorization (e1) of fair market value, while Case 2 (Quakertown) will have fewer than Case 3 (Bristol) but more than Case 1 (Doylestown). Case 1 (Doylestown) is predicted to have the highest totals of moderate levels of property values (e2), and Case 2 (Quakertown) is predicted to have a higher total than Case 3 (Bristol). Finally, Case 1 (Doylestown) is predicted to have the highest number of highly valued structures (e3) with Case 2 (Quakertown) having higher totals than Case 3 (Bristol). All predictions are based on the assumption that higher property values indicate higher viability.

PREDICTED MICRO PATTERNS

Time Frame of Construction

Doylestown (T) 1971-pres. < Quakertown (T) 1971-pres. < Bristol (T) 1971-pres.
Doylestown (T) 1941-1970 > Quakertown (T) 1941-1970 > Bristol (T)1971-1941-1970
Doylestown (T) pre1900-1940 > Quakertown (T) pre1900-1940 > Bristol (T) pre1900-1940

Land Use Change

Doylestown (T) vacant < Quakertown (T) vacant < Bristol (T) vacant
Doylestown (T) alternate use > Quakertown (T) alternate use > Bristol (T) alternate use
Doylestown (T) continuous > Quakertown (T) continuous > Bristol (T) continuous

Architectural Modification

Doylestown (T) modern < Quakertown (T) modern < Bristol (T) modern
Doylestown (T) modified > Quakertown (T) modified > Bristol (T) modified
Doylestown (T) authentic > Quakertown (T) authentic > Bristol (T) authentic

Building Condition

Doylestown (T) dilapidated < Quakertown (T) dilapidated < Bristol (T) dilapidated
Doylestown (T) moderate < Quakertown (T) moderate < Bristol (T) moderate
Doylestown (T) well condition > Quakertown (T) well condition > Bristol (T) well condition

Property Value

Doylestown (T) low < Quakertown (T) low < Bristol (T) low
Doylestown (T) moderate > Quakertown (T) moderate > Bristol (T) moderate
Doylestown (T) high > Quakertown (T) high > Bristol (T) high

## Micro Analysis Table Example – Case N

| *Condition* | *Structure* | | | |
|---|---|---|---|---|
| | *1* | *2* | *3…* | ***Total*** |
| *A* | - | - | - | - |
| $a_1$ | | | | |
| $a_2$ | | | | |
| $a_3$ | | | | |
| | | | | |
| *B* | - | - | - | - |
| $b_1$ | | | | |
| $b_2$ | | | | |
| $b_3$ | | | | |
| | | | | |
| *C* | - | - | - | - |
| $c_1$ | | | | |
| $c_2$ | | | | |
| $c_3$ | | | | |
| | | | | |
| *D* | - | - | - | - |
| $d_1$ | | | | |
| $d_2$ | | | | |
| $d_3$ | | | | |
| | | | | |
| *E* | - | - | - | - |
| $e_1$ | | | | |
| $e_2$ | | | | |
| $e_3$ | | | | |
| | | | | |
| **Total** | | | | |

**Legend**

$a_1$ = 1971-present
$a_2$ = 1941-1970
$a_3$ = pre1900-1940
$b_1$ = Vacant
$b_2$ = Alternate Use
$b_3$ = Continuous
$c_1$ = Modern
$c_2$ = Modified
$c_3$ = Authentic
$d_1$ = Dilapidated
$d_2$ = Moderate
$d_3$ = Austere
$e_1$ = Low Value (TBD)
$e_2$ = Moderate Value (TBD)
$e_3$ = High value (TBD)

1 = Accepts Characteristic
0 = Does Not Accept Characteristic

A = Time Frame of Construction
B = Land Use Change
C = Architectural Modification
D = Building Condition
E = Property Value

**Table 2: Micro Analysis Example Spreadsheet**

## Expected Patterns:
### Micro Analysis

-Structures Per Era
-Land Use Continuity
-Structural Change
-Building Condition
-Assessed Value
-Case 1 (highest amount of peripheral preserved farmland)
-Case 2 (moderate amount of peripheral preserved farmland)
-Case 3 (lowest amount of peripheral preserved farmland)

A = Time Frame of Construction
B = Land Use
C = Architectural Modification
D = Condition
E = Property Value

a1 = 1971-present
a2 = 1941-1970
a3 = pre1900-1940
b1 = Vacant
b2 = Alternate Use
b3 = Continuous
c1 = Modern
c2 = Modified
c3 = Authentic
d1 = Dilapidated
d2 = Moderate
d3 = Well Conditioned
e1 =
e2 =
e3 =

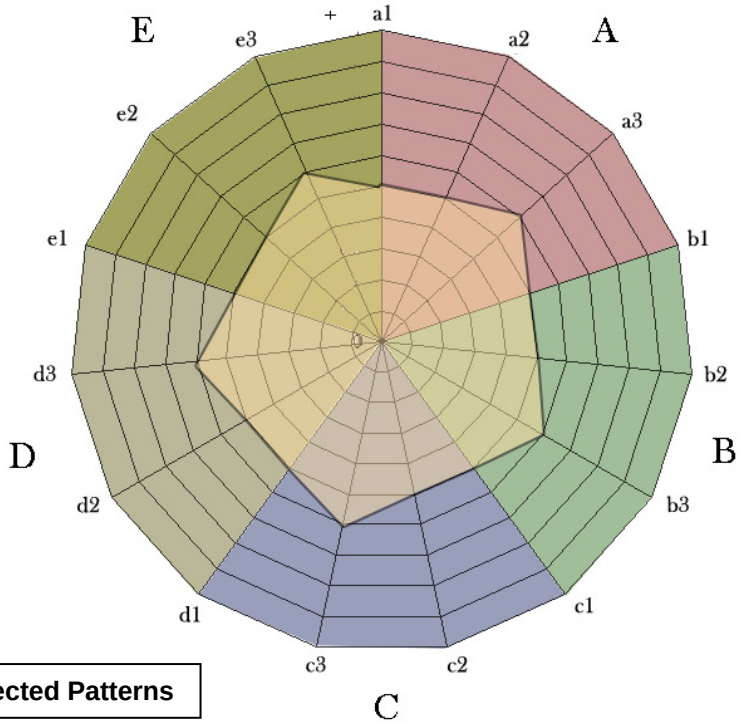


**Image 9: Doylestown Expected Patterns**

## Expected Patterns:
### Micro Analysis

-Structures Per Era
-Land Use Continuity
-Structural Change
-Building Condition
-Assessed Value
-Case 1 (highest amount of peripheral preserved farmland)
-Case 2 (moderate amount of peripheral preserved farmland)
-Case 3 (lowest amount of peripheral preserved farmland)

A = Time Frame of Construction
B = Land Use
C = Architectural Modification
D = Condition
E = Property Value

a1 = 1971-present
a2 = 1941-1970
a3 = pre1900-1940
b1 = Vacant
b2 = Alternate Use
b3 = Continuous
c1 = Modern
c2 = Modified
c3 = Authentic
d1 = Dilapidated
d2 = Moderate
d3 = Well Conditioned
e1 =
e2 =
e3 =

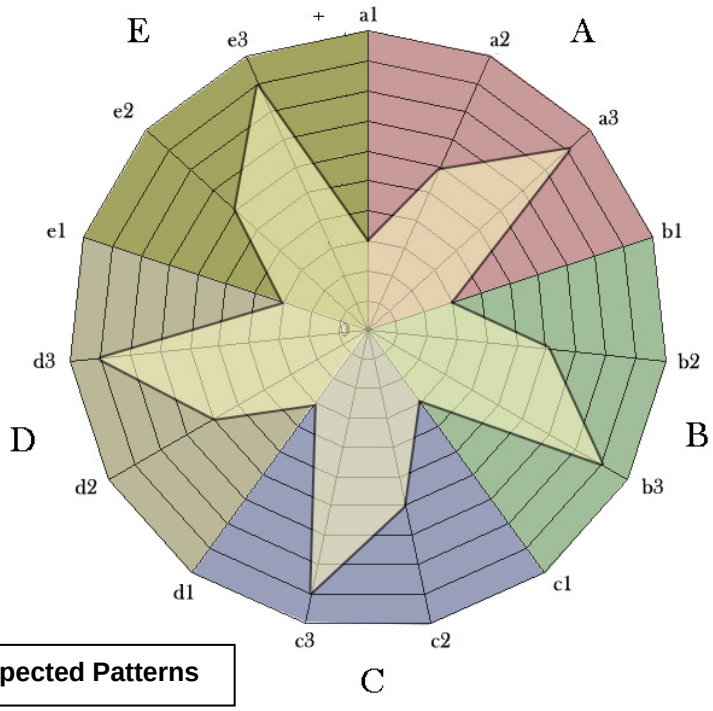


**Image 10: Quakertown Expected Patterns**

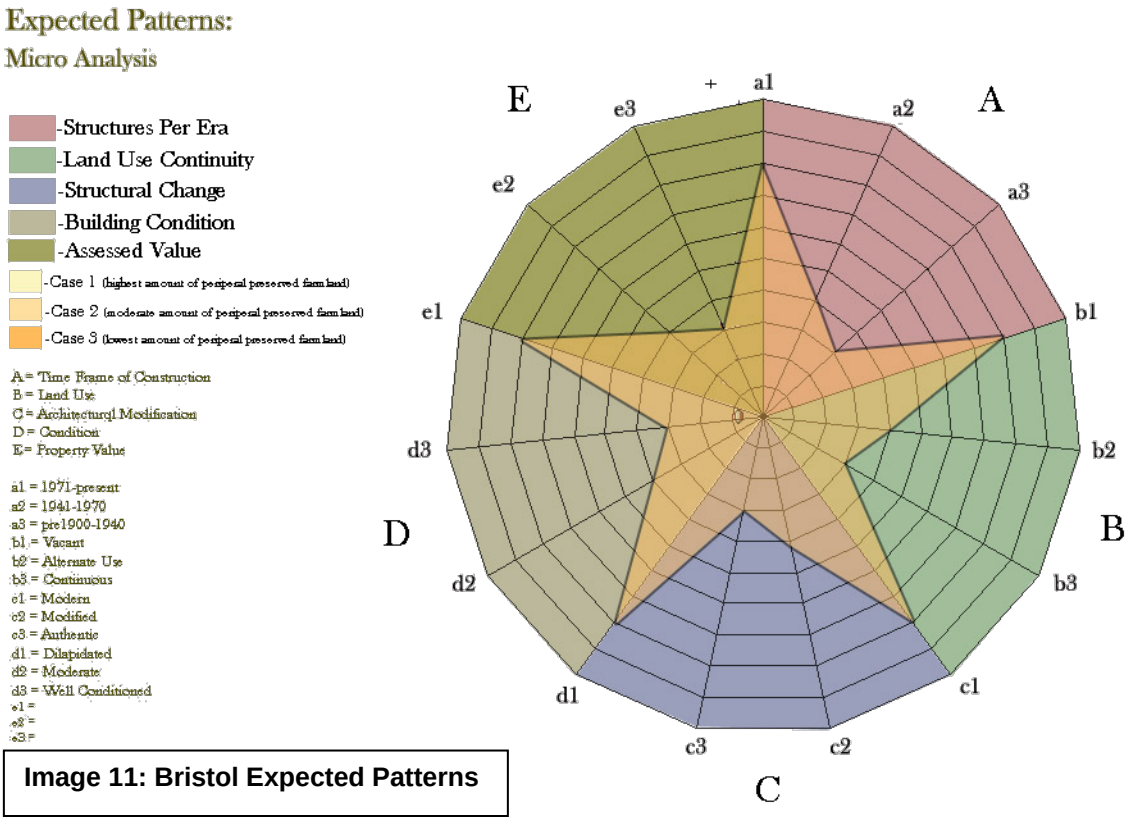


**Image 11: Bristol Expected Patterns**

Macro Analysis

Once the measure are analyzed, we can then match patterns using the categorizations of these measures in order to decipher which explanatory variable was impacted the most. Using an ordinal scale where 1 equals the capturing of an a1, b1, c1, d1, or e1 measure, 2 equals the capturing of an a2, b2, c2, d2, or e2 dimension, and 3 equals the capturing of an a3, b3, c3, d3, or e3 dimension, overall totals will be compared across cases. Because the dimensions are arranged in a manner where the higher assigned number equals a lower rate of neglect, the prediction is that within each category, Case 1 (Doylestown), with the highest amount of preserved farmlands, will have the highest total when the variables are summed, followed in order by Case 2

(Quakertown), then Case 3 (Bristol). This predicted pattern is the same for each individual explanatory variable as well. Comparisons of explanatory variables will show which variables have the highest correlation according to the proposed study and which specific aspects of demolition by neglect are associated both positively and negatively with agricultural preservation.

EXPECTED MACRO PATTERNS

(T) Time Frame of Construction–Doylestown > (T) Time Frame of Construction–Quakertown > (T) Time Frame of Construction–Bristol

(T) Land Use Change–Doylestown > (T) Land Use Change–Quakertown > (T) Land Use Change–Bristol

(T) Architectural Modification–Doylestown > (T) Architectural Modification–Quakertown > (T) Architectural Modification–Bristol

(T) Building Condition–Doylestown > (T) Building Condition–Quakertown > (T) Building Condition–Bristol

(T) Property Value–Doylestown > (T) Property Value–Quakertown > (T) Property Value–Bristol


**Image 12: Macro Analysis Predicted Patterns**

| Macro Scale Table Example – Case N | | | | |
|---|---|---|---|---|
| *Condition* | *Structure* | | | |
| | *1* | *2* | *3* | ***Total*** |
| *A* | | | | |
| *B* | | | | |
| *C* | | | | |
| *D* | | | | |
| *E* | | | | |
| **Total** | | | | |

**Explanatory Variables**

A = Time Frame of Construction
1 =1971-present
2 = 1941-1970
3 = pre1900-1940

B = Land Use
1 =Vacant
2 = Alternate Use
3 = Continuous

C = Architectural Modification
1 = Modern
2 = Modified
3 = Authentic

D = Condition
1 = Dilapidated
2 = Moderate
3 = Austere

E = Property Value
1 = TBD
2 = TBD
3 = TBD

**Table 3: Macro Analysis Table Example**

Cross-Case Analysis

Once totals have been generated for dimensions and explanatory variables, the differences between expected totals and actual totals will be calculated. Conclusions will then be calculated based on agreements with and divergences from predicted patterns. The cross-case analysis looks at overall statistics from both tables and assesses the differences in the percentage of indicator dimensions as well as average points per structure. Because the dimensions were organized in a manner where higher dimension numbers should correlate with lower rates of neglect, we can predict that, where the amount of preserved farmlands is greater, there should be a lower percentage of "1"

variables. The average points per structure will also be calculated; the prediction is that Case 1 (Quakertown) should have the highest average and Case 3 (Bristol) the lowest. We can also assume that there will be a lower rate of neglect as preserved farmland increases. The rate of neglect, which will be the prime determinant to test the hypothesis, is calculated by taking the total of all variables from the macro analysis of the explanatory variables divided by the total of all points possible (if all variables obtained were 3 variables). Because the total number of points possible represents a situation where no neglect is present and we are looking for neglect, the result from this calculation will be subtracted from 100% to determine an overall neglect rate.

EXPECTED COLLECTIVE PATTERNS
(Avg. Points per Structure)-Doylestown > (Avg. Points per Structure) - Quakertown > (Avg. Points per Structure)-Bristol

(% of 1 Var.) - Doylestown < (% of 1 Var.) - Quakertown < (% of 1 Var.) - Bristol

(% of 2 Var.) - Doylestown > (% of 2 Var.) - Quakertown > (% of 2 Var.) - Bristol

(% of 3 Var.) - Doylestown > (% of 3 Var.) - Quakertown > (% of 3 Var.) - Bristol

(Rate of Neglect) - Doylestown < (Rate of Neglect) - Quakertown (Rate of Neglect) - Bristol

AvgPPs = T-Score / T-Structures (using explanatory table)
% of V's = T-Vn / T-Score
% of N = {T-Score / T-Possible Score} – 100% (using explanatory table)

| | Case 1 | Case 2 | Case 3 |
|---|---|---|---|
| **Avg. Pts per Structure** | tbd | tbd | tbd |
| **% of 1 Variables** | tbd | tbd | tbd |
| **% of 2 Variables** | tbd | tbd | tbd |
| **% of 3 Variables** | tbd | tbd | tbd |
| **% of Neglect** | tbd | tbd | tbd |

**Table 4: Cross-Case Neglect Rate Compared Elements**

### *Study Limitations*

There are four major limits to the present study. First, the results cannot be generalized to all municipalities, because each of unit of analysis is within the same political boundary, all three are historic colonial rural towns, and all have roughly the same size and population. Second, the conclusions may be dependent upon factors other than the variables examined. For example, the attitudes of structure owners greatly impact the extent of building neglect, in that owners are responsible for maintenance of their buildings. Third, this research is not relevant to towns that do not practice peripheral agricultural preservation. In other words, the study looks at neglect rates only through the lens of agricultural preservation, not through other policies of legal strictures put in place to control neglect. Fourth, the study assesses demolition by neglect only by looking at structures within historical areas, rather than by taking samples from multiple sites within the towns to cover the impact on the entire locality. Finally, this research is based on the theoretical assumption that there is a bridge between agricultural preservation and urbanism.

# Chapter 4

# HERITAGE OF THE NORTHEASTERN UNITED STATES: ORIGINS, TRANSPORTATION CHANGES, AND SUBURBANIZATION

## *Introduction*

This chapter examines the impact of modernization on the settlements of the northeastern United States and of the Pennsylvanian region, including the change in the importance of agriculture to the area. As this is the qualitative portion of the sequential mixed method, the purpose of this section is to evaluate historical and contemporary differences in the three cases under investigation. Historical data and existing statistics on population changes and the decline in agricultural lands will be assessed. Findings from this chapter will then be compared to those of Bucks County and the three towns under investigation to see if these patterns remain consistent at all three units of settlement: region, county, and municipality.

## *Origin of Pennsylvania*

When first discovered by Europeans, the northeastern region of the United States, like the rest of the continent, was inhabited by groups of Native Americans, people of Mongoloid ancestry unaware of European culture. European invasion of the New World forced many Natives, once fierce territorial rivals, to begin banding together in hopes of limiting the new and forceful occupant's impact on their landscape. Some Natives began to form confederacies to withstand the European onslaught on their lands, such as the League of the Five Nations, made up of groups of Iroquoian Indians inhabiting what is

now New York and Pennsylvania. The Delawares, calling themselves the Lenape, originally occupied the basin of the Delaware River and were the most populous of the several tribes occupying the Pennsylvania region.

With explorations first by Spain and Portugal and later by England, France, the Netherlands, and Sweden, a new age of discovery was sweeping the European continent (McNealy, 2001). The reasons for these migrations varied. Many nations' populations, such as Germans, were fleeing the European continent and migrating to America to escape internal wars within their home countries. Low-income citizens from other countries began to immigrate to the New World in hopes of increasing their social status, while upper-class citizens pursued new business ventures in hopes of increasing their capital. The multicultural settling of historic coastal Pennsylvania brought with it many differing minorities of various faiths and religious viewpoints. Quakers, Puritans, Catholics from England, German Pietists from the Rhineland, Scotch Calvinists from Ireland, and French Huguenots all collided and left their impressions upon the historical landscape of Pennsylvania.

By the 17th century, great economic changes were taking place in Europe. The old manorial system, a loose form of serfdom within a feudal society, which was the organizing principle of rural economy and society most widely practiced in medieval western and parts of central Europe, began breaking down, creating a large class of landless men ready to seek new homes. The manorial system was giving way to a new commercial and trade-driven American economy. Early Swedish and Dutch colonies in America were actually financed through national trade.

There is no evidence that any European culture ever set foot on the Pennsylvanian region until the early 1600s. Around 1609 Henry Hudson, an Englishman in the Dutch service, sailed the *Half Moon* into Delaware Bay, giving the Dutch first claim to the area (Soderlund, 1983). Eventually, an Englishman named William Penn would be responsible for generating a colony in the area.

Penn was an upper-class Quaker who, despite his clout, sought to protect the lower-class believers of his unpopular religion. Seeking a haven in the New World for his persecuted Quaker colleagues, Penn asked the King of England to grant him land in the territory between Lord Baltimore's province of Maryland and the Duke of York's province of New York. The Charter of Pennsylvania was officially proclaimed on April 2, 1681, and by the late 1700s the Province of Pennsylvania had become the third-largest English colony in America (Soderlund, 1983). This settlement was originally composed of only three counties: Philadelphia, Chester, and Bucks.

### *Transportation Changes*

#### Waterways

Before the Europeans' arrival on the American continent, Native American cultures used relatively primitive means of transportation. With limited technological advancement, transportation was either on foot or by canoe. Rivers, historically, served as the nation's first major circulatory arterial routes. Introduction of agricultural practices to the Natives by early European settlers made waterways even more important. Not only did the rich alluvial soils along river banks produce higher yields, but rivers acted as

major circulation thoroughfares in the Old World. Most of America's early cities would ultimately be built along the significant river routes of the time.

By the 1790s, Pennsylvania had initiated extensive studies to improve the navigation of all major streams, and canals began to supplement natural waterways. Although canals declined rapidly with the advent of the railroad, Pennsylvania's ports and waterways remained active due to their proximity to major population centers. New forms of water mobility such as the steamboat allowed these aquatic routes to continue their utility and established Pennsylvania's hydrologic system as a practical medium of transportation, primarily on the Ohio, Allegheny, Monongahela, and Delaware rivers.

## Railways

***Rail Transit Inside Cities and Urban Regions.*** Rail transport in the United States began around the 1830s, operated at first by horsepower or cables. Pennsylvania's tradition of urban public transportation began with the advent of horsecars in Pittsburgh and Philadelphia in the 1850s although Philadelphia's first streetcar system did not begin until 1892 (McNealy, 2001). The streetcar line was the first main expansion of the city. The electric trolley created new pockets of development and suburban districts within the previously agricultural-based outlying communities (Stilgoe, 1983). Utility of the electric streetcar, which was cheaper to ride, provided a less noisy ride which was more intimately connected to the land. Streetcar suburbs took on an intense popularity and railroads became the connecting device of lands which were once wilderness to inner cities. The new suburbs were typically enclaves for the wealthy, because the only cheap

land on the periphery of cities was the least accessible land. These enclaves were tentacle-shaped in pattern and based on the location of the lines themselves. Each district had its own identity and was separated from its neighbors by fields or farmlands. Upper-middle-class citizens wishing to escape the pressures of the city fled to the newly connected fringes.

***Intercity Railroads.*** Pennsylvania's first railroad built as a common carrier was the Philadelphia, Germantown and Norristown Railroad, completed in 1835 (McNealy, 2001). Pennsylvania railways, first built to connect anthracite fields to canals or rivers, eventually aided in stretching the civic boundaries of American localities. American railroad suburbs were dispersed as a string of pearls or a knotted rope, book-ended by railway stations (Stilgoe, 1983). They tended to be compact, because the railroad depots and stations were their suburban centers. As new routes and spur lines spread across the land, speculators and developers snapped up the properties. Railway owners began to work hand in hand with developers, because development assured riders for the railroad companies.

At its origins, the railroad scene, or the “train shed” according to Stilgoe (1983), consisted of the lines themselves, a terminal station, and the railroad yard. Skeptical and somewhat fearful of the fast-moving metal boxes, the general public at first hesitated to embrace the train. The high-speed, steady flow of railroad activity, however, soon caught on as it began to facilitate efficient movement of both passengers and freight. As the aristocracy began to utilize the rhythmic line of transportation, luxurious, high-speed travel became a status symbol of the elite.

As the railway made its way to factories, it became the linking device for Pennsylvanian industrial zones. A symbolic intermingling of technological prowess, industry and railroad created an astonishing new landscape on the edge of cities. As grand bridges were erected to increase the reach of railroads, the iconic state of the metropolitan corridor was only amplified. The middle class, which provided the bulk of workers in these industrial belts, had already begun to flee the center city for its outskirts by the 1840s (Fishman, 1991). The advent of electricity only added to the size of the train shed as power stations connected themselves to the iron armature. The pronounced extension of the urban areas to industrial zones, the creation of electric stations, and the parasitic developments that sprouted around them resulted in an interconnected mesh of confusion that served all income classes (Stilgoe, 1983).

Major railroads chartered in the state included the Philadelphia and Reading (implemented in 1833) and the Lehigh Valley (implemented in 1846, reincorporated in 1853). However, the most significant of all was the Pennsylvania Railroad, chartered on April 13, 1846, and completed to Pittsburgh by 1852 (Root, 2003). It absorbed so many short railroad lines by 1860 that it had nearly a monopoly on rail traffic from Chicago through Pennsylvania. By the mid-1800s the state's 2,598 miles of railroad trackage dwarfed its 954 miles of canal lines (McNealy, 2001). In miles of rail and in total capital invested in railroads, Pennsylvania led all other states on the eve of the Civil War.

At its peak, the Commonwealth of Pennsylvania had more than 10,000 miles of railroad track. However, by the early 1900s the state's railroads had ceased expansion, and after World War I both passenger and freight service began to decline. Because of its

extensive service during World War II, the railroad industry in 1946 was more financially sound than it had been since 1920, but by the end of the 1950s it was losing ground rapidly to the trucking industry due to interstate highway expansion. Suburbanites with cars began to use railroads only for jaunts to their summer homes or for leisure riding. Coal-burning locomotives were also no longer viable, as diesel engines began replacing them.


**Image 13: Reading Railroad-1852**
*(Library of Congress map Collection, 2009)*

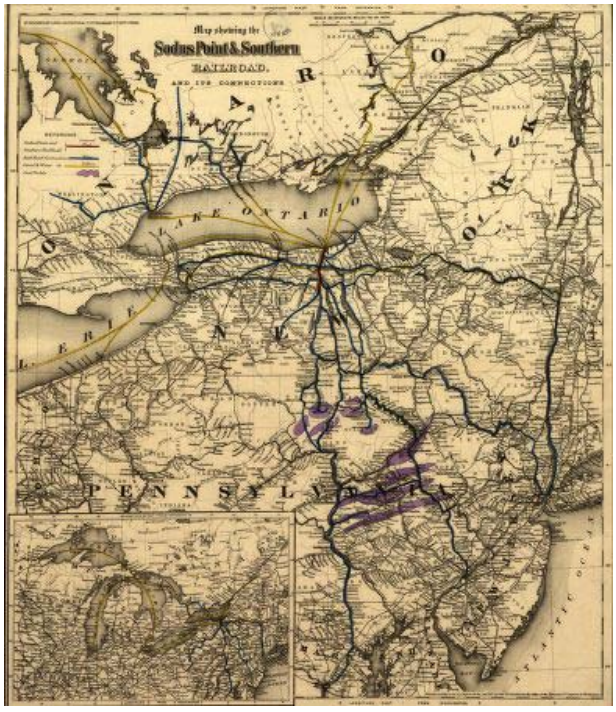


**Image 14: Southern Railroad-1855**
*(Library of Congress map Collection, 2009)*

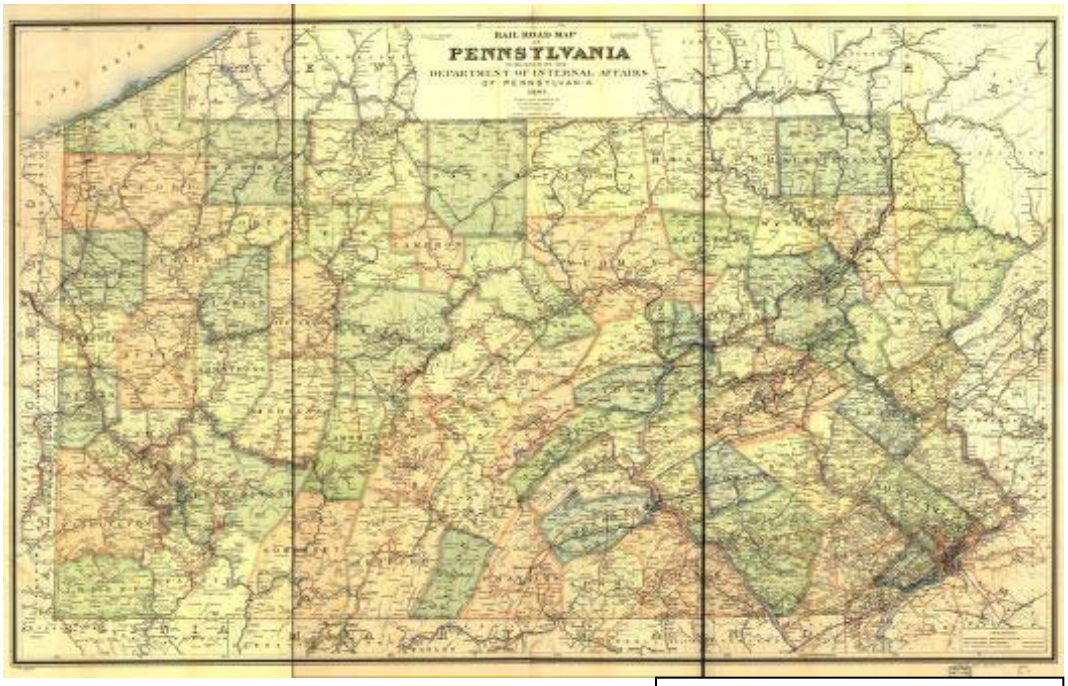


**Image 15: PA Railroads-1855**
*(Library of Congress map Collection, 2009)*

Due to their decreasing usefulness, the railways were going bankrupt. In 1962 the Pennsylvania Railroad and the New York Central merged and took the title of the Penn Central Railroad. In eight short years, the company was insolvent and was bought out by a new government system known as Amtrak.

Roadways and the Automobile

The rivers were important as early arteries of commerce but were soon supplemented by roadways, initially in the southeastern area encompassing Bucks County. Advances in bridge technology helped roadways to supplant waterways as the primary means of travel. Fur trade with the Natives was an economic engine in the

colonial period and quicker means of transporting the goods for sale were rapidly becoming a necessity. As agricultural practices increased, the transport and sale of farm products to major urban areas also became necessary. Construction of new roadways connected small communities to their urban counterparts, easing the sale of agricultural goods. Henceforth, both waterways and roadways linked urban with rural areas. By 1776, stagecoach lines stretched from Philadelphia into south central Pennsylvania, making Philadelphia one of the most important foreign trade centers in the colonies and the commercial metropolis of an expanding hinterland.

Roadway construction also made settlement of new regions of the state possible. By 1832, Pennsylvania led the nation in newly implemented and improved roads, boasting more than 3,000 miles of roadways (Root, 2003). The bridges by which roads crossed the waterways created cultural crossroads within the landscapes and served as a microcosm of the future direction in which technological advancement would soon take the American landscape. Although 1,700 state-owned bridges were built before 1900 in Pennsylvania (Root, 2003), road building activity actually lapsed a bit during the canal and railroad era, then surged again with the advent of the automobile.

By the 1920s the automobile allowed an unparalleled expansion of the city, unrestrained by a focal anchor like that of a trolley car or railroad (Kostoff, 1992). The automobile became the quintessential private instrument, but it operated on publicly maintained roads. As the automobile began to erode the pattern of the streetcar suburb through the scattering of business functions, the weakening of the civic core as a central

hub for social and cultural life, and the dispersal of population into the suburbs, it continued the pattern of centrifugal growth initially promoted by the electric streetcars.

The Interstate Highway Act of 1956 was the last great tool leading to the decentralization that now characterizes Pennsylvania's cities. It contributed a national connective tissue through a seamless fabric of concrete and asphalt, but also stretched the city to the point where its traditional characteristics were lost.

### *Agriculture in Pennsylvania: Historic to Present*

From its origins, Pennsylvania ranked as a leading agricultural area in the U.S., producing surpluses for export as an early economic engine. As early as the 1750s, an exceptionally prosperous farming area heavily reliant upon wheat and corn had developed in southeastern Pennsylvania, the region that includes Bucks County. These agricultural systems were dominated by German immigrants and traditions and spurred the initial development of the western and northern portions of the state, correlated with an increase of livestock farming.

During the pioneer era of Pennsylvania agriculture, more than half of all Pennsylvanians lived on farms (Fletcher, 1955). Agriculture was a way of life and all members of farm families served as farm workers. As other new agricultural techniques emerged and an abundance of crop varieties began to be farmed in the region, the amount of farmland within the state rapidly increased. Some of the new techniques were actually invented in Pennsylvania; for example, early in the 19th century Joseph and Robert Smith

of Bucks County invented a practical cast-iron plow that was an immediate success with farmers, along with a thresher that cleaned and threshed grain in a single operation.

By 1880, however, the growth of total farm acreage in Pennsylvania, which had begun in the colonial period, ended (Pennsylvania Historical and Museum Collection 2008). Total farm acreage has declined ever since, though this trend has been outweighed by improved farming methods that permit production of the same amount of yield on smaller allocations of farmland. Pressure from regional population growth in the region and the need for commercial, residential, and industrial developments caused the total acreage devoted to agriculture to plummet.

> By 1840, the agricultural frontier line within the state had disappeared. With the advancing of settled lands, the area in farms increased from about 14,000,000 acres in 1840 to slightly over 19,000,000 acres in 1900. After that, there was a sharp decline; by 1940 the total area in farms was again about 14,000,000 acres, as it had been a century earlier. The primary cause of this shrinkage was abandonment. By 1940 approximately 50% of Pennsylvanian lands were agricultural, compared to 60% in 1840. However, despite this drastic loss of land, agricultural production remained consistent thanks to improved farming techniques and technological advancement (Fletcher, 1955, p. 3).

During the period from 1840 to 1940, Pennsylvania agriculture was transformed gradually from a simple and largely self-sufficing occupation and way of life into a capitalistic, scientific, and highly commercial enterprise (Fletcher, 1955). Many of the early colonial settlements were self-regulating communities bounded by blankets of agricultural lands. However, the advent of new transportation lines connecting areas within the region enabled an expansion of market services devoted to agriculture and the development of town and city markets. As a result, beginning in the mid-1800s and

greatly accelerating after the Civil War, Pennsylvania farmers began to produce crops and livestock primarily to sell, not simply to feed their own settlements.

Today, Pennsylvania is a state of family-sized farms. As of 1955, the average size of a Pennsylvania farm had been decreasing by about 1/3 of an acre per year since 1840 (Fletcher, 1955), but more recently the annual decrease has grown to one acre per year (Hylton, 1995). Agriculture, nevertheless, remains Pennsylvania's leading industry. While the acreage farmed has fallen significantly over the past 50 years, farm production has still increased dramatically due to technical improvements. The state government has fostered many agricultural developments, recognizing Pennsylvania's 51,000 farms as the backbone of the state's economy. Pennsylvania is one of the nation's most significant food distribution centers, supplying farm and food products to markets from New England to the Mississippi River. Pennsylvania agriculture continues to grow stronger through the statewide efforts of farm and commodity organizations, agricultural extension services, strong vocational agricultural programs, and the Pennsylvania Department of Agriculture, all of which keep farmers informed of new developments and assist them in promoting and marketing farm products.

In recent years Pennsylvania has managed at least to slow the process of the conversion of agricultural lands. In fact, it has seen an increase of about 5% in the total number of farms (see Image16). This statistic, however, can be a bit misleading for two reasons. First, new types of operations such as Christmas tree farms, maple producers, and equine operations were counted as farms by 2007; second, although the number of farms increased, the total amount of agricultural land continued to decrease (see Image

17). Since 1974, only the smallest category of farms (1 to 49 acres) has increased in number (see Image 18). Many of these small farms are actually only hobby farms, worked by individuals to produce specific yields for their families. Assessing the farmlands by land area makes clear the substantial conversion of agricultural spaces to other uses. The total amount of agricultural land in Pennsylvania has decreased by around two thousand acres since 1974 and by about one percent per year since 2002 (see Image 19), despite the increase in the total number of farms.

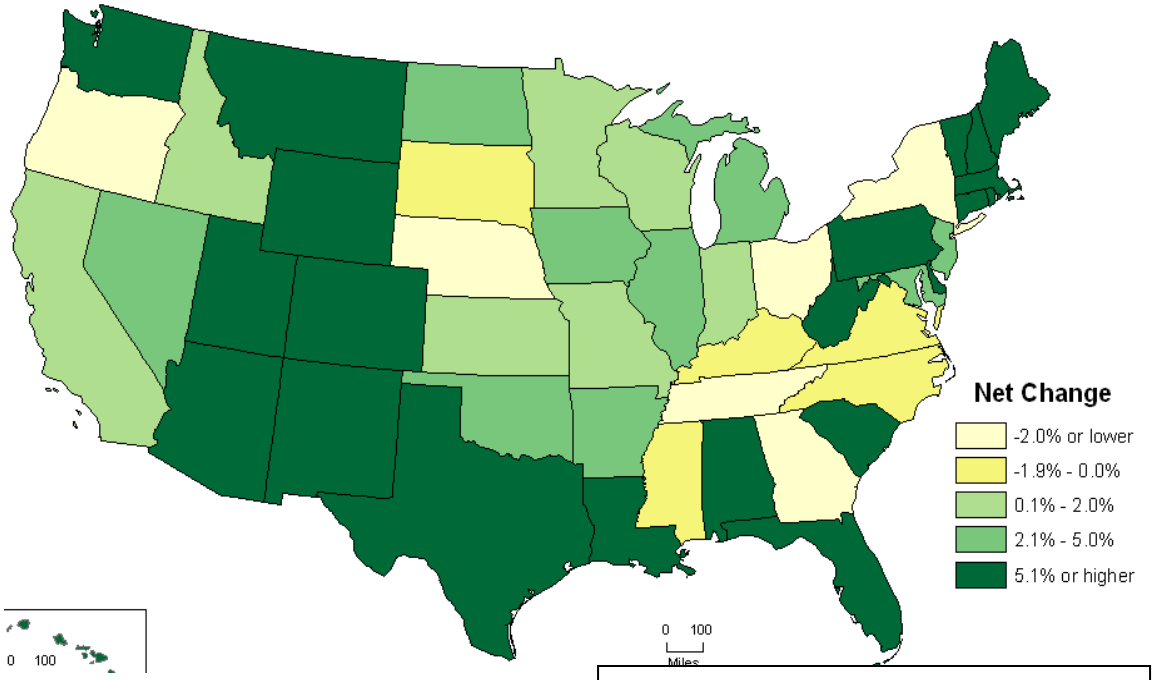


**Image 16: National Changes in Number of Farms 2002-2007**
*(U.S Dept. of Agriculture, 2007)*


**Image 17: Number of PA Farms: 1974-2007**
*(National Agricultural Statistics Service, 2007)*

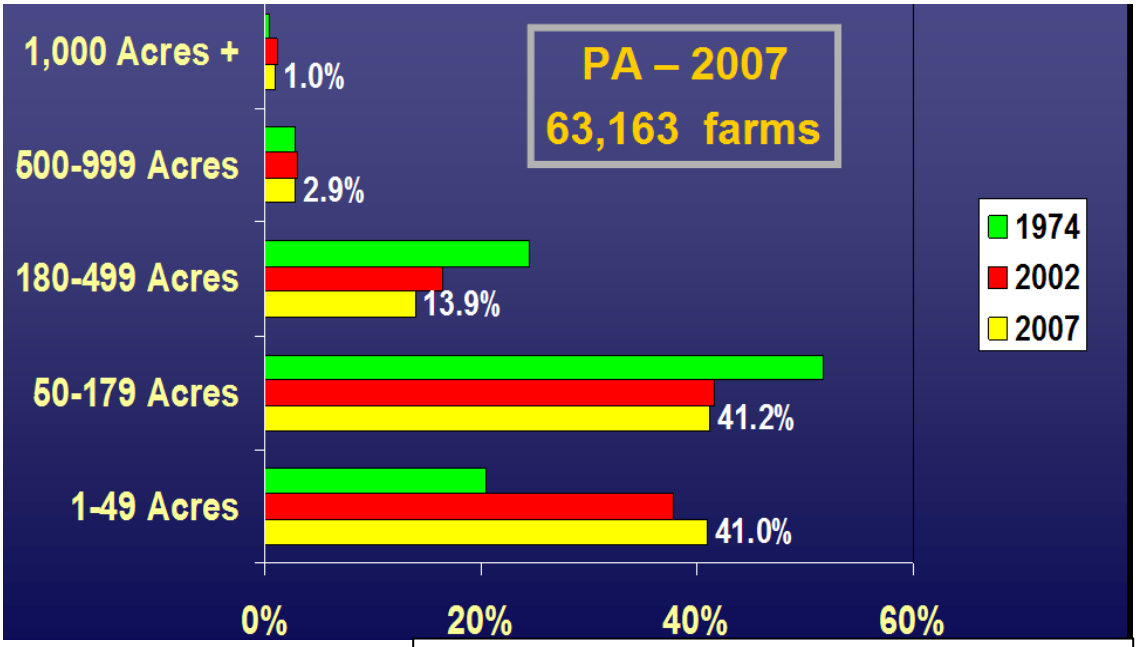


**Image 18: Number of PA Farms by Size of Farm: 2007**
*(National Agricultural Statistics Service, 2007)*

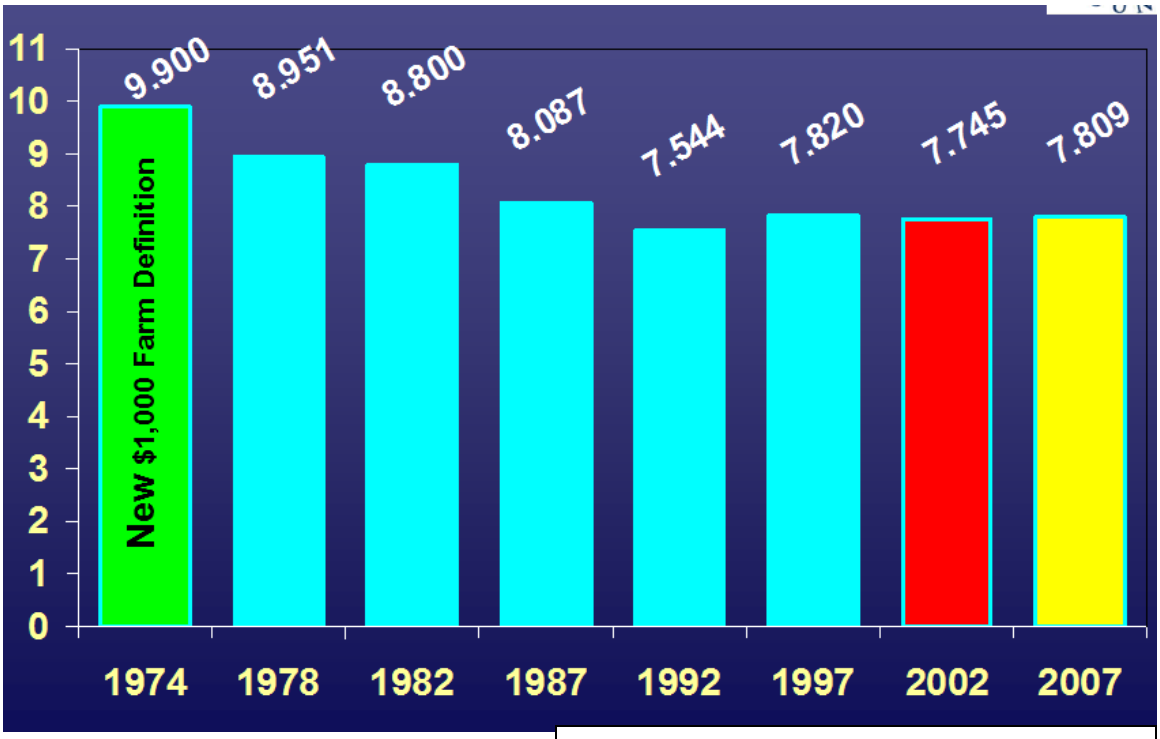


**Image 19: Land in PA Farms: 1974-2007**
*(National Agricultural Statistics Service, 2007)*

***Suburbanization and Population Changes***

The cultural shift resulting from the increase in automobile use and many other American value shifts after World War II changed the Pennsylvania rural landscape from close-knit, traditional townscapes to spread-out strip malls and repetitious, cookie-cutter neighborhoods. In a study done by cultural geographers Pierce Lewis and Wilbur Zalinsky in 1992, the Pennsylvania region stood out to most Americans as having no clear mental image (Nasar, 1998). In other words, this area could not be concretely defined according to the impressions brought forth by recalling its visible landscape. This situation was partly due to the multicultural foundations of the region, which revealed themselves in the visible landscape as a hodgepodge of overlapping styles of differing

societal customs and traditions. Today, however, this diversity is increasingly buried beneath the new asphalt of sprawl, which leaves behind a trail of eroding neighborhoods and dilapidated buildings. Abandonment of buildings in one of the nation's most historic areas and simultaneous destruction of its pristine farmlands and wooded areas have resulted in a state replete with functionless and unused inner-city structures.

> Although the state has grown demographically by 20 percent in last 50 years, a relatively low growth rate, virtually all Pennsylvania cities have lost populations. Eighty five percent of the high income families live in suburbs while 80 percent of the low income populations live in the city. In fact, Bucks, Chester, and Montgomery counties are the most suburbanized in the state and have the smallest percentages of low income people (Hylton, 1995, p.16)"

Basically, an area the size of Delaware has been lost to development in the last 10 years in the region while populations have declined overall. Historically, Pennsylvania is one of the nation's most populated states, but its current population of 12 million (U.S. Census Bureau, 2009) has not changed significantly in several decades. Simultaneously, Pennsylvania has lost more than 4 million acres of farmland since the 1950s. In the last 22 years, one-fourth of Pennsylvania's farmlands have disappeared, while the statewide population has decreased by 140,000 residents (Tse-Chuan & Snyder, 2007). Historical trends show that, through 1910, the state's population grew by 10 per decade, but it has not grown by 10 percent in a decade since the 1930s and its share of the national population has declined rapidly (see Image 20).

The 2000 census reported that, from April 1995 to April 2000, 131,296 people migrated out of Pennsylvania and 1.5 million people migrated between the state's counties (Tse-Chuan & Snyder, 2007). These migration trends demonstrate that a significant number of Pennsylvania residents are shifting internally from one county to

another, contributing to the state's disparate population growth and land development patterns. While the total population has grown by only 4 percent since 1990 (see Image 21), the amount of developed lands has increased by more than 50 percent (see Image 22). These trends show that the population is spreading out and requiring larger parcels of lands to build upon.

Population statistics within Pennsylvania cities and boroughs (i.e., historically urban areas) have followed the same patterns (see Image 23). Populations in the cities and boroughs decreased by over 1,200,000 persons, or by almost 18 percent. The greatest population losses were experienced by Pennsylvania's cities, which lost 945,447 persons (23.2 percent), followed by boroughs, which declined by 274,978 persons (9.7 percent). In contrast, population in townships of the first and second class increased by 42,333 (2.9 percent) and 1,659,641 persons (48 percent), respectively (Tse-Chuan & Snyder, 2007) (see Image 23).

This population growth in relatively rural townships is the primary cause of the change in land cover. For example, the total number of acres developed in Pennsylvania increased by 53.6 percent, while Pennsylvania's population grew by only 3.4 percent; 1.6 acres were developed for every person added to Pennsylvania's population during the 1990s. Despite Pennsylvania's population increase of 3.4 percent in the 1990s, the density of its developed areas decreased from 17.2 to 12.1 persons per developed acre. As a consequence, many urban areas in the state have languished, experiencing increasing blight, decay, and abandonment.

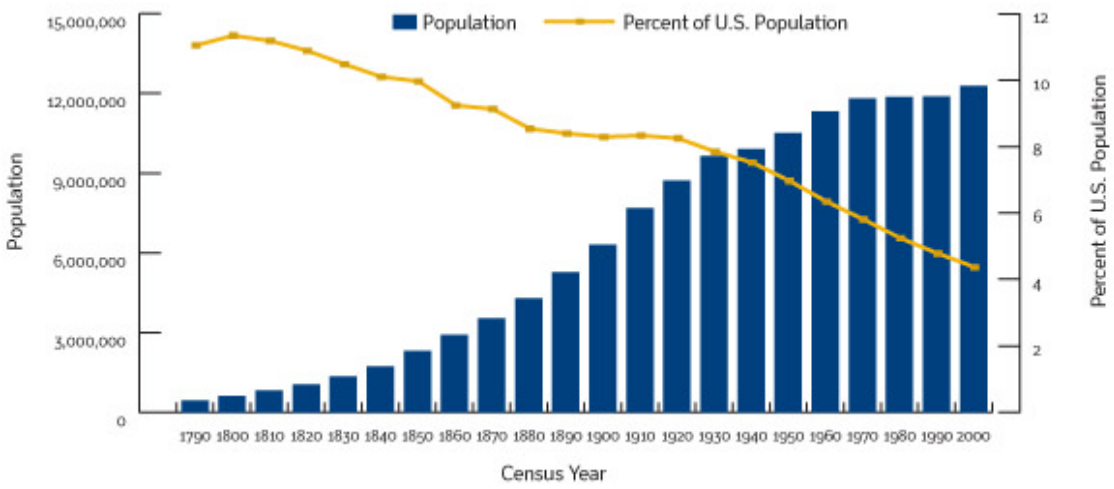


**Image 20: PA Historic Population Growth and Share of U.S. Population**
*(Tse-Chuan & Snyder, 2007).*

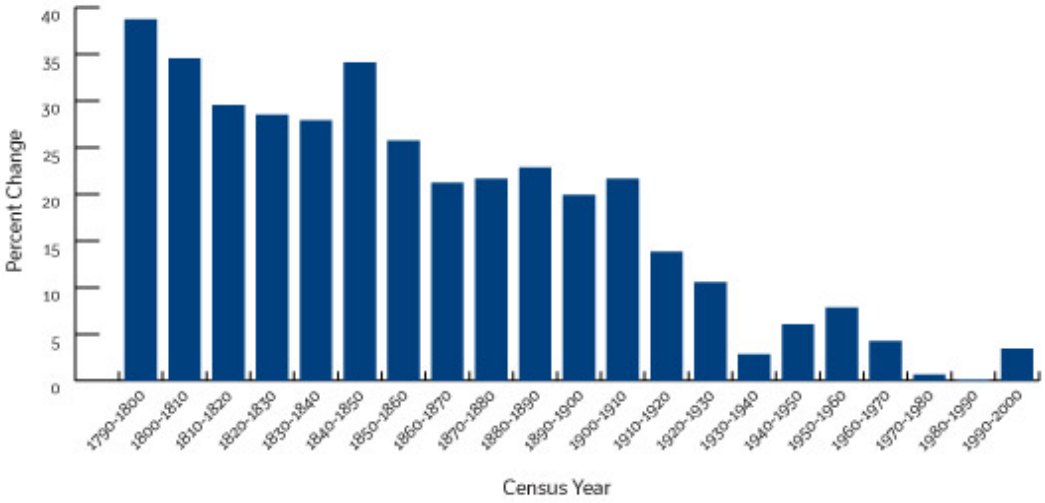


**Image 22: Rates of Change for Developed Lands and Land Cover Distribution**
*(Tse-Chuan & Snyder, 2007)*

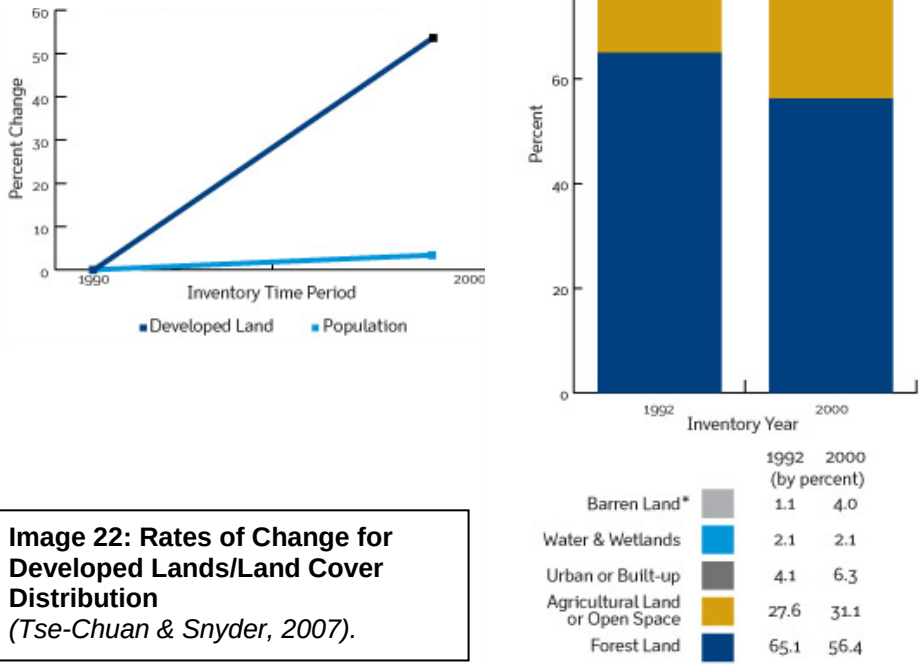


**Image 22: Rates of Change for Developed Lands/Land Cover Distribution**
*(Tse-Chuan & Snyder, 2007).*

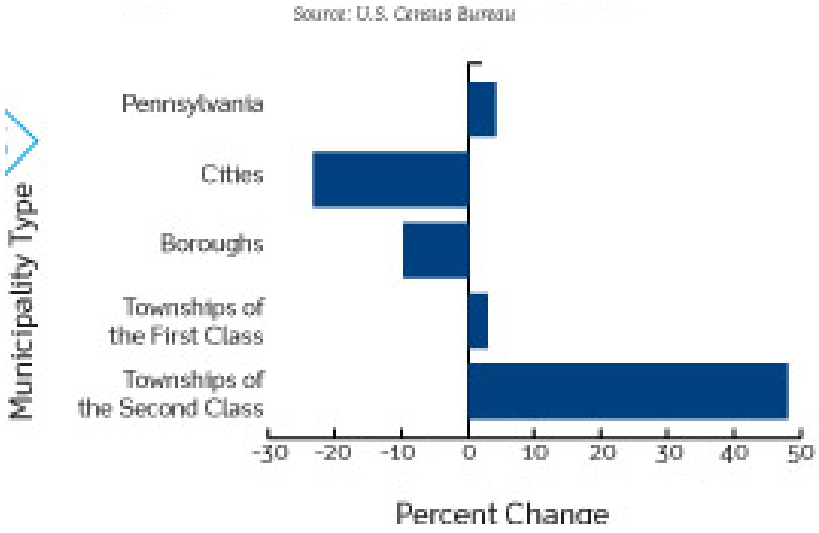


**Image 23: Population Change by Municipality Type**
*(Tse-Chuan & Snyder, 2007)*

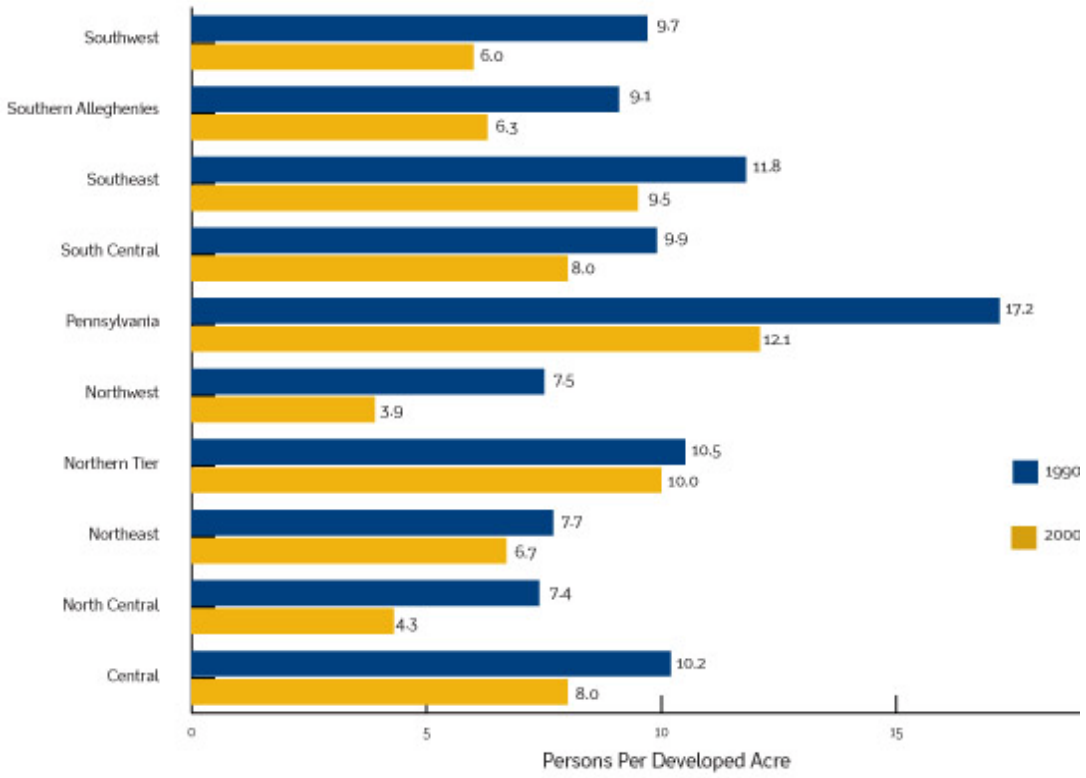


**Image 24: Persons Per Developed Acre: 1990-2000**
*(Tse-Chuan & Snyder, 2007).*

Rural and urban population trends seem to show that this process is continuing. In 1970, Pennsylvania's rural areas housed 3.02 million residents. By 2000, that number had grown to 3.39 million, an increase of 11 percent. On the other hand, in 1970, 8.73 million people lived in Pennsylvania's urban areas; by 2000, the urban population had increased by only 2 percent to 8.88 million. This pattern shows that the rural lands are gaining population five times faster than the urban areas, a primary reason for the loss of agricultural acreage. The out-migration of populations from urban cores has,

simultaneously, left many of the inner-city areas functionless and unoccupied, resulting in a rapid pace of decay. And this uneven population growth is projected to continue:

> By 2030, rural areas are projected to have a total population of 3.57 million, an increase of 5 percent from 2000. Projections show that, by 2030, 9.62 million people will live in urban Pennsylvania, an increase of 730,000 residents, or 8 percent, from 2000. In the 60-year span of 1970 to 2030, rural Pennsylvania's population is projected to experience a gain of 17 percent, or 515,000 new residents. In comparison, the U.S. population is expected to grow 79 percent, for a gain of 160.2 million residents (Center for Rural Pennsylvania, 2009, p. 4).

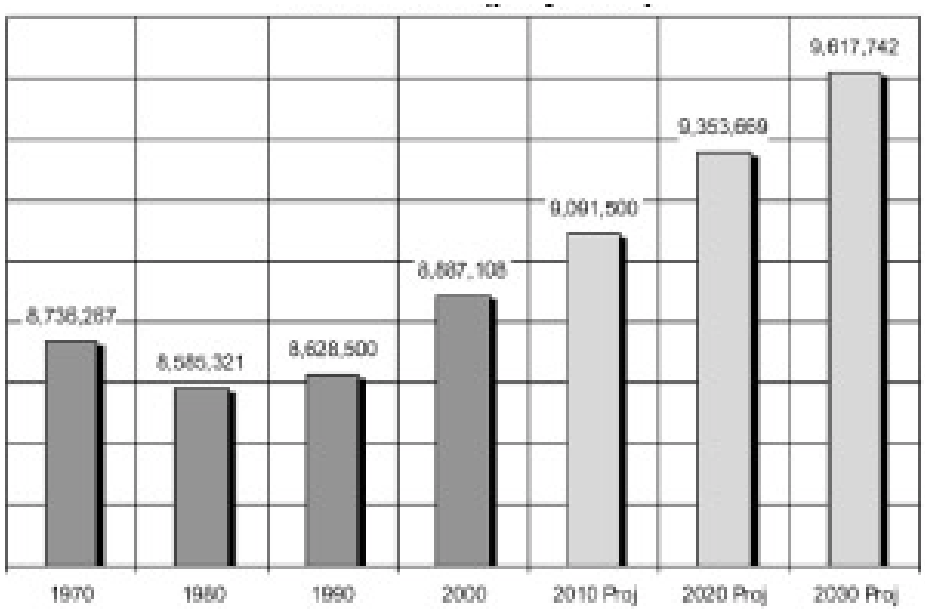


**Image 25: Urban PA Populations and Projections: 1970-2030**
*(The Center for Rural Pennsylvania, 2009)*

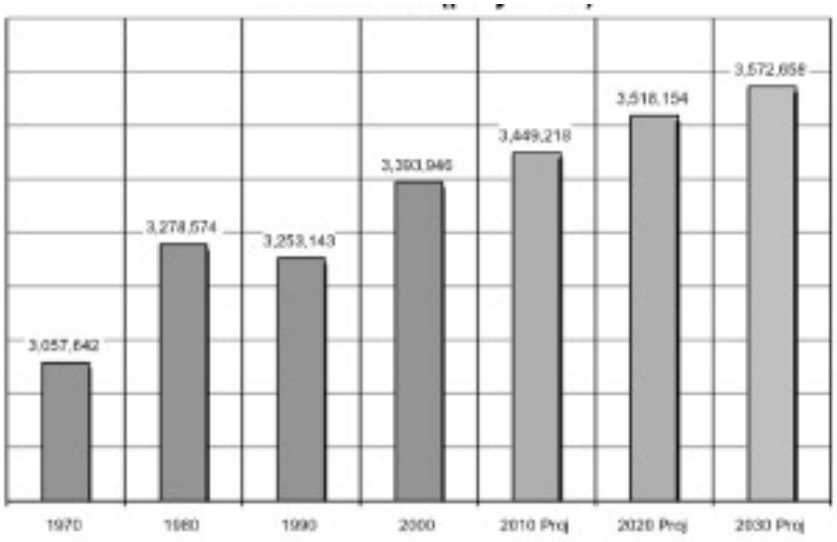


**Image 26: Rural PA Populations and Projections: 1970-2030**
*(The Center for Rural Pennsylvania, 2009)*

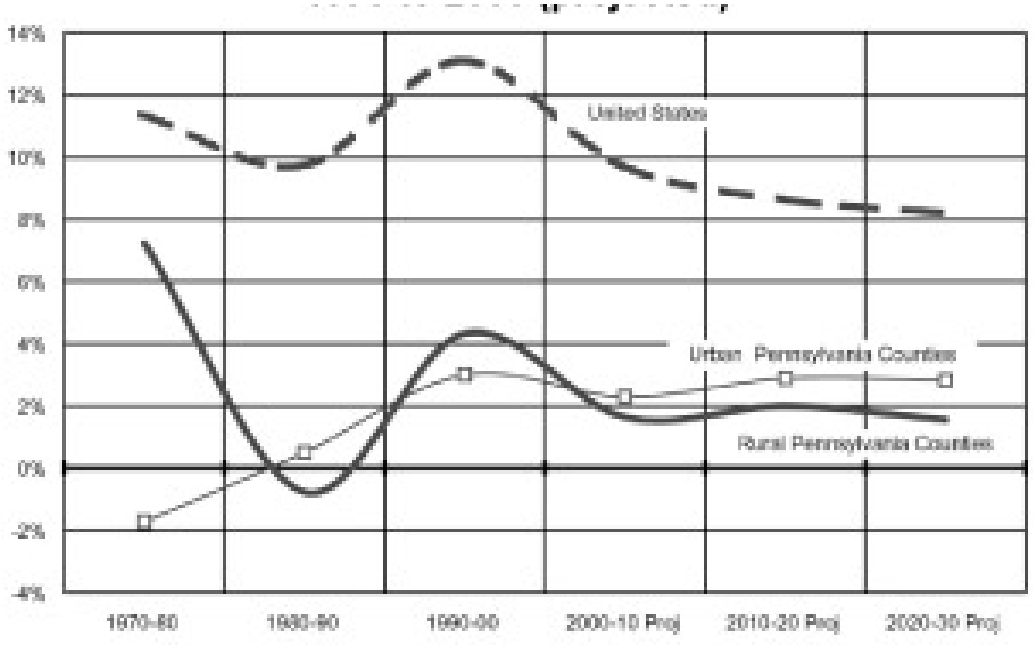


**Image 27: Percent Change in Population in PA and U.S.**
*(The Center for Rural Pennsylvania, 2009)*

### *The Northeastern Settlement Landscape: Building Materials*

Early 17th-century domestic colonial architecture within the Delaware River Valley was somewhat influenced by Swiss and Dutch cultural elements, despite their relatively small percentage of the population, and heavily impacted by English Quakers who dominated the areas by the late 1600s. Mostly vernacular in impact and somewhat ephemeral, Swedish and Dutch elements were more decorative than definitive (Noble, 1984). Guided by William Penn's vision based on trade and commerce, the architectural character of historic Quaker settlements was characterized by gravitation towards cities and ports along rivers; buildings replicated the small, red brick structures of the Georgian English cities that they had fled in search of religious freedom. As settlement continued until the end of the 17th century, architectural character began to mimic the style of rebuilt London, being reconstructed after the great fire of 1866, and more aristocratic typologies.

As the Quaker populace left its impression upon the urban landscape, German migrants were steadily altering the rural landscape. German settlers began arriving at the same time as the Quakers, but in much smaller numbers, and they chose to leave their cultural stamp on the countryside, using the limestone found in these bucolic areas as their primary building material.

Immediately following the Germans came the Scottish-Irish, who were forced to settle on the poorest agricultural lands due to their late arrival. This group began intermingling with the existing cultures and using mixes of building materials that would eventually characterized the entire region. By the late 1700s and early 1800s, building

material began to reflect social stature. Log buildings indicated the low-income demographic, stone indicated the middle to upper class, and Georgian brick style gave the indication that the owner was a wealthy figure (U.S. Department of the Interior, 2000).

Intermixing of ethnic groups and fashion changes led to the diffusion of cultural identity. As new technologies emerged, the stonemasonry that characterized German structures and the time-consuming effort of selecting, cutting, and placing stone became increasing costly (Rivinis, 1972); as a result, construction of stone buildings became less common. Actually, many of the stone cottages that remain in the landscape were crafted from rock from the Delaware River itself, as stone construction remained an attractive way to prevent the spread of fire. As a result, a fascinating variety of historic brick, stone, log, and wooden structures continue to form a collage amidst the urban and rural landscape of the Delaware River Valley.

# Chapter 5

# THE BUCKS COUNTY SETTLEMENT LANDSCAPE: AGRICULTURE, SUBURBANIZATION, AND EVOLUTION

### *The Delaware River Valley*

When Bucks County was first formed, the rivers were the primary organizing device for its political boundaries. The Delaware River receives water from a network of streams and two major creeks: the Neshaminy, draining two-thirds of the county's 640 square miles, and the Tohickon, which drains much of the upper portions of the county **(**Soderlund, 1983). The Delaware River Valley lies within the fertile Piedmont Plateau, nestled between the Delaware River on the east and the Susquehanna River on the west. As immigrants purchased tracts of lands from William Penn's sons, forests were cleared to uncover the nutrient rich limestone substrata, watered by the area's abundant streams, that produced extremely fertile soils. Today, descendants of immigrant German Protestant settlers continue to sow and reap on the several thousand small farms that dot the landscape. The communities that have grown from this rich agricultural haven have long held steadfast in their attempts to retain their traditional and historical character.

Bucks County rests within the Delaware River Valley, near the southeastern corner of Pennsylvania. Set along a sweeping bend of the Delaware River that forms both its northeastern and eastern boundaries, Bucks County gains great economic benefit from its location. The idyllic forests and agricultural lands of the county act as an opposing force to the two metropolises of Philadelphia and New York City between which the county lies. Despite the onslaught of suburban expansion, some portions of

Bucks County have been able to retain quaint, small scale, dense towns which coexist with the fertile agricultural landscape and act as rich pockets of American history and the primary ingredient to the harmonious recipe which produces the traditional quality of the valley.

### *The Clashing of Cultures: The Formation of Bucks County*

The profound discovery of the "New World" by European explorers resulted in a contested American landscape that would eventually generate a cultural kaleidoscope within the Pennsylvanian colony and the Delaware River Valley. As the Virginian and Massachusetts colonies were rapidly settled, Pennsylvania and the Delaware River Valley somehow remained an afterthought. Henry Hudson entered the region with the Dutch in 1624 in pursuit of rich farmlands, and the push for settlement within Pennsylvania began (McNealy, 2001). The Dutch set up small, clustered settlements on islands within as they began their westward expansion. As the English began to probe the wilderness of what was to become Bucks County in 1633, they settled only on the outskirts of the mainland, due to a lack in navigation technology. Not until five years later did the Swedes finally manage to drop anchor on the mainland, founding a settlement known as New Sweden. Dutch and English settlers eventually conquered the Swedish forts and began the pursuit of the westward expansion of the American frontier line.

These clashing European cultures laid claim to lands already inhabited by tribal nations, who had reaped the bounty of the region's forested mountains, rushing rivers, and fine valleys (Root, 2003). European settlers brought not only new ideas and customs

to the area, but also measles and smallpox, which weakened Native populations such as the Lenape Indians, the Susquehannocks, the Eries, the Neshaminy, and the Five Nations of the Iroquois (McNealy, 2001). The new settlers considered these tribes "savage" and in need of learning European "civility."

The process from "wilderness" to "civilization" of the American landscape was a transition from stewardship and mobility to consumption and permanence (Cronon, 1983). The introduction of Native Americans to the practice of agriculture proved to be the stabilizing factor in their normally nomadic way of life. Cronon (1983) argued that, as European countries imposed their customs and cultural traditions upon the existing Native ways of life, both human and landscape went through a process from "savagery" to "civility." The Natives were a mobile society who altered their homelands as the seasons changed; the Europeans, however, were cast in the mold of a stable and non-nomadic culture. Whereas Indian villages were non-agricultural and varied in size and location seasonally, European settlers created relatively permanent settlements based on farming systems.

Agricultural practice brought with it a sense of ownership and husbandry of property. To take possession of a land was to make the resident permanent and provide a certain care for it. This was also a European way of claiming lands from Native Americans who had possessed them by right of first occupancy. Agricultural activities were one of the first considerations in a town's layouts, and land division became the process by which New World mosaics were created.

The conflict between Native and European cultures thus centered on the land and its use. An advanced Stone Age culture mixed with differing European customs, resulted in a highly contested county with differing visions. To some Europeans this corner of the New World was "forbidding and uncivilized and ripe for improvement," but to others it was like a Garden of Eden, "unspoiled and full of promise" (Root, 2003). However, to the many Native cultures who already called the campestral oak-hickory forests home, the landscape was simply that: home. "Though they cut down trees to make small villages and gardens, these were temporary clearings to be reclaimed by the forest after the soil was exhausted and the community moved on. To the European, taking an axe to the woods meant building a permanent new home; to the Lenape, it meant destroying their old one" (McNealy, 2001).

### *The Creators of the Bucks County Landscape*

#### *William Penn's Vision*

Although the multicultural settlement of Bucks County created a clash of settlement ideals within the occupying populace, one man attempted to create a system of settlement that could serve as a peaceful framework for all groups. One of three original Pennsylvania counties founded by William Penn in 1682, the Bucks County received its name from a shortening of the name Buckinghamshire, England, where the Penn family originally lived. A visionary and idealist, Penn put forth new ideas about religious freedom, political organization, and social reform in an attempt to resolve some of the cultural clashes within the colony. The new colony acted as the midpoint of the original

thirteen colonies and the centerpiece of the American frontier at that time. In 1681, King Charles II gave 40,000 square miles of territory to William Penn in exchange for forgiveness of a 16,000-pound debt owed to his father, who had been an admiral in the British navy. The king named the land "Pennsylvania" in honor of William's father who had died eleven years earlier. The tax applied to this land was two beaver skins and one-fifth of all gold and silver found there (McNealy, 2001). In November 1682 Penn sailed to America aboard the *Welcome* and began implementing his vision for the New World.

Penn immediately began laying out plans for an ideal colony that would blend the urban with the rural. His intention was to project agriculture as a vital instrument in the character of a place, but he was also aware of the need for great cities. As one of the nation's first planners, Penn laid out Philadelphia with four green squares (which are still intact today) as the foreground to which rural towns would be designed as background.

With Penn as proprietor, a development plan was devised for the rural farms surrounding the capital. For every 5,000 acres of lands purchased surrounding Philadelphia purchased, buyers also received specified smaller lots within the city as well (McNealy, 2001). Pursuant to this incentive-based program, new owners who could encourage six families to settle in these developing rural towns received their lands for free. However, Penn, being the visionary he was, also saw the need to reserve some of this peripheral land while clearing areas for development. New owners were required to leave one acre of trees of every five on land they purchased (McNealy, 2001). Preservation of tree specimens such as mulberry and oak was encouraged because of the demand for silk and ship building at the time.

Penn divided the province of Pennsylvania into the counties of Bucks, Philadelphia, and Chester in 1682 **(**Soderlund, 1983). These counties subsequently began to divide themselves in a different manner, one unlike the typical local governments of Virginia and New England but, rather, along a medieval premise of traditional English patterns of local government. The "township and borough" method was a method of politically dividing the county according to settlement and local government. The county itself was to have little or no political authority, but acted as a collecting device for the regional localities; local governments would take precedence (Peterson, 2003).

According to Penn's vision, the original intent of this layout was to create a system of locally governed townships, each of them about six square miles, or 5,000 acres in area. Each of these townships was to be near six square miles in area or around 5000 acres in size at maximum. Each township was then divided into a village with a "townstead" and a "commons" (McNealy, 2001). The "townstead" was to become a centrally located downtown, while the "commons" was a green space located at the core of this townstead, free of cultivation and set aside for public use. The commons would be the town square, with wedge-shaped farms radiating from its extremities. Each townstead was to be organized around two streets, with a primary arterial serving as a linkage to a meeting house and a church around which the surrounding residences would be organized. On the outskirts, 500-acre farms would encompass these townsteads, completing the formula for township layout. (McNealy, 2001). Since the town square idea was usually disregarded in the planning of these rural villages, outlying agricultural lands became the original shared social spaces of the time.

As the settlements filled their cores to capacity, new towns spawned from populations of surrounding cities that have been filled were planned and laid out, with surrounding farmlands providing open spaces for the residents. Infill development began to occur, however, and Penn's vision was not fully developed. New settlements formed their own local governments and disrupted the planned developments Penn had envisioned, sometimes breaking free from their townships to become new localities.

Today, many of Penn's original visions of Bucks County have vanished from the landscape. The "commons" in Newtown, Pennsylvania has been replaced by a monument, and the "townstead" in Wrightstown was long ago subdivided and sold for development. Other townships planned at initial settlement never came into existence. Townships such as Buckingham and Solebury had also initially planned for a central village with a commons, but as the townships were developed that idea was abandoned resulting in the creation of more densely populated boroughs instead. Although modern changes may have disrupted some of the implementation of Penn's ideals, one objective remained consistent: the towns were encompassed by farmlands.

*Henry Mercer's Vision*

The eventual settlement and incorporation of Pennsylvania and Bucks County resulted in a landscape that began to discard many of Penn's original ideals in pursuit of new American ones, such as Enlightenment philosophies and, later, the modern pursuit of technological advancement. As the Industrial Revolution was sweeping the country by the early 1900s, Henry Chapman Mercer, a resident of the county from 1856 to 1930 and

a founding member of the Bucks County Historical Society, noticed the transformation in the Pennsylvania landscape. Deep anxieties spawned by America's transition from a preindustrial to an industrial and commercial society, and from a producer to a consumer culture, caused Mercer to begin preserving relics of this transformation as a symbolic representation of the state's evolution.

Henry Chapman Mercer was born in Doylestown, Bucks County in 1856. He was a ceramist, folklorist, archaeologist, architect, historian, collector, and musician (McNealy, 2001). In a county that valued hard work and agriculture as its primary means of progress, industrialization and technological change generated new and easier means of producing goods. Mercer saw the types of tools used in the region as representations of the collision of cultures within the county. He believed that tools illustrated the daily life of a people at a given time (Arbor, 1994). For example, as the rise of agricultural societies led to improvements in farm methods and machinery, Pennsylvania turned toward a market-oriented approach in the mid-1800s in place of a self-regulating farmstead system. Mercer began collecting outdated tools as technological advances began to replace them. He saw these tools as a microcosm of the evolutionary path that characterized the entire nation and as cultural remnants and artifacts, not just decaying rubble. He even referred to his collection as the "Tools of the Nation Maker" (Arbor, 1994). To Mercer, the story of Bucks County was the story of the entire nation.

The Mercer Museum is not only the collecting agent for Mercer's many cultural artifacts, but a symbol of Mercer's philosophy of how the landscape should be developed. In the museum, Mercer organized his collections according to their function. The

artifacts were grouped according to how they met human needs. His plan was to arrange the exhibits in logical order, beginning at the bottom of a four-story layout. First would come those tools that had to do with the securing and preparing of food; then clothing; then shelter; then the arts and sciences. His premise was to place a primary structure within a space and then allow surrounding structures to complete the space as they were implemented.

Mercer saw a rejuvenation of art, honest labor, and spiritual vitality in the "object lessons," as he referred to them, that he collected. To Mercer, these tools were not only preservations of nostalgia, but the antidote to a landscape that was being tragically altered. The collection of these democratic pieces of evidence helped to explain the patterns of human history and made connections from the past to the present through their antiquity. Mercer sought to zealously rescue and preserve the material records of the transformation of the Pennsylvania landscape so as to make meaningful connections between past and present, rising above mere antiquarianism. Scientific but also tinged with nostalgia and a certain disquietude with the relentless pace of modern mechanical innovations, Mercer expressed a concern for the historic aspects of landscapes that was shared by many others of his time (McNealy, 2001).

An 1879 Harvard graduate, Mercer became one of the four founders of the Bucks County Historical Society in 1880. This society sought to preserve the remnants of the ideals set forth two centuries earlier by William Penn. Mercer saw the need for modernistic advancement to cater to the inhabiting culture, but also realized the need to

preserve and maintain historical remnants that would visibly display this advancement and the roots with which it was inescapably intertwined.

Mercer's death in 1930 paralleled the beginnings of the Great Depression, which further threatened many of the attributes that had created the character of the Bucks County landscape. Mercer was an extremely wealthy man who built one of America's only castles, Fonthill. A stickler for traditional development, Mercer never compromised his beliefs despite his fortune. A rusted bicycle lays aside the dining room in his Fonthill estate, symbolic of his belief in antiquity and heritage. Mercer never purchased an automobile and made many of the luxuries of his castle, such as stair rails, from scrap iron and artifacts that he had gathered amidst the Bucks County landscape.

Whereas William Penn's framework for new municipal layouts may have fallen short of many of its initial goals, it left its indelible impression upon the Bucks County landscape. Mercer, in a rapidly changing and industrializing world, saw a need to preserve Penn's ideals. Each creator of the Bucks County landscape would contribute to its two primary identifying components as agriculture and historic preservation. Sadly, due primarily to civic expansion in an automobile-driven society, these two elements are being threatened by the same enemy: massive suburbanization.

### *Suburban Sprawl and Population Changes in Bucks County*

Legend has it that Henry Ford once visited the Mercer Museum and offered to purchase it and move it to Michigan, as part of a historical museum of his own creation. Mercer refused to sell. Ironically, the ideals promoted by Ford would eventually corrupt

the serenity of farming communities within Bucks County. Assembly-line, mass-production, Levittown-style housing based on Fordist principles would eventually make its impression on developers, and the growth of single-family housing would ultimately force the conversion of Pennsylvanian farmlands**.** Population booms after World War II further encouraged people to leave cities, combining with automobile dependency and the beginnings of a national highway system to set the stage for a new centrifugal development pattern directly opposite to the region's historical layout.

As one of the first Levittowns was to be located in southern Bucks County, the county would become an early player in the sprawl that would come to plague the nation. Once a destination in its own right, the county is now increasingly seen as a suburban location for those who work in Philadelphia or even New York City. Rapid development has erased considerable history in one of the nation's oldest counties.

Located 45 minutes north of Philadelphia and 1.5 hours from New York City, the rural farmlands of Bucks County are rapidly being converted to suburban developments. The county has lost 70% of its farmland between 1950 and 1997, a drop in acreage from over 260,000 to fewer than 84,000 (U.S. Department of Agriculture, 2005). Assuming a conversion rate of about 1 percent per year since 1997, the total as of 2010 would be around 81 percent. The region is ranked second on a list of the nation's 20 most threatened lands and was also voted one of the top ten "Last Chance Landscapes" by Scenic America (Olson & Lyson, 1999).

This farmland conversion is due to the combination of overall population increase and inner-city population decrease (Hylton, 1995). Bucks County has nearly doubled

since 1960, adding 300,000 people to its population (see Image 28). There was a 35% increase in population from 1960-1970; since then the increase has slowed slightly, but has remained substantial (see Image 29). Population projections predict that Bucks County will grow another 17% from 2000 to 2030, the 12th-highest growth rate among Pennsylvania's 67 counties (see Image 30).

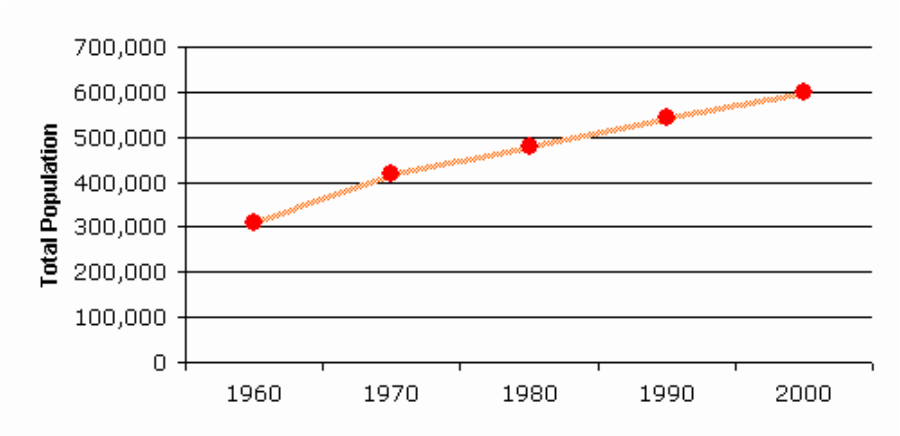


**Image 28: Bucks County Population Change: 1960-2000**
*(Tse-Chuan & Snyder, 2007)*

### Population, 1960-2000

| | 1960 | 1970 | 1980 | 1990 | 2000 |
|---|---|---|---|---|---|
| **Total** | 308,567 | 416,728 | 479,211 | 541,174 | 597,635 |
| **Change** | | 108,161 | 62,483 | 61,963 | 56,461 |
| **Percent Change** | | 35.05% | 14.99% | 12.93% | 10.43% |

**Image 29: Bucks County Percent Population Change: 1960-2000**
*(Tse-Chuan & Snyder, 2007)*

| | POPULATION | | | % CHANGE | |
|---|---|---|---|---|---|
| | 1970 | 2000 | 2030 (Proj.) | 1970-2000 | 2000-2030 (Proj.) |
| Pennsylvania | 11,793,909 | 12,281,054 | 13,190,400 | 4.1% | 7.4% |
| Adams | 56,937 | 91,292 | 114,689 | 60.3% | 25.6% |
| Allegheny | 1,605,016 | 1,281,666 | 1,132,736 | -20.1% | -11.6% |
| Armstrong | 75,590 | 72,392 | 63,736 | -4.2% | -12.0% |
| Beaver | 208,418 | 181,412 | 147,744 | -13.0% | -18.6% |
| Bedford | 42,353 | 49,984 | 51,926 | 18.0% | 3.9% |
| Berks | 296,382 | 373,638 | 491,914 | 26.1% | 31.7% |
| Blair | 135,356 | 129,144 | 107,272 | -4.6% | -16.9% |
| Bradford | 57,962 | 62,761 | 58,680 | 8.3% | -6.5% |
| Bucks | 415,056 | 597,635 | 697,961 | 44.0% | 16.8% |
| Butler | 127,941 | 174,083 | 220,496 | 36.1% | 26.7% |
| Cambria | 186,785 | 152,598 | 124,101 | -18.3% | -18.7% |
| Cameron | 7,095 | 5,974 | 5,612 | -15.8% | -6.1% |
| Carbon | 50,573 | 58,802 | 69,098 | 16.3% | 17.5% |
| Centre | 99,267 | 135,758 | 166,148 | 36.8% | 22.4% |
| Chester | 278,311 | 433,501 | 692,054 | 55.8% | 59.6% |
| Clarion | 38,414 | 41,765 | 37,895 | 8.7% | -9.3% |
| Clearfield | 74,619 | 83,382 | 79,890 | 11.7% | -4.2% |
| Clinton | 37,721 | 37,914 | 32,263 | 0.5% | -14.9% |
| Columbia | 55,114 | 64,151 | 69,765 | 16.4% | 8.8% |
| Crawford | 81,342 | 90,366 | 90,088 | 11.1% | -0.3% |
| Cumberland | 158,177 | 213,674 | 282,921 | 35.1% | 32.4% |
| Dauphin | 223,834 | 251,798 | 269,855 | 12.5% | 7.2% |
| Delaware | 600,035 | 550,864 | 583,942 | -8.2% | 6.0% |
| Elk | 37,770 | 35,112 | 26,269 | -7.0% | -25.2% |
| Erie | 263,654 | 280,843 | 267,538 | 6.5% | -4.7% |
| Fayette | 154,667 | 148,644 | 131,874 | -3.9% | -11.3% |
| Forest | 4,926 | 4,946 | 7,999 | 0.4% | 61.7% |
| Franklin | 100,833 | 129,313 | 148,596 | 28.2% | 14.9% |
| Fulton | 10,776 | 14,261 | 17,506 | 32.3% | 22.8% |
| Greene | 36,090 | 40,672 | 38,857 | 12.7% | -4.5% |
| Huntingdon | 39,108 | 45,586 | 47,564 | 16.6% | 4.3% |
| Indiana | 79,451 | 89,605 | 66,095 | 12.8% | -26.2% |
| Jefferson | 43,695 | 45,932 | 42,529 | 5.1% | -7.4% |
| Juniata | 16,712 | 22,821 | 25,696 | 36.6% | 12.6% |
| Lackawanna | 234,107 | 213,295 | 194,835 | -8.9% | -8.7% |
| Lancaster | 319,693 | 470,658 | 553,293 | 47.2% | 17.6% |
| Lawrence | 107,374 | 94,643 | 83,348 | -11.9% | -11.9% |
| Lebanon | 99,665 | 120,327 | 131,118 | 20.7% | 9.0% |
| Lehigh | 255,304 | 312,090 | 381,738 | 22.2% | 22.3% |
| Luzerne | 342,301 | 319,250 | 287,943 | -6.7% | -9.8% |
| Lycoming | 113,295 | 120,044 | 109,969 | 6.0% | -8.4% |
| McKean | 51,915 | 45,936 | 39,716 | -11.5% | -13.5% |
| Mercer | 127,175 | 120,293 | 122,967 | -5.4% | 2.2% |
| Mifflin | 45,268 | 46,486 | 45,599 | 2.7% | -1.9% |
| Monroe | 45,422 | 138,687 | 239,824 | 205.3% | 72.9% |
| Montgomery | 623,799 | 750,097 | 888,265 | 20.2% | 18.4% |
| Montour | 16,508 | 18,236 | 17,038 | 10.5% | -6.6% |
| Northampton | 214,368 | 267,066 | 342,081 | 24.6% | 28.1% |
| Northumberland | 99,190 | 94,556 | 92,182 | -4.7% | -2.5% |
| Perry | 28,615 | 43,602 | 45,638 | 52.4% | 4.7% |
| Philadelphia | 1,948,609 | 1,517,550 | 1,408,232 | -22.1% | -7.2% |
| Pike | 11,818 | 46,302 | 94,374 | 291.8% | 103.8% |
| Potter | 16,395 | 18,080 | 17,153 | 10.3% | -5.1% |
| Schuylkill | 160,089 | 150,336 | 146,078 | -6.1% | -2.8% |
| Snyder | 29,269 | 37,546 | 38,955 | 28.3% | 3.8% |
| Somerset | 76,037 | 80,023 | 76,298 | 5.2% | -4.7% |
| Sullivan | 5,961 | 6,556 | 6,287 | 10.0% | -4.1% |
| Susquehanna | 34,344 | 42,238 | 77,530 | 23.0% | 83.6% |
| Tioga | 39,691 | 41,373 | 39,680 | 4.2% | -4.1% |
| Union | 28,603 | 41,624 | 52,280 | 45.5% | 25.6% |
| Venango | 62,353 | 57,565 | 50,205 | -7.7% | -12.8% |
| Warren | 47,682 | 43,863 | 32,145 | -8.0% | -26.7% |
| Washington | 210,876 | 202,897 | 212,986 | -3.8% | 5.0% |
| Wayne | 29,581 | 47,722 | 67,197 | 61.3% | 40.8% |
| Westmoreland | 376,935 | 369,993 | 380,588 | -1.8% | 2.9% |
| Wyoming | 19,082 | 28,080 | 20,565 | 47.2% | -26.8% |
| York | 272,603 | 381,751 | 482,986 | 40.0% | 26.5% |

**Image 30: PA Population & Projections by County: 1970-2030**
*(Tse-Chuan & Snyder, 2007)*

This increase in population has fueled the dramatic loss of agricultural lands, which is expected to continue according to projections (see Image 31). In its 2025 Plan, the Delaware Valley Regional Planning Commission forecasts that the region will grow by 11 percent in the next 25 years, mostly in the outer ring of suburbs (Tse-Chuan & Snyder, 2007). This haphazard development will be extremely consequential not only to farmlands, but also to the historic inner core cities and towns, which are losing both population and function to peripheral development. As of 1995, Portland, Oregon had the same number of people living on half as much developed land as Bucks County (Hylton, 1995).

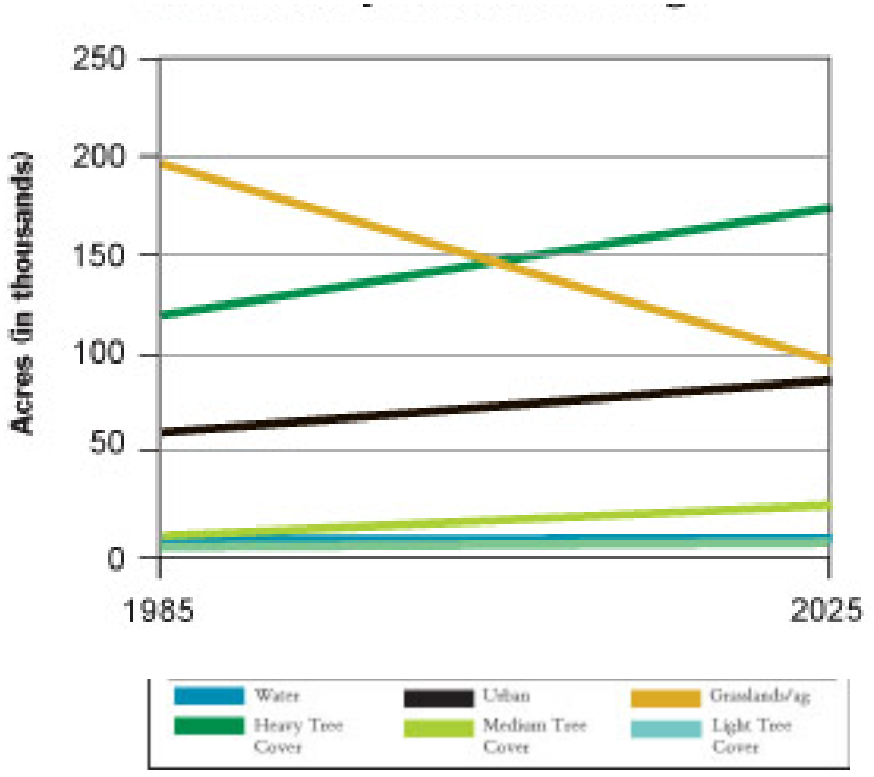


**Image 31: Bucks County Landcover Change: 1985-2025**
*(Tse-Chuan & Snyder, 2007)*

Population increase and farmland conversion in Bucks County have caused both the number of working farms and the actual sizes of agricultural parcels to decrease. Following the same pattern as the state of Pennsylvania, Bucks County is now characterized by a wealth of farms smaller than 50 acres in size (see Image 40). While the majority of this land is classified as cropland (see Image 41), smaller-sized hobby farms generally do not actually produce marketable crops and are often sold for profit based on their development potential. To help counteract this dilemma, the state and county have adopted a number of agricultural preservation strategies.

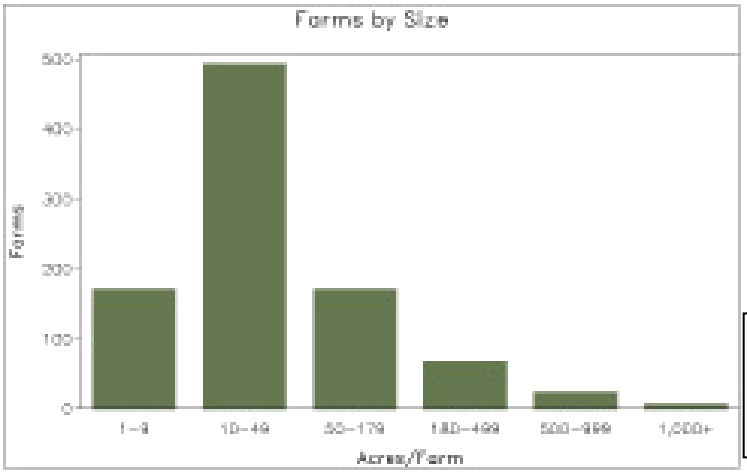


**Image 32: Bucks County Farm Totals by Size** *(Bucks County Planning Commission, 2005)*

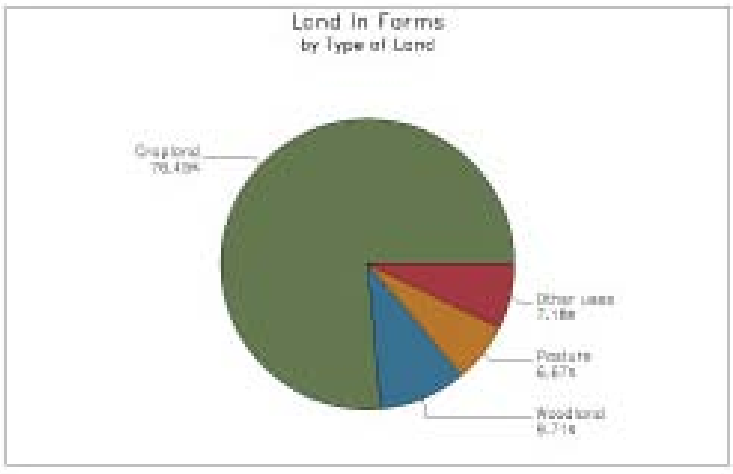


**Image 33: Bucks County Agricultural Land Use** *(Bucks County Planning Commission, 2005)*

***Agricultural Preservation in Bucks County***

In an attempt to counter some of the devastating effects of sprawling development patterns, Pennsylvania has implemented a unique system of land use management practices aimed at agricultural preservation. In doing so, it is holding steadfast to the ideals of both Penn and Mercer, both by protecting farmland and by seeking to contain and sustain the cities. Pennsylvania leads the nation in number of farms and total acres preserved for agriculture (Bucks County Planning Commission 2005).

Farmland preservation at the state level is based upon the Easement Purchase Program, which both protects open spaces and sustains the land's ability to produce foods. Easements are considered for purchase only if they are part of an Agricultural Security Area (ASA) and are then evaluated using several criteria such as quality, stewardship, and value. A petition for creation of an ASA must be submitted by the township, with a combined minimum of 250 acres; an established ASA must be reevaluated every seven years (Bucks County Planning Commission 2005). Quality is relative to location and size, while stewardship is based upon the site's ranking in use of nutrient management techniques. Proximity to water, sewer lines, non-farm development, historic character, and type of agricultural use are all taken into account to determine value. Overall farm preservation eligibility is dependent upon four primary factors once the petition has been signed and criteria have been evaluated:

- The farm must be at least 50 acres in size unless adjacent to an existing property.
- The farm must be located in a designated Agricultural Security Area.
- The farm must contain at least 50% cropland or other type of agricultural operation.
- The farm must contain at least 50% Class I-IV soils
  (Bucks County Historical Commission, 2005).

The Bucks County Agricultural Land Preservation Program was set up in 1990 to preserve the economic stability of agricultural lands within the county as well as open space outside the farming communities.

> The county has lost over 71% of its agricultural lands during the last 50 years. From 260,100 acres of agricultural lands in 1950 to only 76,831 acres as of 2002, the county's percentage of farmlands has dramatically dropped from 67% to 20% in 52 years. Despite the dramatic loss of farmlands within the county due mainly to suburban sprawl, the county still ranks 12th out of 67 counties in regards to agricultural production. With a market value of farm products and output of $61 million a year, 219 active full time farms, and an average farm size of 84 acres, these statistics are a testament to the resiliency of the character of these farming communities and the eagerness to hold on to the pastoral quality which they provide to the county (Bucks County Historical Society, 2005, p. 2).

There are currently 88 farms preserved within Bucks County. The preservation of these farms not only sustains the historical, social, economic, and cultural significance of these lands, but also provides an observer with a glimpse into the cultural traditions of a particular generation. As the leading industry in Pennsylvania and a historical centerpiece of the county, agricultural parcels act as both the setting for the abundance of historic structures unique to the region and as a means of combating the sprawling patterns that are endangering them (Bourke, Jacob, & Luloff, 2006). In this sense, these deeply held symbols of heritage help to limit the effects of modernization on the historic landscape. Agriculture helped to shape the region and continues to provide economic, environmental, and cultural benefits (Smith, 1999).

The barriers to preserving these farmlands are, however, considerable. Low profitability, low product prices and rising input costs, development pressures that can make it more profitable to sell a land than to farm it, labor shortages due to a decrease in the availability of reliable and skilled labor, declining availability of support services

such as agricultural-related equipment and supply dealers, burdensome tax policies that can decrease profitability while exaggerating the development potential value of the land, and intergenerational transfers to a new generation of owners who see little return for the hard work of farming—all these factors make preservation of these farmlands a difficult task (Olson, 1999). To ease these barriers and provide compensation to those owners who enroll their farms in preservation programs, Bucks County uses two forms of agricultural preservation: purchase of development rights and agricultural zoning.

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*Purchase of Development Rights*

In America, when you own a piece of land, you also own a bundle of rights that accompany the property. Since the 1970s, most local governments have been less inclined to use zoning powers to restrict the use of land (Daniels & Bowers, 1997). Instead, many programs offer compensation, representing part of the land's development value, to owners who commit to preserving their farmland. Known as PDRs (Purchase of Development Rights) or PACEs (Purchase of Agricultural Easements), these programs have been implemented in 14 states. They provide a monetary payment of the difference between the value of the preserved land for development purposes and its agricultural value to the owner. In exchange, conservation easements are placed on the property, restricting its use to farming and related purposes. Easement restrictions then run with the land as it is deeded or sold to future heirs. Removal of development rights from lands also makes land more affordable (Daniels and Bowers, 1997). First used in the early 1970s in Suffolk County, New York, PDRs give owners a way to obtain cash from land

without developing it. With no developmental rights, the value of the farm for estate tax purposes is also reduced, making it easier to pass the farm to the next generation. Thus, confidence in the future viability of farming is increased throughout the agricultural population.

Purchase of development rights programs, although extremely popular due to the compensation they offer and the fact that they are voluntary, suffer from a few major problems. First, is the issue of chronic underfunding. Appropriating enough capital to preserve the necessary volume of farms is a constant struggle for legislatures and local governing bodies. The Federal Farm Protection Program allocates $35 million to assist state and local governments, but this amount is clearly inadequate to address the problem (Olson & Lyson, 1999).

Second, because these programs are voluntary by nature, the government runs the risk of being outbid by developers for key parcels. In this case, only ribbons and threads of farmlands are saved, resulting in a checkerboard pattern of protected and unprotected agricultural lands. The critical mass of preserved lands needed to sustain agriculture may not, then, be adequately protected.

Third, because the money paid for PDRs comes from taxpayers, compensation for these preserved lands is highly contested. Who should pay for PDR programs, and how much should be given to these landowners? Disputes between the people being paid for preserving their farmland and those paying for it continually plague the program. The people being compensated, obviously, want the highest land value estimates that can be

obtained. On the other hand, critics are often bitter that taxpayer money is distributed to other people for doing nothing.

The voluntary preservation of open farmland for a cash return is appealing to most landowners. This method, although effective and popular, is still stymied by the frequent inability to assure the long-term preservation of a critical mass of agricultural land. As payments for development rights must continue for at least 15 years to make an impact (Daniels & Bowers, 1997), perhaps PDRs alone cannot achieve the overall goals of farmland preservation.

*Agricultural Zoning*

Farmers in the Santa Clara Valley of California are thought to have been the first to see the need for agricultural zoning (Roberts, 1982). Overspill of population growth and development from San Francisco and expansion into unincorporated areas of the county created two problems for the area: real estate taxes were skyrocketing in areas with farmlands ripe for development, and residential development became permissible in agricultural areas due to new cumulative zoning regulations. The Greenbelt Extension Law of 1955 was enacted to create exclusively agricultural zones. For this particular area, unfortunately, the scheme proved to be in vain. Farmers began to sell their properties as land values continued to rise, and assessors disregarded the policies as the people whom the law was intended to protect looked past it for short-term monetary gain.

Despite this particular instance of failure, the most common type of farmland preservation today is direct regulation through zoning ordinances that create agricultural

zones. The uses permitted within these zones can vary, but are limited to agricultural activities. Of the four types of agricultural zoning, two types create a ratio of dwelling units per acre, while the other two deal with conflicts between uses. Large-lot zones and area-based allocation zones allow for a certain number of residential units per acre of farmland. Large-lot zones require a minimum acreage of farmlands to be preserved and permit one dwelling unit per 10 to 200 acres, while area-based allocation zones allow for a number of permitted residences based on the size of the preserved parcel. In exclusive agricultural zones, only farming activities and associated uses are permitted. Conditional-use zones, on the other hand, permit other uses if it can be proven that they will not conflict with the agricultural uses.

In many cases, agricultural zones become depositories to preserve land only until a local government considers the time right for desired residential and commercial developments. In such instances they are generally only short-term answers put in place until other zones can be shifted around to make way for a proposed development. Agricultural zoning can protect large quantities of land, at least temporarily, but it sometimes can cause development to spread even faster, as developers leapfrog protected lands to more distant locations. From the farmer's perspective, the primary drawback of agricultural zoning is that it restricts land use without providing compensation; if instituted prior to other compensative measures, it can, however, keep the cost of buying development rights down. For example, Lancaster County, Pennsylvania used this approach and pays about one-third of the average price paid to owners of neighboring counties' farmlands for development rights (Daniels & Bowers, 1997).

# Chapter 6

# DOYLESTOWN, QUAKERTOWN, AND BRISTOL: HISTORICAL AND CONTEMPORARY COMPARISONS

## *Doylestown*

### *The Origin of Doylestown*

Before it obtained its official title of Doylestown, the borough had only a few small log homes scattered amidst very heavily forested lands. The town's origin actually dates back to the mid1700s (Duess, 2007). Like many cities near Philadelphia, Doylestown began as a six-square-mile plot organized around two streets, with wedge-shaped agricultural properties radiating outward from the town square. Generally, this town square was to consist of a church and a meeting house, placed in the middle of the town within a public common space. Doylestown, in a somewhat inverted fashion, began as a tavern strategically located at the intersection of two streets that connected Philadelphia to other northern cities of Pennsylvania, allowing the hamlet to blossom into a popular urban townscape.

William Doyle moved from Philadelphia to Chippewa Township in 1727 and purchased 50 acres of property. The land was a hilly terrain, which made development and growth difficult, although the hydrologic system provided by the Delaware River permitted tapping into an aquifer, and a multitude of springs abounded within the new town. Doyle's intention was to build a village that would capitalize on these springs. He was successful in attracting additional settlers and erected the first building, a log tavern that brewed its beer from the aforementioned aquifer (McNealy, 2001).

The tavern's strategic location where Main Street and State Street, two roads linking Swede's Ford and Coryell's Ferry (now Norristown and New Hope, along U.S. Route 202), crossed the road linking Philadelphia and Easton (now Pennsylvania Route 611) allowed the hamlet to grow despite the undulating topography (Duess, 2007). This tavern became the "commons" and served the residential area that eventually encompassed it; the tavern was the only one within five miles of these homesteads.

English settlers were the dominant culture to inhabit the new town. Mostly upper class citizens, they utilized brick as their primary building material, a quality which still characterizes the borough. Bucks County settlement patterns expanded northward, the county seat of Newtown was no longer centrally located. As Bucks County's political boundaries were reshaped into the clumsy trapezoidal shape it has today, and the county seat was moved from Newtown to the more centrally located Doylestown in 1813, although the borough was not officially incorporated until 1838, partly also due to its location at a major crossroads of a largely agricultural area.

An electric telegraph station was built in 1846 and by 1856 a branch of the North Pennsylvania Railroad was completed to Doylestown, linking it to its urban counterparts, stretching its boundaries, and allowing populations to leave the inner city (McNealy, 2001). The late 1800s saw the first of several trolley lines connecting Doylestown with Willow Grove, Newtown, and Easton begin operation. The courthouse acted as an armature for new developments and the borough began its rapid growth. Early and mid-19th-century technological advances strengthened its growth as a cultural, commercial, and institutional center for the region. Despite the onslaught of technological changes

that were impacting the rest of the nation, substantial industrial development never occurred within Doylestown, and it eventually evolved into a borough that could adhere to the ideals of Henry Chapman Mercer.

A sewer system and treatment plant were authorized in 1903, and the local government of Doylestown expanded sewer service to about three-quarters of the town in 1921. But by 1931, the advent of the automobile and improved highway service had put the last trolley line out of business and early compact streetcar suburbs began their transformation into automobile suburbs. As the town began to develop around sewer infrastructure and this infrastructure expanded, inter-urban transportation evolution began to pull the borough's population outward. During the following decade after Mercer's death, the lifestyle of Doylestown's population of around 4,500 in 1930 was drastically altered as Doylestown constituents were forced to embrace the automobile as the primary means of travel within the region. The Great Depression also took its toll on the borough, as many historic houses constructed a century earlier fell into disrepair (McNealy 2001).

As in many small towns across the country, the postwar decades also brought a new competitor to the downtown business district: the shopping mall. By the 1960s, the toll could be seen in Doylestown by the numerous vacant buildings and dilapidated storefronts in the center of town. The Bucks County Redevelopment Authority responded with a federal urban renewal scheme that called for the demolition of 27 historic buildings. The local business community objected to such wholesale clearance and responded with its own plan, called Operation '64—The Doylestown Plan for Self-Help Downtown Renewal. This private initiative was successful in saving Doylestown's

old buildings and historic character, while improving business at the same time. One historic landmark that could not be saved was the 80-year-old courthouse and clock tower, which was replaced by the present county complex in the early 1960s. In an effort to protect and enhance one of its most valuable and fragile resources, the historic character of the community, the borough established a Historic and Architectural Review Board (HARB) in 1972.

By the 1980s, the borough began to see an increase in the demand for the convenient in-town living that Doylestown offers. This resurgence spurred a new market for both infill housing and commercial space that continues today. One result has been increased investment by way of infill, rehabilitation, and adaptive reuse along some of the borough's thoroughfares.

By the end of the 1980s, the downtown business district was again showing the impact of massive new competition from the latest wave of suburban shopping centers, as well as the recession that hit hardest in the northeastern states. In response, Doylestown borough's city council established a volunteer group to formulate plans for the downtown area made up of civic-minded representatives from business organizations, government, and the residential community. This effort resulted in streetscape improvements, including cast-iron street lamps and brick pavers, facade improvements and other beautification efforts, and the establishment of a Main Street Manager Program.

*Suburbanization and Population Changes*

During the mid-19th century several large tracts located east of the Doylestown courthouse area were subdivided into neighborhoods (Clark, 2006). As the town grew and new infrastructure was needed to support a rising population, measures were needed to protect many of these older structures.

After the current Bucks County Courthouse was built in Doylestown in 1960, residential expansion within the town began to increase. Much has changed in the last five decades as the county population has mushroomed. Currently, the town's economy is largely tourism-based, creating a need to preserve its historic structures. The downtown has rebuilt itself largely by turning to an out-of-town audience based on heritage tourism. As the Philadelphia metropolitan area expanded from southern into central Bucks County, the fields and farms of the communities around Doylestown quickly began to sprout housing developments. This development brought thousands of people to the area, and the town was well positioned to capitalize on its proximity to the growing metropolitan population.

Since the 1990s, the population within the borough has decreased by around 500 persons, or 5.5% (see Image 34). A large increase in population in the early 1990s has been reversed, and the current population is about the same as in the 1970s, when agricultural preservation programs began in the county. This decline in population may have caused a dramatic rise in the rate of demolition by neglect of historical structures within the town. However, the current median income level of Doylestown is $58, 689, about $8,000 higher than the state itself (U.S. Census Bureau, 2009). The high amount of

income may help to counteract this population loss as current inhabitants of existing structures have more money to spend on maintenance and upkeep.

Since 1970 the borough has added more than 1,000 housing units. However, its population has remained fairly stable due to a decrease in the number of persons per household. This demographic shift parallels national trends toward smaller household size due to an aging population, more single-person households, later age of marriage, higher rates of divorce, and other factors.


**Image 34: Doylestown Population and Housing Change: 1970-2005**
*(U.S. Census Bureau, 2009)*

**Image 35: Doylestown Sanborn Map: 1900**
*(Bucks County Historic Preservation Society, 2009)*

**Image 36: Doylestown Sanborn Map: 1940**
*(Bucks County Historic Preservation Society, 2009)*

**Image 37: Doylestown Aerial Photograph Map: 1975**
*(Bucks County Planning Commission, 2005)*

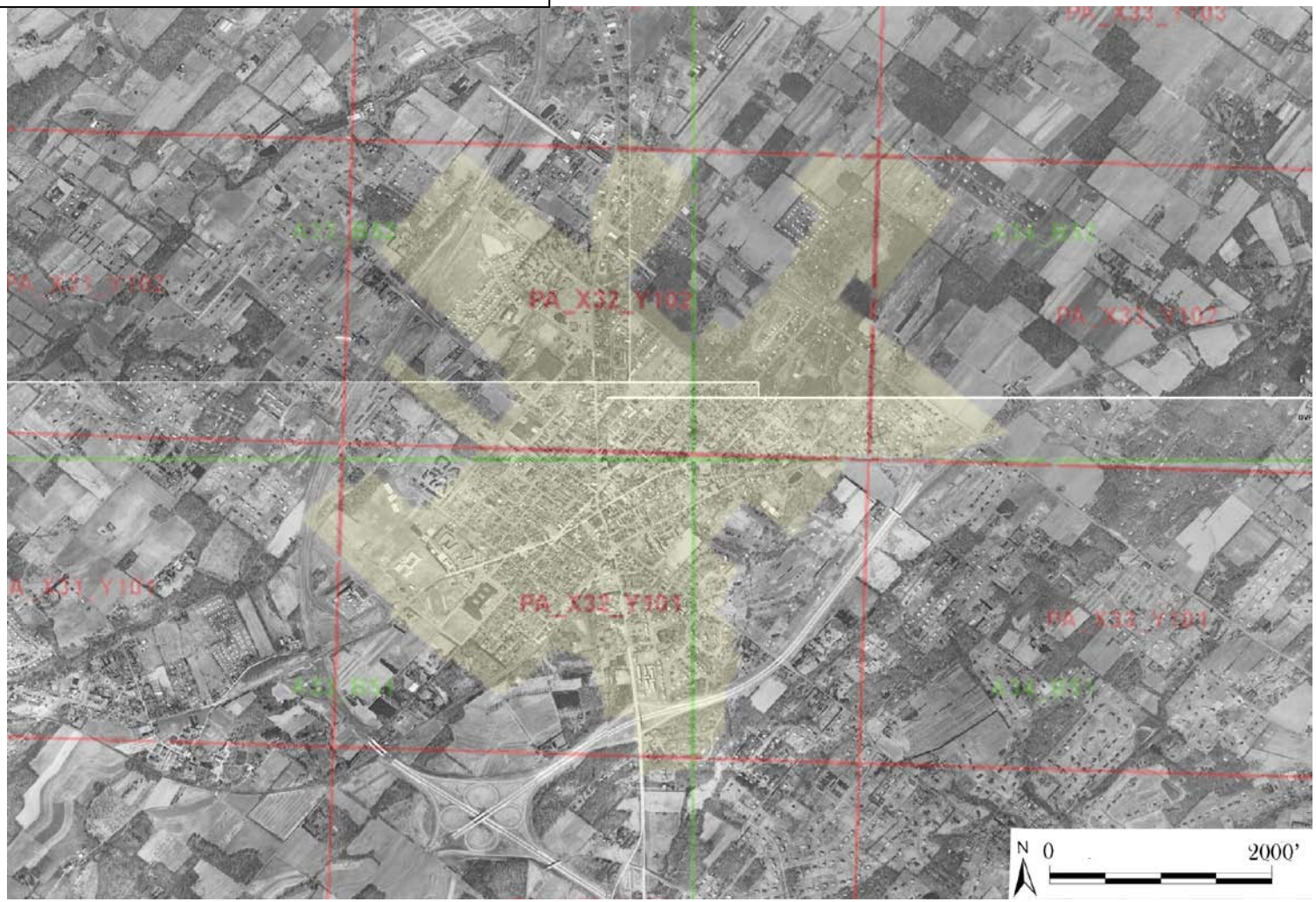


**Image 38: Doylestown Aerial Photograph Map: 2005**
*(Bucks County Planning Commission, 2005)*

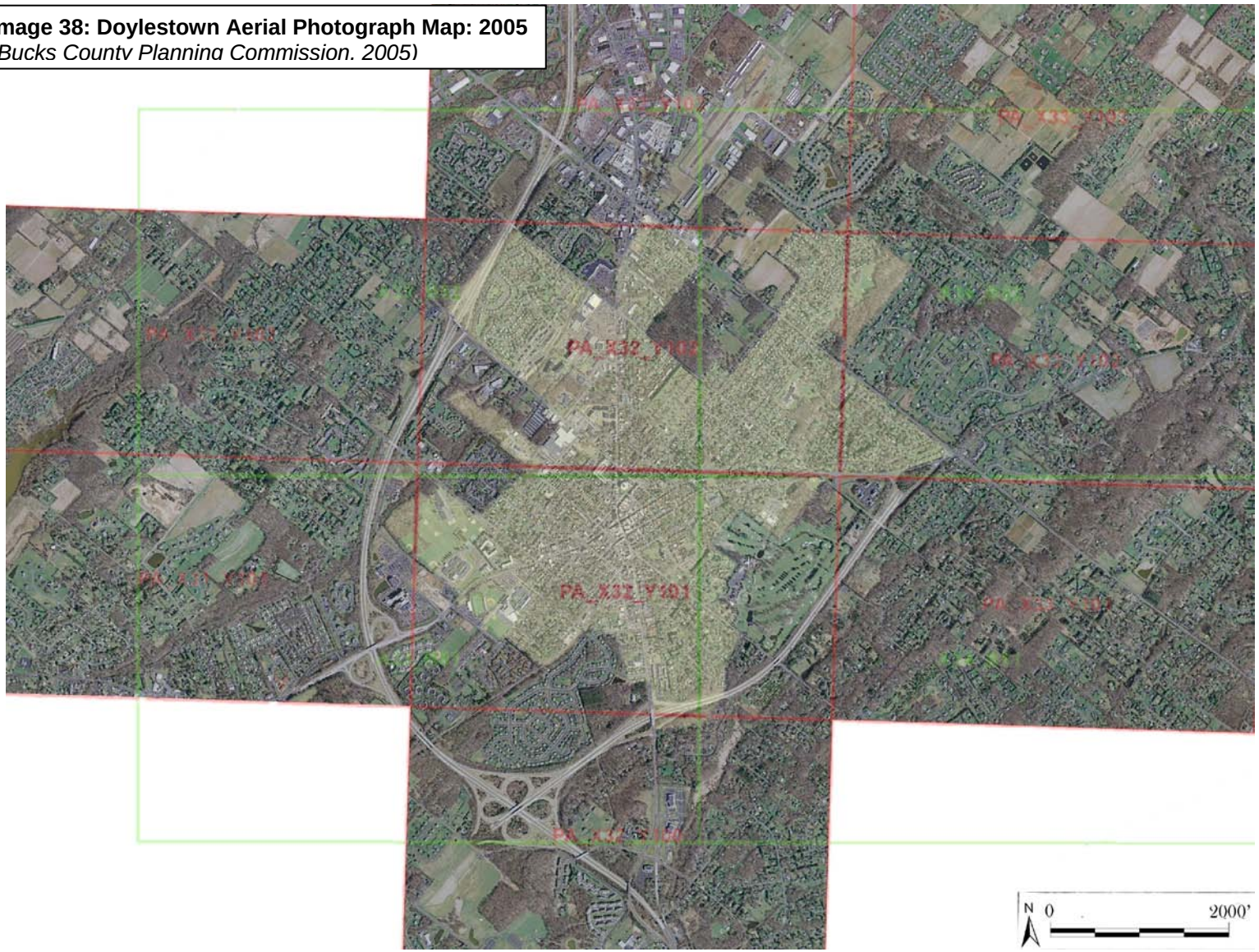


**Image 39: Doylestown Figure-Ground Drawing: 1900**

**Image 40: Doylestown Figure-Ground Drawing: 1940**

**Image 41: Doylestown Figure-Ground Drawing: 1975**

**Image 42: Doylestown Figure-Ground Drawing: 2005**

***Quakertown***

*The Origin of Quakertown*

In 1705, the Lenape Natives referred to the area that would become Quakertown as the "Great Swamp"; by 1720, the area had become known by European settlers as the "Rich Land," a more appropriate term due to the area's fertile soils (Pilecki & Potser, 2002). The name of the first town in the area, in fact, was Richland. In the early 1700's, Peter Lester and William Edward, devout Quakers, began gathering people on a monthly basis near the intersection of Old Bethlehem Road and Station Road for business meetings with regard to Quaker trade and commerce. These meetings stressed preservation of Quaker beliefs and the legacy of buildings and grounds that their predecessors had created; this philosophy still influences community life within the borough (Pilecki & Potser, 2002).

By the mid 1700s, Richland had been officially established as a township within the county, while, at the nearby intersection where Lester and Edward's Quaker meetings had occurred, a separate hamlet had sprouted; it would eventually become Quakertown Borough. Originally referred to as Quaker's Town, it sat at an intersection where roads connected it to Philadelphia and Milford in Southern Bucks County. As a crossroad village with a tavern, it soon became a stopover for stagecoaches and commercial traffic between Allentown and Philadelphia. Although it was the core of an extensive community of English and German Quaker convert farmers (generally upper and middle class settlers), the village center remained quite small until the mid-19th century. In fact, by 1820, Quakertown contained only approximately 12 dwellings (McNealy, 2001).

These dwellings were more than likely made of limestone from the Delaware River, a trademark of German settlers which is still found within the landscape today.

Around the mid-1800s the North Pennsylvanian Railroad arrived and transformed the hamlet into a thriving downtown and busy village, making it a destination in its own right. The railroad brought growth and prosperity to many communities in Bucks County. Sleepy villages were roused to life and crossroads hamlets grew into towns. Quakertown was actually one of the first railroad towns in the county. It became a separate village from Richland when the railway was built; a post office sprouted along the corridor and Quakertown was officially named and incorporated as a borough in 1855 (McNealy, 2001). By the year 1880 the town population had reached about 1,800.

The national economic expansion following the Civil War, combined with the presence of the still relatively new railroad, transformed Quakertown from a tiny hamlet into a thriving commercial center. Manufacturing and local industries shipped their products around the region via the rail corridor, and the borough began to blossom into a dense pocket of industry and worker housing.

*Suburbanization and Population Changes*

Like many other former railroad towns across the nation, Quakertown has been forced to create new economic engines. Historical growth was dependent upon business (particularly manufacturing) and industry. In the 19th century, local industrial establishments included cigar and cigar-box factories, silk mills, harness factories, and stove foundries. Today the most prominent industries are construction and health care.

Quakertown is considered a bedroom community and regional shopping and service center for Bucks County and Philadelphia, but it still generates a large portion of its economic revenue from heritage tourism.

Demographic data show a steep increase in population from 1970 to 1980, followed by then a gradual, but small, decrease. Population statistics have been relatively consistent since 1990. The borough added 37 persons from 1990 to 2000 (See Image 43). Although a 0.4% increase in population is not very large, the ability to retain population over time may help to decrease the rate of demolition by neglect of a town's historic structures. The current median income level of Quakertown is $53, 340, about $3,000 higher than the state itself (U.S. Census Bureau, 2009). Although about $5,000 lower than Doylestown, the income level is relatively larger than the state's indicating that more money is available to spend on the maintenance of existing buildings by owners.

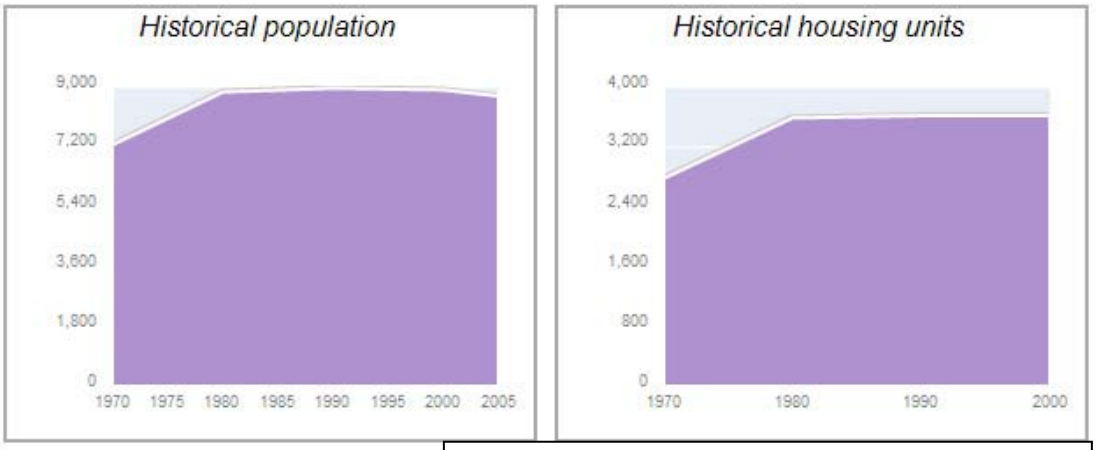



**Image 43: Quakertown Population and Housing Change: 1970-2005**
*(U.S. Census Bureau, 2009)*

**Image 44: Quakertown Sanborn Map: 1900**
*(Bucks County Historical Society, 2009)*

**Image 45: Quakertown Sanborn Map: 1940**
*(Bucks County Historical Society, 2009)*

**Image 46: Quakertown Aerial Photograph: 1975**
*(Bucks County Planning Commission, 2005)*

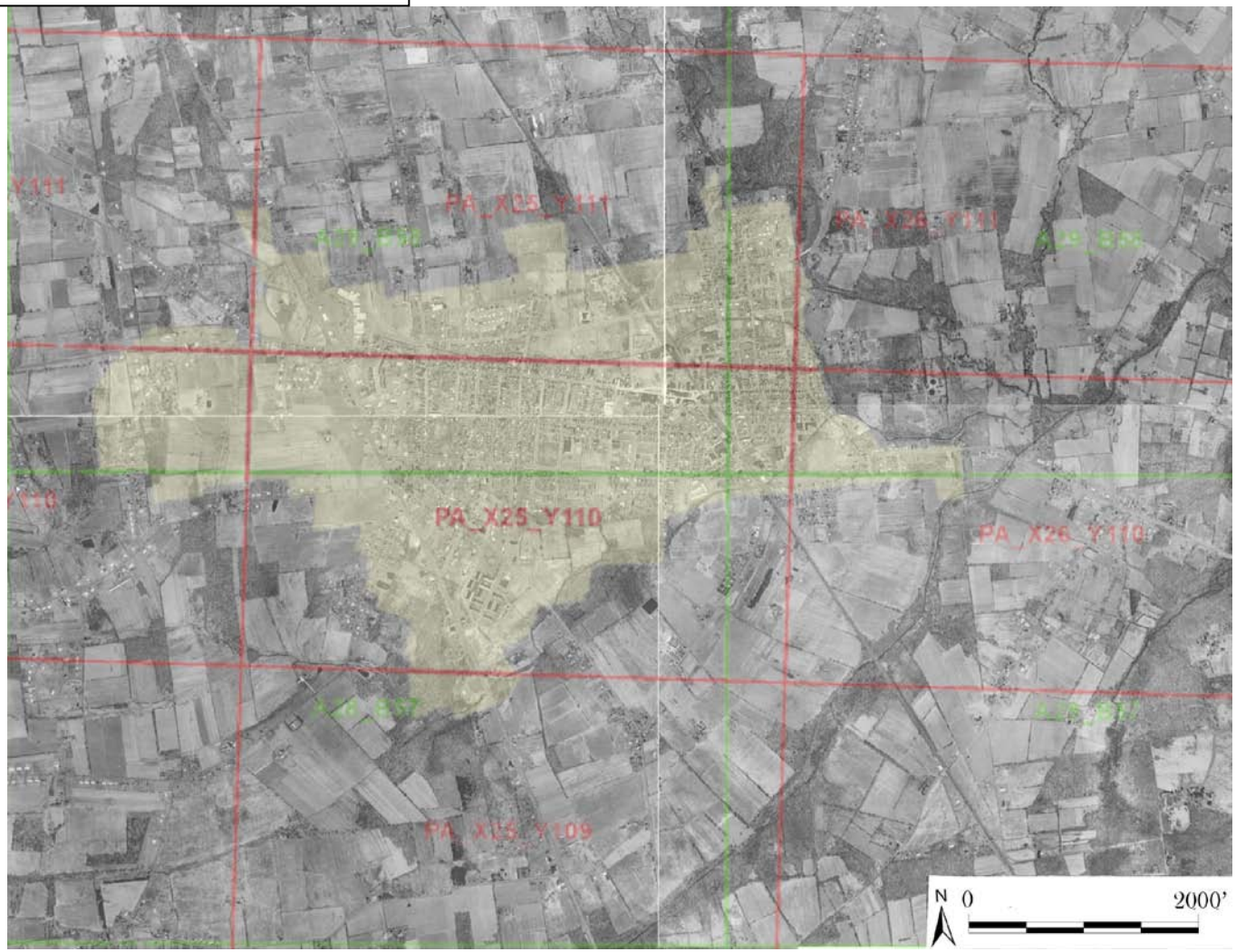


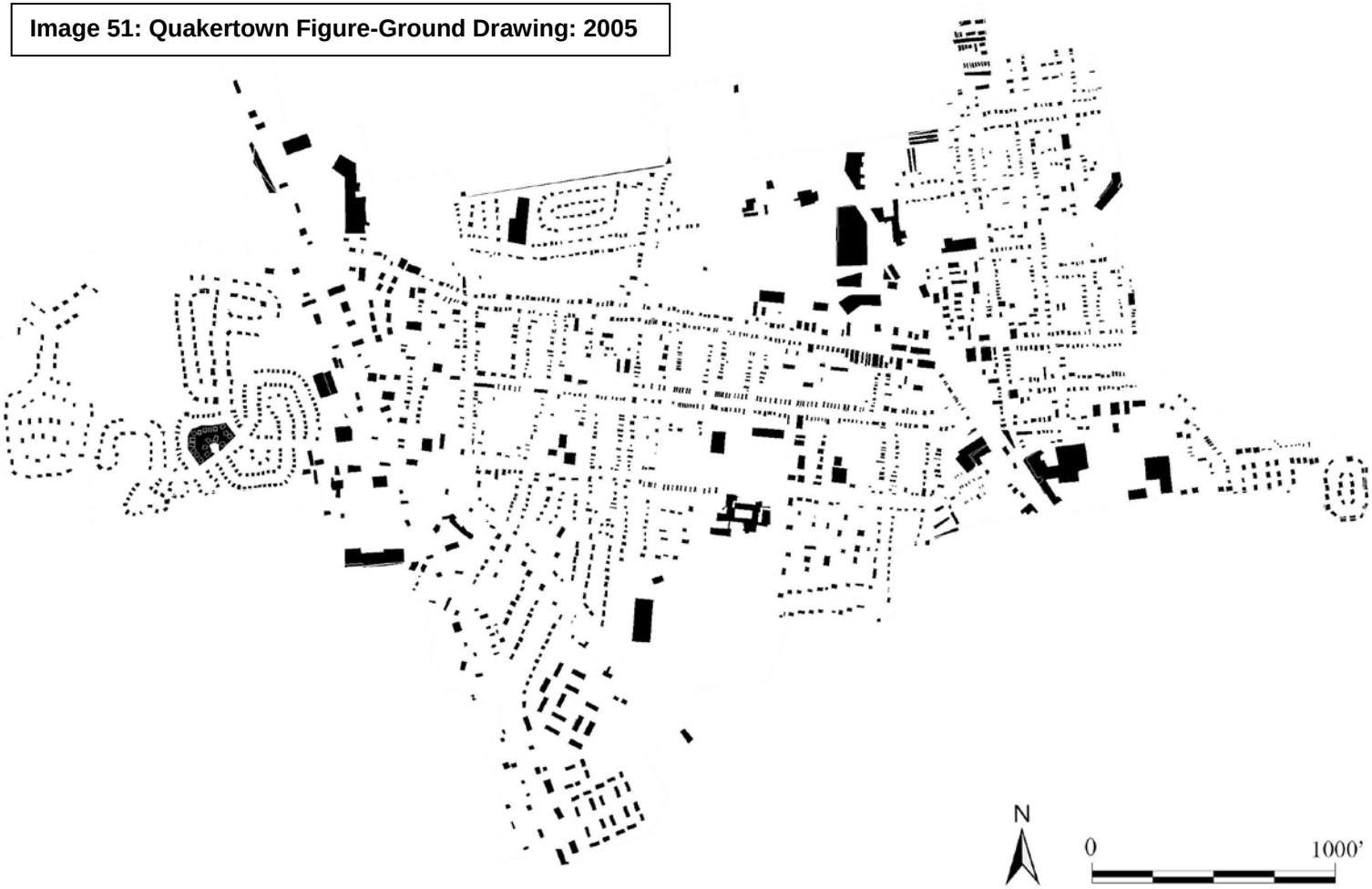
**Image 47: Quakertown Aerial Photograph: 2005**
*(Bucks County Planning Commission, 2005)*

**Image 48: Quakertown Figure-Ground Drawing: 1900**

**Image 49: Quakertown Figure-Ground Drawing: 1940**

**Image 50: Quakertown Figure-Ground Drawing: 1975**

**Image 51: Quakertown Figure-Ground Drawing: 2005**



***Bristol***

*The Origin of Bristol*

More than three centuries have passed since the first European settlers occupied the 262 acres along the Delaware River now known as Bristol borough. A major land route linking Philadelphia and New York City passed through Bristol, and hotels along this road hosted a bevy of travelers when the United States capital was located in Philadelphia just after the American Revolution. Many original homes are still standing and are part of the three centuries of architecture reflected in the residences and public building of the town.

Founded in 1681, Bristol is Bucks County's largest borough and oldest town. From its earliest days, Bristol was a center of milling and industry. First settled as Buckingham in 1681, Bristol was originally used as a port and dock. It was an aristocratic town at its origin, and was originally named by William Penn after the name of his birthplace (McNealy, 2001).

Never actually settling on one primary source of revenue at its origin, the town utilized the Delaware River to create multiple venues for fiscal income. Bristol actually began as one of the first spas in America. Due to its location along the Delaware River, the town had ready access to water with which to pamper elite settlers and the high-income population. It also came to be known as the county's only seaport, and shipbuilding was its first primary industry.

Original cultures within the town were of both English and German ancestry. As other cultures such as the Swedish and French began to occupy the lower quality

agricultural lands, the hamlet began to flourish. Early population growth created demand for a market town in Bristol, whose small, scattered, and inefficient layout needed order and iconic buildings to symbolize its prestige. From 1681 to 1725 Bristol served as Pennsylvania's colonial capital. A street was built to connect the river town to Philadelphia, and Bristol became the first county seat in 1700; by 1720 the town was officially incorporated The mill town would eventually lose its central location as the county's boundaries expanded, and the county seat was moved to Newtown and eventually to Doylestown.

With the building of the Delaware Canal and the Pennsylvania Railroad, the borough became the home of many factories. The town's population grew from 2,500 in 1860 to 10,000 in 1910, when some 3,300 people were employed in mills (McNealy, 2001).

Currently, Bristol is a riverfront community with significant tourism but a greater dependence on manufacturing. Bristol is rich in history, boasting many historic and restored houses that line the streets of Radcliffe and Mill, its two primary arterials. Away from these main streets, however, much of the historic integrity is perishing.

*Suburbanization and Population Changes*

Bristol's population has fallen dramatically and continuously since the 1970s (see Image 44). In fact, since 1990, the borough has seen a decrease in population of 4.8%, or nearly 500 persons. Comparatively speaking, Doylestown has lost more of its inner-city

population, but both boroughs have had significant losses. This magnitude of population loss has undoubtedly contributed to the rate of demolition by neglect within the town.

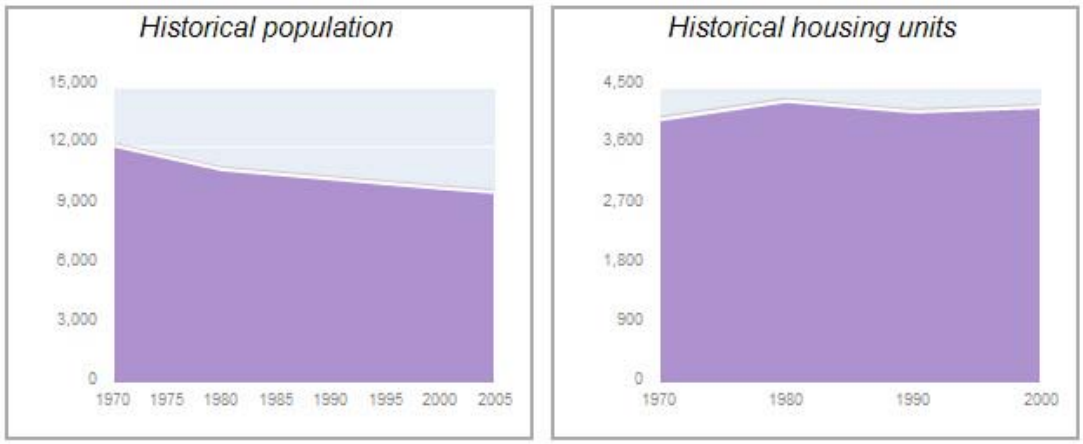



**Image 44: Bristol Population and Housing Change: 1970-2005**
*(U.S. Census Bureau, 2009)*

**Image 45: Bristol Sanborn Map: 1900**
*(Bucks County Historical Society, 2009)*

**Image 46: Bristol Sanborn Map: 1940**
*(Bucks County Historical Society, 2009)*

**Image 47: Bristol Aerial Photograph: 1975**
*(Bucks County Planning Commission, 2005)*

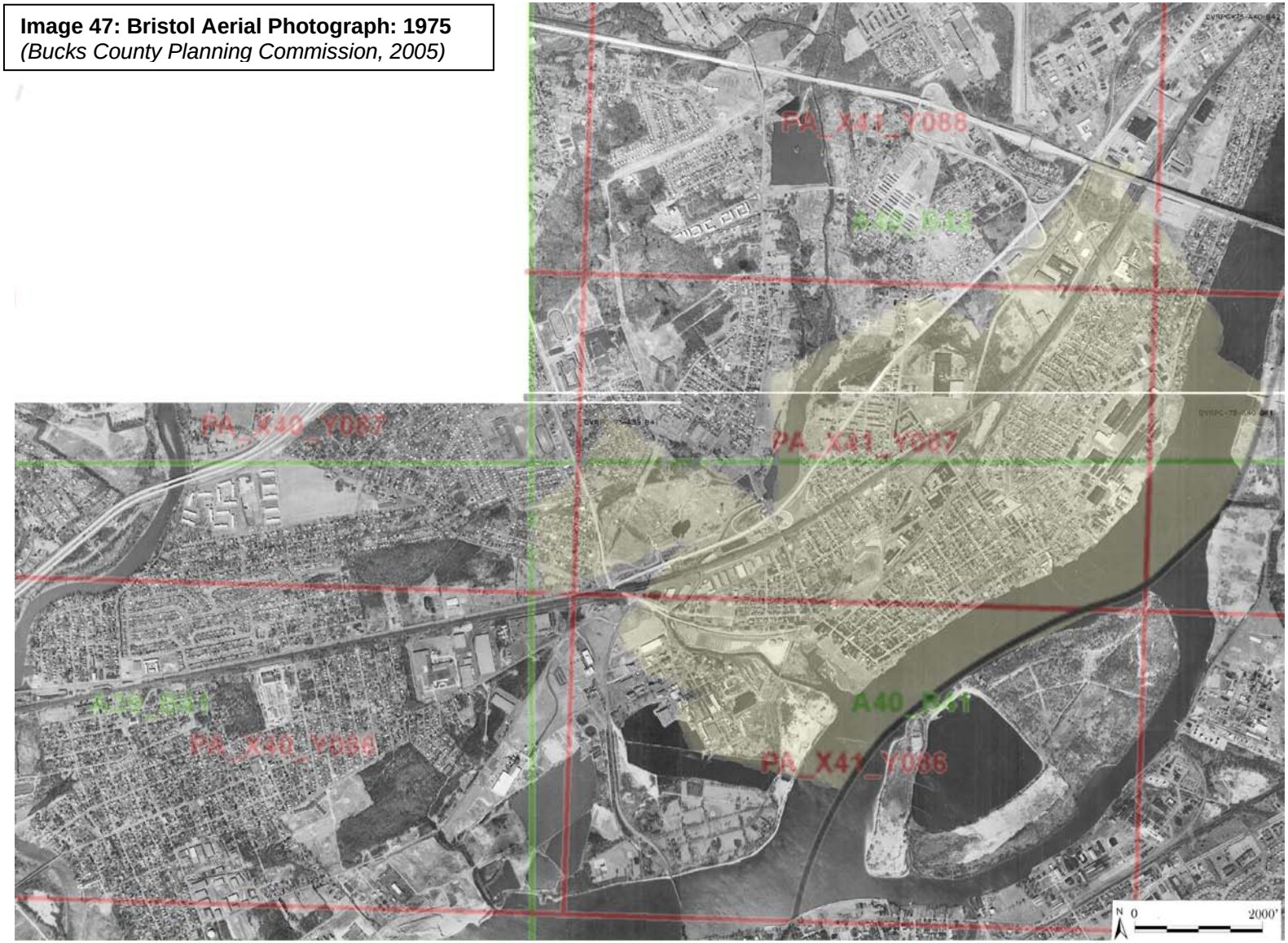


**Image 48: Bristol Aerial Photograph: 2005**
*(Bucks County Planning Commission, 2005)*

**Image 49: Bristol Figure-Ground: 1900**

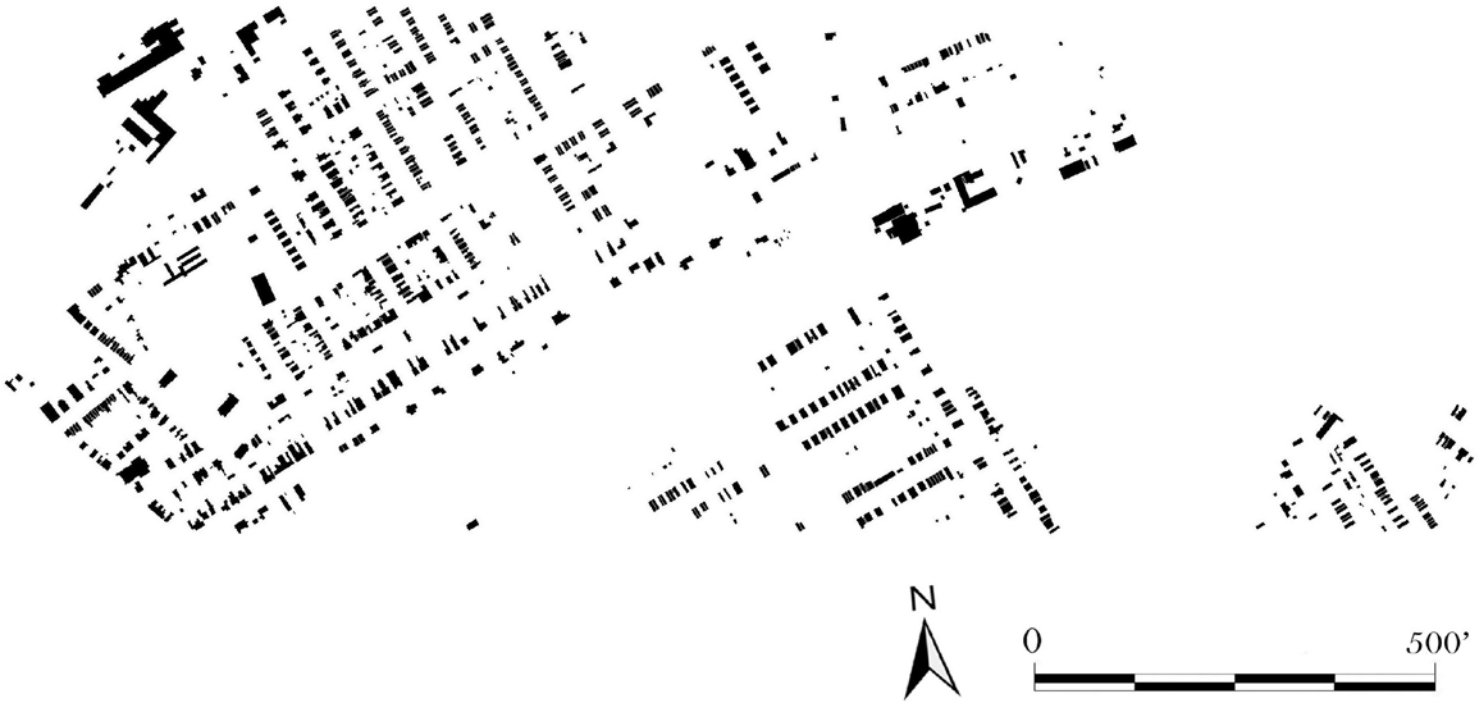


**Image 50: Bristol Figure-Ground: 1940**

**Image 51: Bristol Figure-Ground: 1975**

**Image 52: Bristol Figure-Ground: 2005**

### *Comparing Historic Preservation Policies and Programs across Boroughs*

Pennsylvania's local government structure gives townships and boroughs, not counties, the authority to regulate historic preservation ordinances and policies. Hence, it is important to compare the different strategies employed by each local government. The three boroughs under investigation are urbanized areas with their own local governments. All three cases have local historic districts that encompass their approximately two-square-mile areas. The state has enabled townships to zone for historic districts under Pennsylvania Act 167. Using this state law, townships and boroughs can designate historic districts, appoint an advisory Historical Architectural Review Board (HARB), and then regulate, within the limits of local law, changes to the exteriors of buildings. This approach is best used where there is a concentration of historic buildings, such as in village areas, and where the township officials wish to protect the exterior appearance of these buildings. A historic overlay district is a zoning technique that places special restrictions on development, in addition to those of the base zoning district, so as to enhance preservation efforts. Although Pennsylvania Act 167, the Historic District Act, permits regulation of historic districts, it does not provide for the designation or regulation of individual historic resources outside a historic district. Fortunately, all three towns in this study have historic districts that occupy the entirety of each borough.

Doylestown (Case 1) and Bristol (Case 3) are also listed on the National Register of Historic Places, which gives their locally zoned historic districts national and state benefits, while Quakertown is pending acceptance on the National Register and is regulated only by local ordinances. Although being listed on the National Register places

no restrictions on private property, state recognition of historic districts allows for a larger scope of protection of historic structures. The original concept of an American historic district was as a protective area surrounding more important, individual historic sites. As the field of historic preservation progressed, those involved came to realize that the structures acting as buffer zones were actually key elements of the historic integrity of larger, landmark sites. Preservationists eventually took the position that districts should be more encompassing, blending together a mesh of structures, streets, open space, and landscaping to define the historic character of a historic district.

A listing on the National Register of Historic Places constitutes federal governmental acknowledgment of a historic district. This acknowledgment is an honorary status that can also make the location eligible for federal financial incentives to protect its historic character. Most U.S. state governments have a listing similar to the National Register of Historic Places, and listing on the National Register qualifies the structure or geographic location for similar state-level benefits, such as qualification for tax incentives. In addition, the property can gain a greater level of protection under state law. In sum, the benefits of being listed on the National Register can include:

1.) Recognition that a specific property or properties are significant to the nation or state
2.) Eligibility for federal or state tax incentives for non-income-producing buildings
3.) Federal or state preservation grants for planning and rehabilitation of buildings owned by nonprofit organizations
4.) Consideration in the planning for federal or state projects (National Register of Historic Places, 2010)

Local historic districts usually enjoy the greatest level of protection, under law, from any threats that may compromise their historic integrity. This is because many land-use decisions are made at the local level and, in Pennsylvania, preservation decisions are also made primarily on the local level. The county government provides advice to local governments, but does not have legal authority. Local historic districts are most likely to generate resistance because of the restrictions they tend to place on property owners, so achieving legal recognition of a historic district can be a political challenge.

Early historic preservation efforts in this country focused initially on the preservation of individual buildings for their historical value and architectural merit. Overlay district provisions address alterations, additions, and uses that would potentially alter the character of an individual resource. The underlying zoning is not to be affected. Policies employed by both Doylestown and Bristol's local governments include historic district zoning, tax incentives for preserving a historic structure, design guidelines for new developments within the historic district, and transfer of development rights for the owners of preserved structures. In contrast, Quakertown, the borough not yet listed on the National Register, has only zoning ordinances and design guidelines in place. These historic overlay districts achieve two primary objectives: (1) recognition of historic resources and (2) establishment of a variety of techniques for their protection. Historic preservation ordinances involved with these overlay districts are designed to protect designated areas with historically significant resources.

Historic district zoning may still permit greater densities and types of uses that do not blend with the existing character of older areas. New construction may also introduce

factors that conflict with the character of an existing neighborhood. The number of modern structures may increase unless the zoning is adjusted to reflect the existing neighborhood density and to prohibit uses that would detract from the character of the area. Incentive zoning, one such tool used to accommodate growth within historic neighborhoods, allows a developer to build a larger building if the structure provides certain public benefits, such as the preservation of historic buildings. This system, in some cases, has led to the loss of neighborhood uniformity, with large structures over shadowing the existing historic structures they were supposed to protect (Collins, Waters, & Dotson, 1991). Incentive zoning, also known as bonus zoning, must be carefully and strategically utilized as a growth management tool for historic preservation, and is generally best suited for those cities seeking to promote growth while holding on to only a minimum amount of historic structures.

In all three boroughs in this study, interim zoning controls have been implemented in areas of extreme growth. These controls allow for a continuance of contemporary zoning controls while new plans and ordinances are being adopted. They function like overlay districts, restricting development while new, permanent zoning changes can be made for individual districts. They are, however, limited to specific time periods and should be related to a comprehensive plan. Thus they prevent demolition of historic buildings and structures only for a short time period. Bristol currently has four interim overlay zones in place.

Another mechanism for salvaging and regulating historic properties utilized by all three boroughs is the establishment of design guidelines. They consist of recommended

design options for alteration or rehabilitation of existing buildings and construction of new buildings. Although guidelines are not binding, they make a strong statement about the importance of preservation to a community. Local preservation ordinances and guidelines can be effective, but do not address the financial pressures that face owners of historic properties. To be effective, preservation efforts should also address pressures that may conflict with historic preservation planning. The mixture of building age and materials promotes interesting skylines and attractive, human-scaled street-level facades while minimizing environmental impacts (Collins, Waters, & Dotson, 1991). The important fact here is that design guidelines can affect a local body's decision to approve or disapprove of proposed development grants.

The provision of financial incentives is a technique utilized by Doylestown (Case 1) and Bristol (Case 3) which encourages private property owners to become involved in preservation efforts and invest in historic properties. These incentives are intended to eliminate many of the financial advantages of new construction compared with restoration or preservation projects. Financial incentives primarily take the form of low-interest loan programs and tax incentives from governmental bodies. Revolving loans administered by a local bank or the borough assist with the cost of preserving structures. The federal government also provides tax credits for rehabilitation or renovation of income-producing properties listed on the National Register.

Local governments may offer tax incentives such as property tax abatements, freezes, or credits. The availability of particular incentives depends on state enabling legislation. The Pennsylvania Historic and Museum Commission, the regional office of

the National Park Service, and the National Trust for Historic Preservation provide information regarding available funding to eligible parties. The use of financial incentives derives from the policy perspective that it makes good economic sense as well as good preservation sense not merely to protect buildings from demolition, but also to see that these buildings become contributing elements in the city's economy (Collins, Waters, & Dotson, 1991).

The exercise of transfer of development rights (TDRs) has also been used by Doylestown and Bristol, but usually on a singular-unit basis. If a historic building occupies a site with development opportunities greater than what the building offers under existing zoning, the owner may be tempted to alter or demolish the property to take advantage of the greater opportunities. These opportunities take the form of development rights. Regulations can be adopted which permit the sale and transfer of development rights to areas where more intense development is permitted and encouraged. The unused development rights can be transferred to another site to increase its permitted density, and the property owner is compensated for any property rights that are sold. For example, if a historic district wants to protect a three-story historic building located in a six-story development area, the owner is allowed to transfer the remaining development rights into a zone designated to receive them. The zone where the development rights will be transferred must also be somewhat restrictive; otherwise there would be no incentive to buy and transfer the development rights and the chance of saving the historic building would decrease.

These policies are implemented to ensure that new construction is compatible with the character of a historic district and that existing historic structures are preserved, rehabilitated, renovated, adaptively reused, or restored. It has been proven that using multiple policies simultaneously aids in increasing historic integrity (Collins, Waters, & Dotson, 1991); thus is appears that Doylestown (Case 1) and Bristol (Case 3) have better internal strategies in place to retain historic character.

In addition to these polices, each case under investigation utilizes the Main Street Program as a framework to retain the town's traditional layout and historic character. Main Street is a comprehensive, community-based revitalization approach, developed by the National Trust for Historic Preservation in 1980. Pennsylvania's Main Street program is one piece of the overall community and economic development plan of the state's Department of Community and Economic Development (DCED). The five-year program encourages revitalization by leveraging private dollars and requiring ongoing, local support, as evidenced by the establishment of an organization and documented financial commitment from the community. The program is based on a four-tiered process: design, promotion, organization, and economic restructuring (National Trust for Historic Preservation, 2010).

The first tier, design, involves preserving and enhancing existing historic resources and utilizing their characteristics for new developments. Promotion involves advertising and marketing these design characteristics to expand heritage tourism and community acceptance. After the design is marketed to the public, organization of these design goals helps to achieve consensus among the inhabitants about what is needed.

Once community members have identified common goals, new and more modern economic endeavors are recruited to fill unused space in the historic building during the economic restructuring phase. All three cases under investigation have implemented the program along their Main Streets and clustered samples were taken from each borough's Main Street utilizing the clustered random sampling method.

***Synopsis of Qualitative Data***

Differences among the three cases provide primary data which can aid in the assessment of the pre-listed research questions. There are five key differences which the qualitative evaluation has surfaced (see Table 5). First, and seemingly the most important, is the fact that the local governments of Doylestown (Case 1) and Bristol (Case 3) utilize three preservation strategies which are not shared by the local government of Quakertown (Case 2). As previously stated, listing on the National Register of Historic Places makes a larger amount of financial incentives available to counteract demolition by neglect. Also, the state and national recognition provided by this placement can sometime encourage maintenance of structures due to national or state planning initiatives. The fact that Quakertown (Case 2) does not utilize tax incentives or the transfer of development rights to help ensure the preservation of buildings may also increase its rate of neglect as ownership attitudes towards the preservation effort may be lowered due to a lack of compensation.

Secondly, Quakertown (Case 2) is the only case which has shown a rise in population since 1990. This statistic suggests that an increase in preserved farmland does

not necessarily prevent population migration from the inner city to the periphery. The practice of preserving peripheral agricultural lands may however help to retain inner city populations, is not indicated as all three cases are currently employing the strategy.

Third, only Doylestown (Case 1) utilizes Heritage tourism as its primary means of revenue. While Quakertown (Case 2) and Bristol (Case 3) both generate some level of income from heritage tourism, it does not generate their highest fiscal contribution. This indicates that Doylestown (Case 1) probably puts more money into maintaining their existing historic structure than the other two localities to help increase its primary source of revenue.

Fourth, as amount of preserved farmland has increased, housing totals have actually decreased since 1970. This suggests that function relocation may not be highly impacted by the practice of farmland preservation, or at least that housing may simply be relocating on the preserved farms. The increase in hobby farming in the state and county reinforces this claim. Pennsylvania's state and local governments have been slow to regulate the spread of hobby farms in the rural-urban fringe and in growing nonmetropolitan areas. In fringe areas in particular, the new policies and incentives devised and implemented to lessen the amount of hobby farms have not been studied to effectively evaluate their usefulness.

Finally, as amount of preserved farmland has increased, median income has also increased. This indicates that the owner of the structures residing within Doylestown (Case 1) should have more money to spend on keeping their structures maintained than

the other two boroughs and the Quakertown's (Case 2) population should also have the financial means to do so more than Bristol (Case 3) .

| *Case 1 - Doylestown* | | *Case 2 - Quakertown* | | *Case 3 - Bristol* | |
|---|---|---|---|---|---|
| **Current Population** | 8227 | **Current Population** | 8688 | **Current Population** | 9923 |
| **Current Size** | 2.2m$^s$ | **Current Size** | 2.0 m$^s$ | **Current Size** | 1.9 m$^s$ |
| **Date Founded** | 1745 | **Date Founded** | 1803 | **Date Founded** | 1720 |
| **Preserved Farms** | 46 | **Preserved Farms** | 13 | **Preserved Farms** | 1 |
| **Total Acreage** | 3323.38 | **Total Acreage** | 1057.27 | **Total Acreage** | 99.9 |
| **Preservation Strategy** | ASA/PDR | **Preservation Strategy** | PDR | **Preservation Strategy** | PDR |
| **National Register Listing** | Yes | **National Register Listing** | Yes | **National Register Listing** | Pending |
| **Transportational Origin** | Intersection (Hwy202-Hwy611) | **Transportational Origin** | Railroad (North Pennsylvania RR) | **Transportational Origin** | Waterway (Delaware River) |
| **Dominant Culture** | English/Scottish-Irish | **Dominant Culture** | German | **Dominant Culture** | English |
| **Commercial Origin** | Alcohol | **Commercial Origin** | Tobacco | **Commercial Origin** | Spa |
| **Typology** | Courthouse Town | **Typology** | Railroad Town | **Typology** | Mill Town |
| **Historical Connections** | Philadelphia-Milford | **Historical Connections** | Bethlehem-Perkasie | **Historical Connections** | Philadelphia-Bristol |
| **Town Size at Origin** | Hamlet | **Town Size at Origin** | Hamlet | **Town Size at Origin** | Hamlet |
| **Historic/Present Economies** | Civic to Tourism | **Historic/Present Economies** | Manufacturing to Construction | **Historic/Present Economies** | Resort to Manufacturing |
| **Defined Area of Historic Character** | District | **Defined Area of Historic Character** | District | **Defined Area of Historic Character** | District |
| **Recognition Level of District** | National-State-Local | **Recognition Level of District** | Local | **Recognition Level of District** | National-State-Local |
| **Historic Pres. Policies** | HD Zoning<br>Tax Incentives<br>Design Guidelines<br>TDR's | **Historic Pres. Policies** | HD Zoning<br>Design Guidelines | **Historic Pres. Policies** | HD Zoning<br>Tax Incentives<br>Design Guidelines<br>TDR's |
| **HP Promotional Programs** | Operation '64<br>Main St Program | **HP Promotional Programs** | Main St Program | **HP Promotional Programs** | Main St Program |
| **Pop. Change since 1990** | -5.5% | **Population Change since 1990** | +0.4% | **Population Change since 1990** | -4.8% |
| **Housing Total since 1990** | -100 | **Housing Change since 1990** | +50 | **Housing Change since 1990** | +100 |

**Table 5: Similarities and Differences of Cases under Investigation**

# Chapter 7

# COMPARING RATES OF NEGLECT: RESEARCH CONCLUSIONS AND FUTURE NEEDS FOR CULTURAL LANDSCAPE STUDIES

## *Introduction*

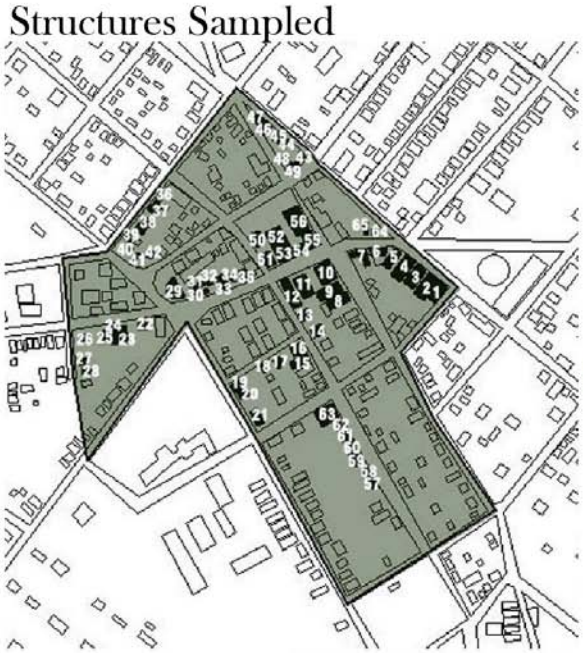
As information from the qualitative portion of the sequential mixed method study has been evaluated, this paper will move into the quantitative evaluation and assess the match of the empirical based patterns to the predicted patterns on all three scales of measurement: micro, macro, and cross case. This data will be synthesized with the qualitative data and utilized to answer specific research questions and test the initial hypothesis. These findings will then be evaluated to determine future research needs on demolition by neglect and the causal variables which this particular research suggests may have the strongest impact on neglect of historic structures.

## *Sampling*

Using the clustered random spatial sampling method, structures in each town under investigation were selected from the sample frame identified by the spatial morphology overlay analysis. Historical figure-ground mappings from 1900, 1940, 1975, and 2005 were overlaid to produce the sample frame from which building surveys would be conducted within each case under investigation. Within this sample frame, enough samples were taken from each case to produce a 90% confidence level and a 10% confidence interval. Case 1, Doylestown, had 202 total structures within the sample frame, and 65 structures were randomly selected in clusters of seven within each quadrant

(city block) to achieve a 90 percent confidence level. Case 2, Quakertown, had 211 structures within its sample frame, and 66 structures were sampled to obtain the same results. Case 3, Bristol, had a population of 126 qualifying structures and required 55 samples to achieve the desired limits. Results were then adjusted to compare across cases as though an equal number of samples had been taken from each case.

**Image 61: Doylestown Sample Frame/Historic Layover and Location of Samples Structures**




1900

1940

1970

2005

**Image 62: Quakertown Sample Frame/Historic Layover and Location of Samples Structures**

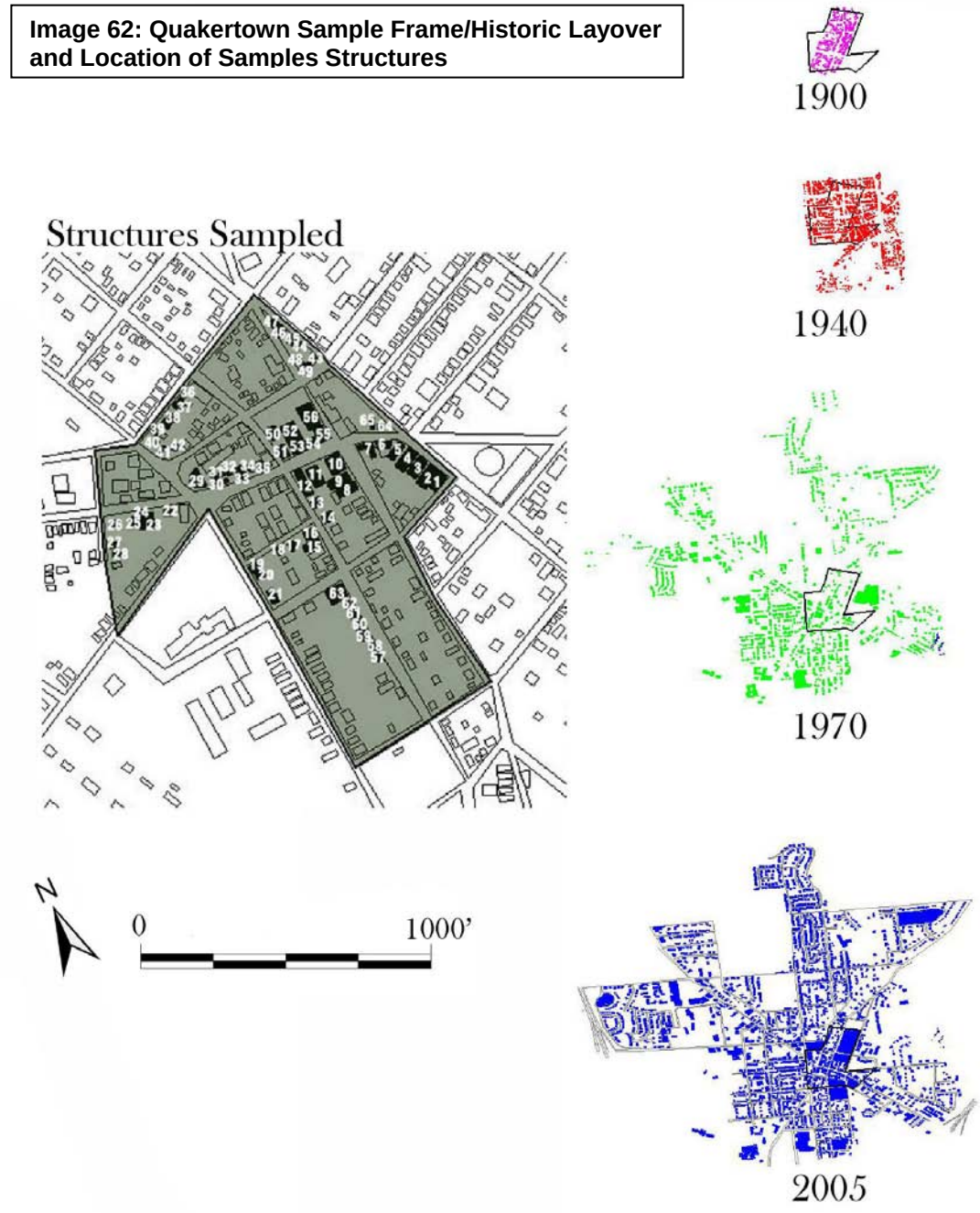
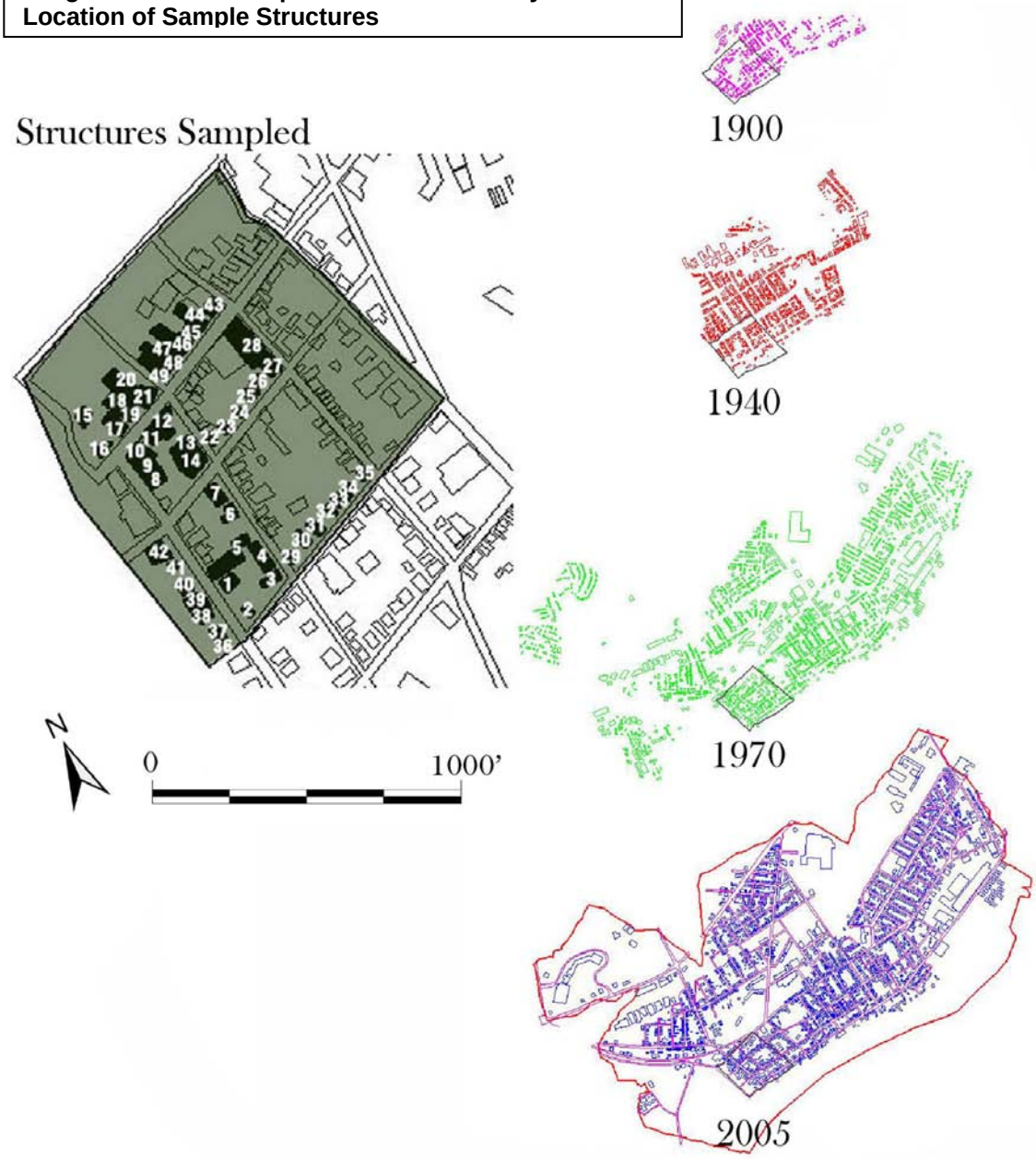


**Image 63: Bristol Sample Frame/Historic Layover and Location of Sample Structures**



***Survey Results: Micro Analysis*** (67% Mean matched pattern rate)

*Time Frame of Construction* (56% matched patterns)

Although a positive correlation was revealed when compared to predicted patterns, this explanatory variable assessment suggested that, as the amount of preserved farmland increases, the ability to retain historic structures increases while the amount of contemporarily developed buildings decreases. With regard to building age, the strongest correlation was between amount of preserved farmland and the ability to retain structures built prior to 1940. Case 1 (Doylestown) had a large number of older buildings still in existence and also had the lowest amount of buildings built between 1971 and the present. However, although Case 2 (Quakertown) had more 1941-1970 buildings than Case 3 (Bristol), as predicted, Case 1 (Doylestown) did not. This result could be because the retention of older structures in Doylestown presented a lesser need to construct new buildings from 1941 to the present. The primary disagreement with predictions came between Case 2 (Quakertown) and Case 3 (Bristol) as two of the three predictions were not accurate. Case 2 (Quakertown), which had more preserved farmland, actually had fewer pre-1900 to 1940 buildings than Case 3 (Bristol) as well as more modern structures. This result could be due to the differences in preservation policies on the local level.

Predicted:

Doylestown (T) 1971-pres. < Quakertown (T) 1971-pres. < Bristol (T) 1971-pres.
Doylestown (T) 1941-1970 > Quakertown (T) 1941-1970 > Bristol (T) 1971-1941-1970
Doylestown (T) pre1900-1940 > Quakertown (T) pre1900-1940 > Bristol (T) pre1900-1940

Actual:

Doylestown (T) 1971-pres. < Quakertown (T) 1971-pres. > Bristol (T) 1971-pres.***
Doylestown (T) 1941-1970 < Quakertown (T) 1941-1970 > Bristol (T) 1971-1941-1970
Doylestown (T) pre1900-1940 > Quakertown (T) pre1900-1940 < Bristol (T) pre1900-1940

*Land Use Change* (56% matched patterns)

The building surveys revealed that, as the amount of preserved farmland increased, the ability to retain consistent land uses was not positively affected. However, Doylestown (Case 1) had more buildings with alternate uses and a lower vacancy rate than either Quakertown (Case 2) or Bristol (Case 3). Land use remained fairly consistent through time in Bristol (Case 3), more so than in both other cases, which actually increases the integrity of its historic structures. Again, there is a major discrepancy relative to predicted patterns when comparing Case 2 (Quakertown) and Case 3 (Bristol), as all three predictions proved inaccurate. These patterns suggest agricultural preservation may not be directly correlated with keeping a land use consistent through time within a structure, even if, as the amount of preserved farmland increases, the amount of buildings with *some* useful function also increases.

Predicted

Doylestown (T) vacant < Quakertown (T) vacant < Bristol (T) vacant
Doylestown (T) alternate use > Quakertown (T) alternate use > Bristol (T) alternate use
Doylestown (T) continuous > Quakertown (T) continuous > Bristol (T) continuous

Actual:

Doylestown (T) vacant < Quakertown (T) vacant > Bristol (T) vacant
Doylestown (T) alternate use > Quakertown (T) alternate use < Bristol (T) alternate use
Doylestown (T) continuous > Quakertown (T) continuous > Bristol (T) continuous***

*Architectural Modification* (56% matched patterns)

Architectural modification results showed that retention of unaltered historic structures had the strongest relationship with amount of preserved farmland, although the unexpected results when comparing Case 2 (Quakertown) and Case 3 (Bristol) still plague the analysis, perhaps due to differences in local government policies. The pattern from the previous two comparisons continued, in that most predictions were accurate

when comparing Case 1 (Doylestown) to Case 3 (Bristol) and Case 1 (Doylestown) to Case 2 (Quakertown), but fallacies with the hypothesis are exposed when comparing Case 2 (Quakertown) to Case 3 (Bristol). Overall, results show that, as the amount of peripheral preserved farmland increases, the number of modern structures decreases while the number of authentic structures increases. However, the total number of modified structures actually decreased, suggesting that renovation activity may also increase as farmland preservation increases.

Predicted:

Doylestown (T) modern < Quakertown (T) modern < Bristol (T) modern
Doylestown (T) modified > Quakertown (T) modified > Bristol (T) modified
Doylestown (T) authentic > Quakertown (T) authentic > Bristol (T) authentic

Actual:

Doylestown (T) modern < Quakertown (T) modern > Bristol (T) modern
Doylestown (T) modified > Quakertown (T) modified < Bristol (T) modified***
Doylestown (T) authentic > Quakertown (T) authentic < Bristol (T) authentic

*Building Condition* (100% matched patterns)

Building condition proved to show the strongest correlation with the increase in amount of preserved farmland, as all nine predicted patterns proved to be accurate. In particular, the number of well-conditioned buildings increased significantly as the amount of preserved farmland increased. Also, although all three cases had a low number of dilapidated structures, the total decreased as the amount of preserved farmland increased. Moderate structure totals were fairly close when comparing, although the predictions proved accurate. This fact, however, suggests that, although the process of demolition by neglect may be slowed by increasing the amount of peripheral preserved farmland, it may still be occurring because structures in moderate condition show that there are still buildings which are experiencing a decline in building condition.

Predicted:

Doylestown (T) dilapidated < Quakertown (T) dilapidated < Bristol (T) dilapidated
Doylestown (T) moderate < Quakertown (T) moderate < Bristol (T) moderate
Doylestown (T) well condition > Quakertown (T) well condition > Bristol (T) well condition

Actual:

Doylestown (T) dilapidated < Quakertown (T) dilapidated < Bristol (T) dilapidated
Doylestown (T) moderate < Quakertown (T) moderate < Bristol (T) moderate
Doylestown (T) well condition > Quakertown (T) well condition > Bristol (T) well condition

*Property Value* (67% matched patterns)

Property value had the second strongest relationship, behind building condition, according to the percentage of matched patterns with an increase in preserved farmland. Comparisons showed that, within the range of $0 to $162,000, as amount of preserved farmland increased, so did assessed values of structures in five of six instances. Results in the highest category of assessed value, however, disagreed with predicted patterns. Only predictions from the comparison between Case 1 (Doylestown) and Case 2 (Quakertown) proved accurate, as Case 3 (Bristol) actually had the highest number of buildings with assessed values between $163,000 and $243,000 assessed values. However, none of the three cases had a significant amount of buildings falling within this category.

Predicted:

Doylestown (T) $0-&81,000 < Quakertown (T) $0-&81,000 < Bristol (T) $0-&81,000
Doylestown (T) $82,000-$162,000 > Quakertown (T) $82,000-$162,000 > Bristol (T) $82,000-$162,000
Doylestown (T) $163,000-$243,000 > Quakertown (T) $163,000-$243,000 > Bristol (T) $163,000-$243,000

Actual:

Doylestown (T) $0-$81,000 < Quakertown (T) $0-$81,000 > Bristol (T) $0-$81,000
Doylestown (T) $82,000-$162,000 > Quakertown (T) $82,000-$162,000 > Bristol (T) $82,000-$162,000
Doylestown (T) $163,000-$243,000 > Quakertown (T) $163,000-$243,000 > Bristol (T) $163,000-$243,000***

*Overall Micro Scale Comparisons*

Results from the building surveys showed that the differences in preservation policies used by the local government in Quakertown (Case 2) may have impacted

agreements with the hypothesis negatively. Although no set of predictions was lower than 50%, indicating at least a positive correlation which is consistent with the hypothesis, disagreements with predicted patterns when comparing Case 2 (Quakertown) to Case 3 (Bristol) were frequent. When comparing Case 1 (Doylestown) to Case 2 (Quakertown), there was a 93% matched pattern rate, indicating an extremely high correlation between an increase in amount of preserved farmland and decline in the rate of demolition by neglect. However, there was only a 33% matched pattern rate when comparing Case 2 (Quakertown) to Case 3 (Bristol). This difference could be due to the fact that Quakertown uses less extensive preservation policies to aid in retaining historic structures. This assumption is also validated when comparing Case 1 (Doylestown) to Case 3 (Bristol), as 73% of predicted patterns were matched, again representing strong agreement with the hypothesis. The lack of preservation strategies in place in Quakertown and the fact that it is not listed on the National Register could be the intervening outside influences disrupting consistency with predicted patterns.

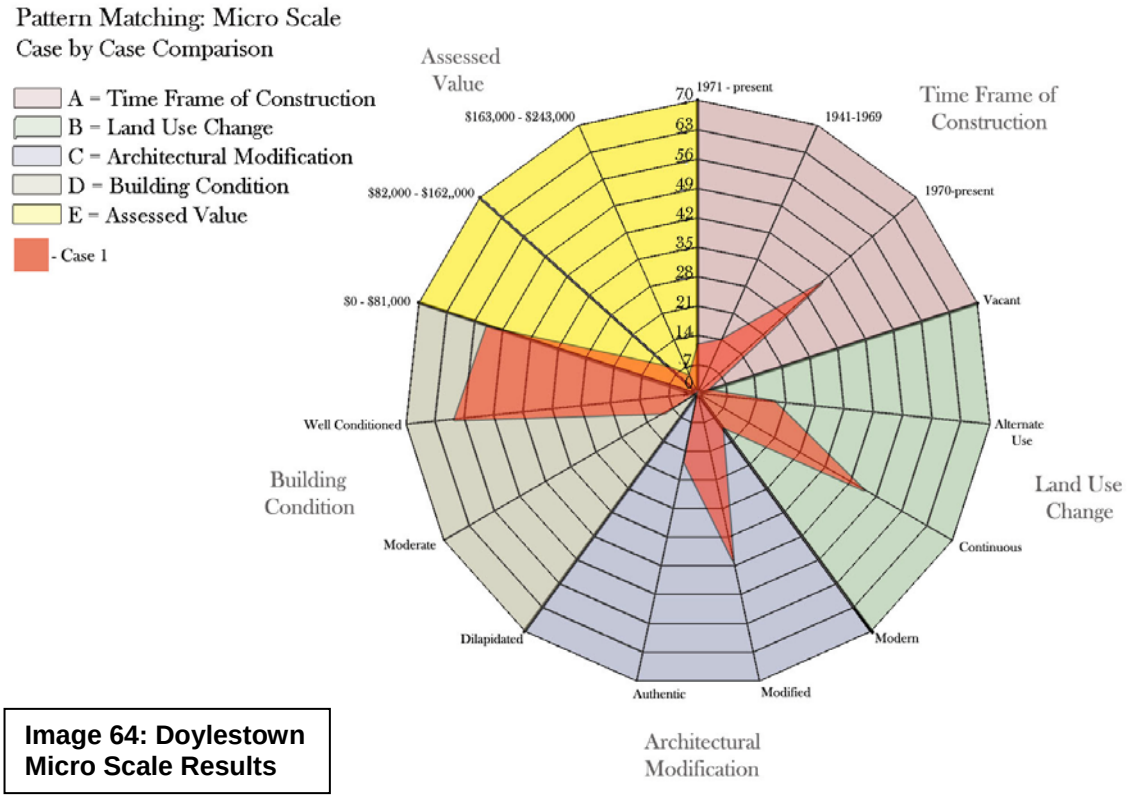



**Image 64: Doylestown Micro Scale Results**

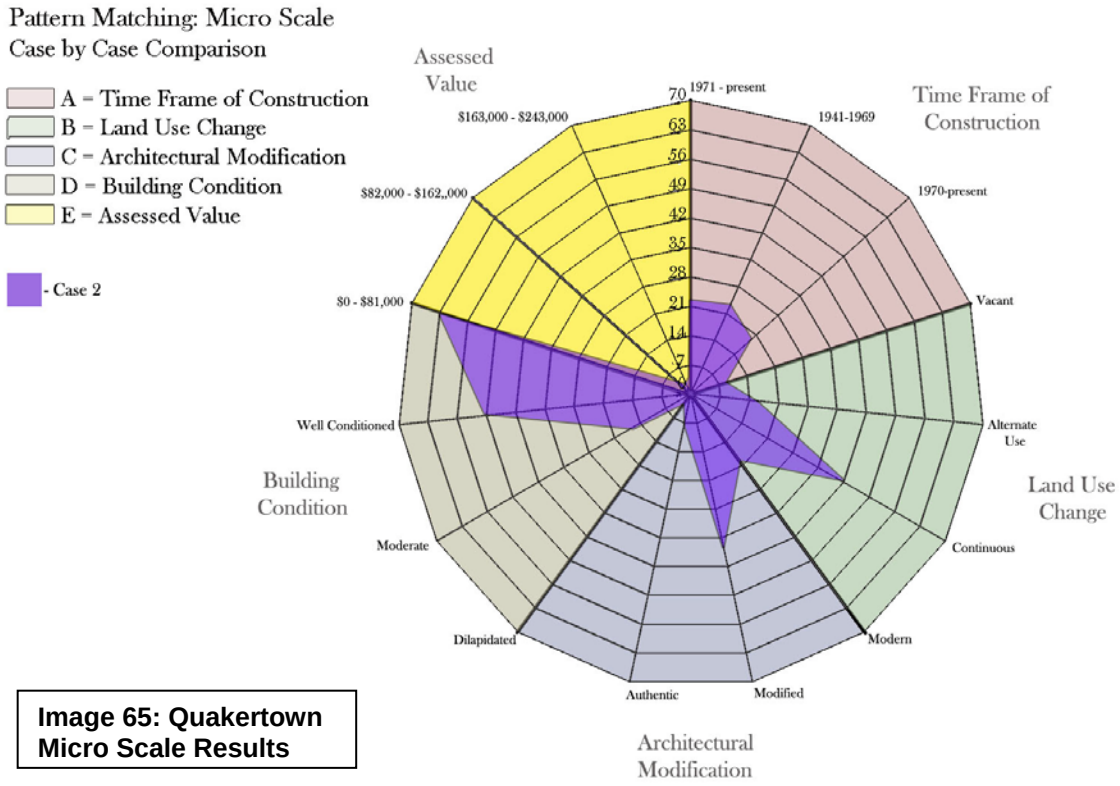



**Image 65: Quakertown Micro Scale Results**

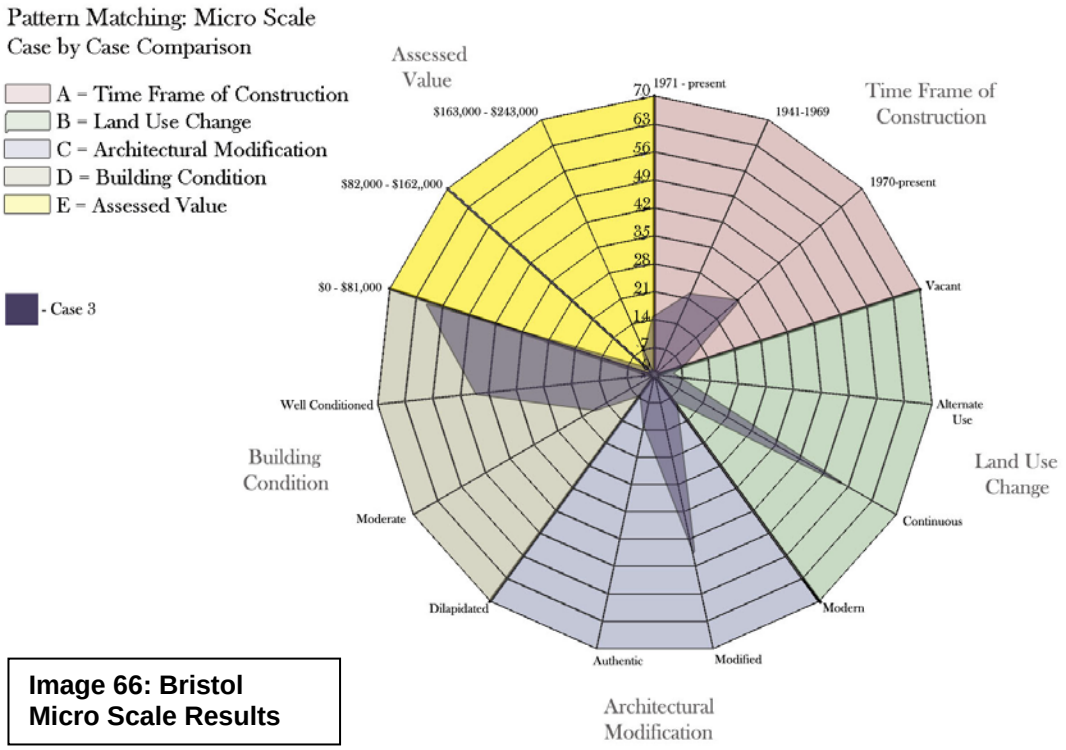



**Image 66: Bristol Micro Scale Results**

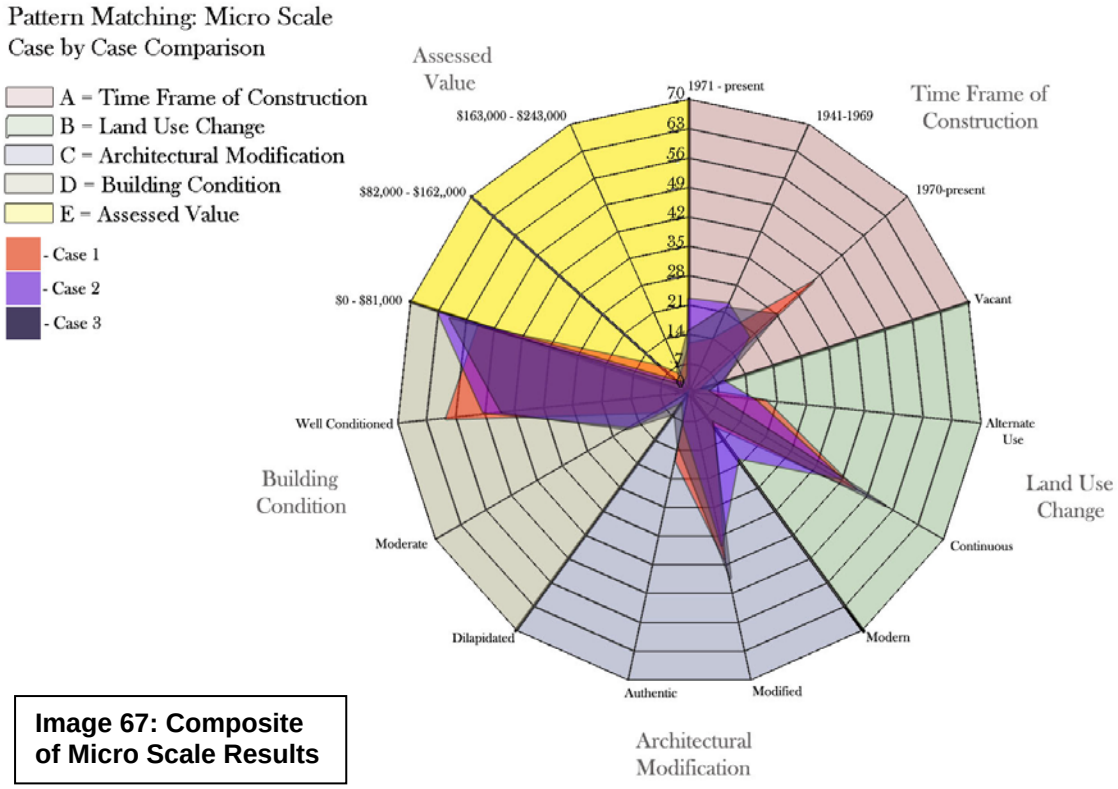



**Image 67: Composite of Micro Scale Results**

***Survey Results: Macro Analysis*** (80% matched patterns)

On a macro scale, the correlation between the increase in amount of preserved farmland and the decrease in the rate of demolition by neglect proved to be much stronger, with an overall rate of 80% matched patterns when compared to predictions. A similar pattern to the micro scale also emerged, with both building condition and property value having the highest positive correlations. Building condition proved to have the highest differences in totals, making it the explanatory variable with the strongest positive correlation on both scales, followed by property value. Architectural modification, land use change, and time frame of construction also followed similar patterns to the micro scale analysis. When comparing Case 1 (Doylestown) to Case 2 (Quakertown) and Case 3 (Bristol), the predicted patterns were generally confirmed. However, Quakertown (Case 2) comparisons to Bristol (Case 3) diverged from predicted patterns, somewhat disconfirming the initial hypothesis of the study. Collectively, there was a 100% matched pattern rate when comparing Doylestown (Case 1) to Quakertown (Case 2), a 40% matched pattern rate when comparing Quakertown (Case 2) to Bristol (Case 3), and a 100% matched pattern rate when comparing Doylestown (Case 1) to Bristol (Case 3) on a macro scale. Again, Quakertown (Case 2) proves to be an anomaly, possibly due to the aforementioned differences of local government regulations.

Predicted:
(T) Time Frame of Construction–Doylestown > (T) Time Frame of Construction– Quakertown > (T) Time Frame of Construction–Bristol
(T) Land Use Change– Doylestown > (T) Land Use Change–Quakertown > (T) Land Use Change– Bristol
(T) Architectural Modification– Doylestown > (T) Architectural Modification– Quakertown > (T) Architectural Modification– Bristol
(T) Building Condition– Doylestown > (T) Building Condition– Quakertown > (T) Building Condition– Bristol
(T) Property Value– Doylestown > (T) Property Value– Quakertown > (T) Property Value– Bristol

Actual:

(T) Time Frame of Construction– Doylestown > (T) Time Frame of Construction–Quakertown > (T) Time Frame of Construction–Bristol
67% Matched Patterns

(T) Land Use Change– Doylestown > (T) Land Use Change–Quakertown < (T) Land Use Change–Bristol
67% Matched Patterns

(T) Architectural Modification– Doylestown > (T) Architectural Modification–Quakertown> (T) Architectural Modification–Bristol
67% Matched Patterns

(T) Building Condition– Doylestown > (T) Building Condition–Quakertown > (T) Building Condition–Bristol
100% Matched Patterns

(T) Property Value– Doylestown > (T) Property Value–Quakertown > (T) Property Value–Bristol
100% Matched Patterns

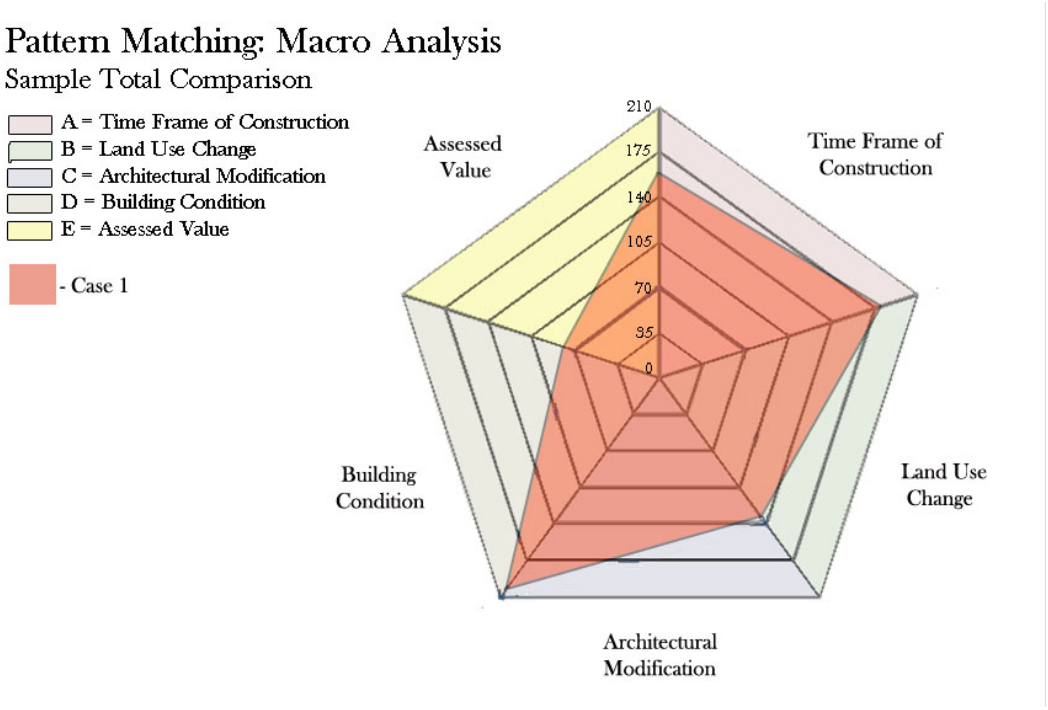



**Image 68: Doylestown Macro Scale Results**

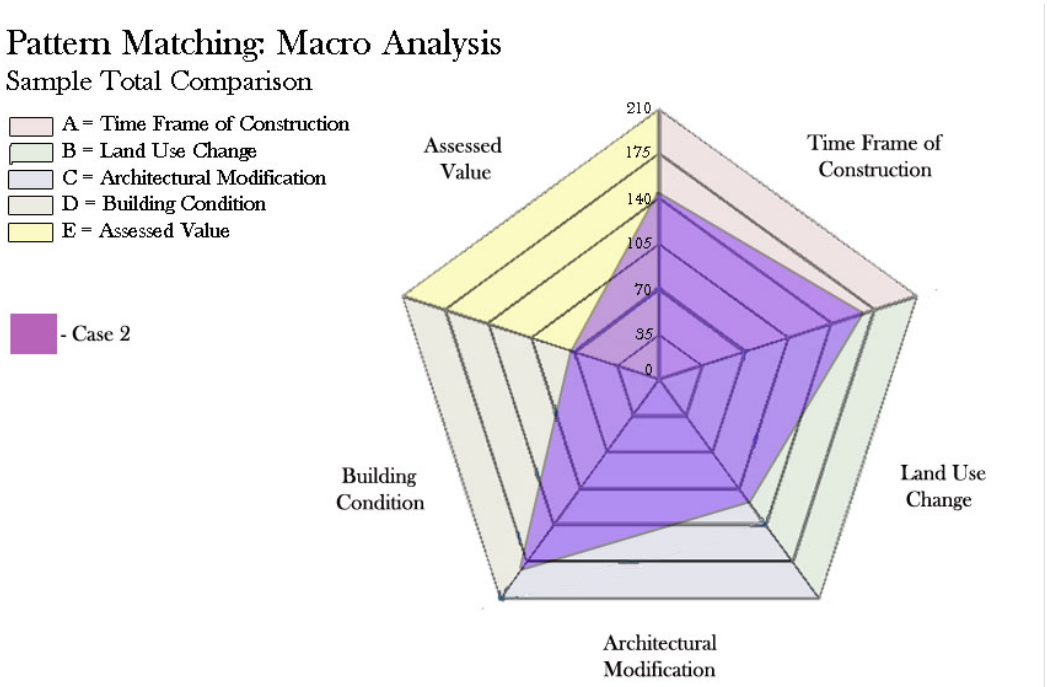



**Image 69: Quakertown Macro Scale Results**

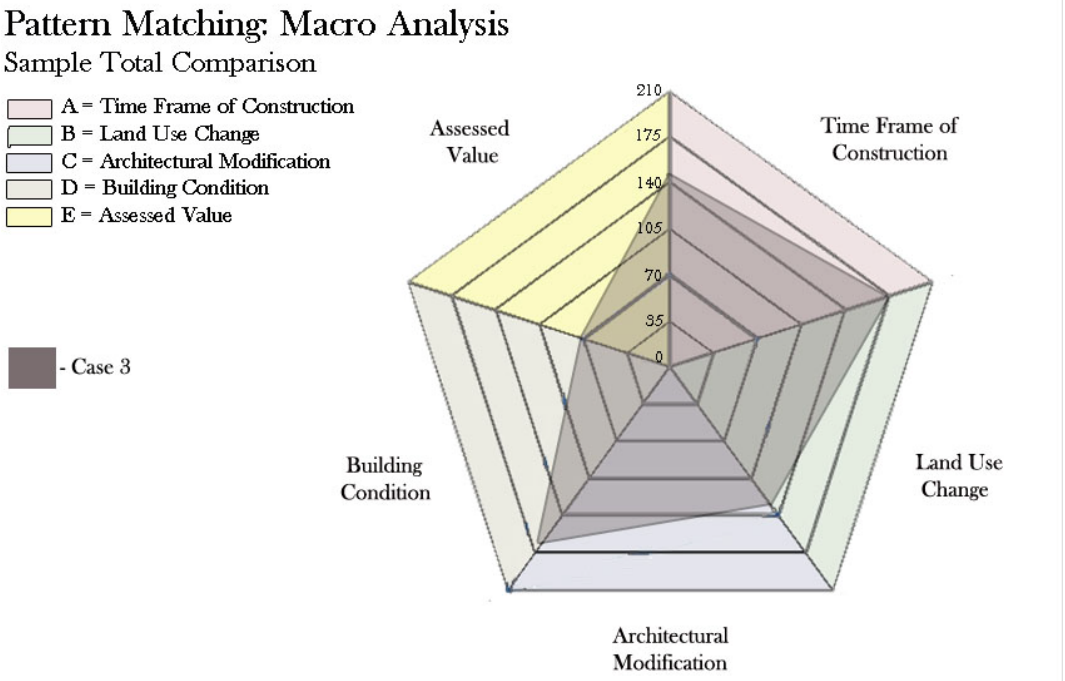



**Image 70: Bristol Macro Scale Results**

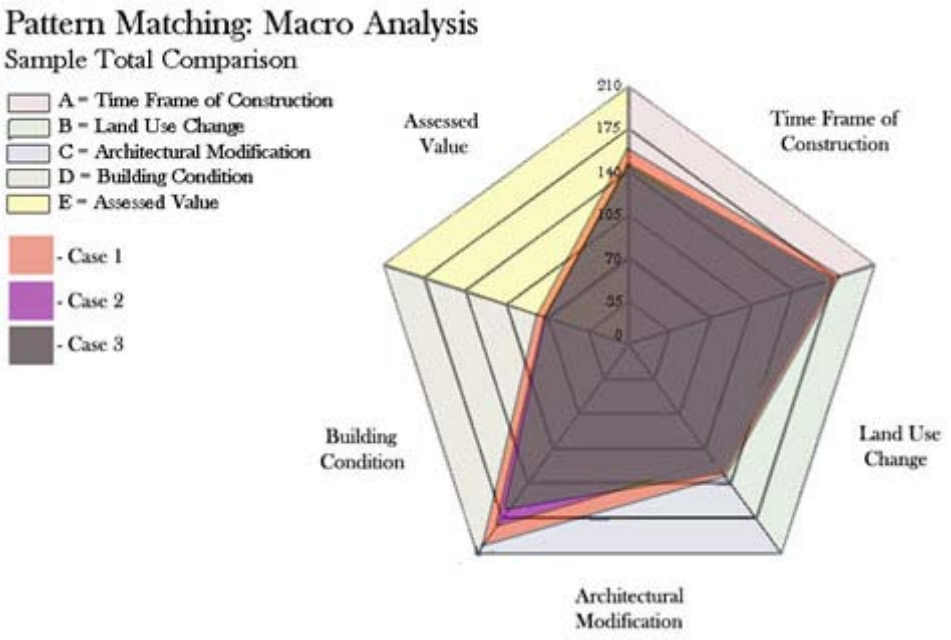



**Image 71: Composite of Macro Scale Results**

***Survey Results: Cross-Case Analysis*** (67% matched patterns)

The cross case analysis showed a positive correlation with a 67% matched pattern rate, but disagreements between again lowered the agreement with predictions. Case 1 (Doylestown) actually had the highest average number of points per structure (the higher the mean, the lower neglect), while Case 2 (Quakertown) and Case 3 (Bristol) were almost identical in their outcomes. This result means that a given building in Case 1 (Doylestown) is likely to be experiencing less neglect than a structure in Case 2 (Quakertown) or Case 3 (Bristol). The cross-case analysis also showed that the case with the highest amount of preserved farmland (Case 1) actually had the lowest amount of "1" variables (indicating higher neglect in occurrence according to the utilized ordinal scale), while Case 2 (Quakertown) and Case 3 (Bristol) were extremely close in their

percentages. This result means that, of the primary measures contributing to neglect, Case 1 (Doylestown) was experiencing the least. Inversely, the percentage of "3" variables, measures that indicate the prevention of neglect, followed this same pattern. The percentages of "2" variables were extremely close in all cases, indicating that the process of neglect is present within each case under investigation. Finally, the overall rates of neglect were lowest for Case 1 (Doylestown) and equal for Case 2 (Quakertown) and Case 3 (Bristol).

These results indicate that, when towns have similar preservation strategies, there may be a stronger positive correlation between an increase in the amount of preserved farmland and the decrease in the rate of demolition by neglect. The cross-case analysis revealed the same pattern as both the micro and macro analyses. Other than the difference in the percentage of "2" variables, all patterns were matched when comparing Case 3 (Bristol) to Case 1 (Doylestown), the two cases with identical historic preservation ordinances in place. There was also a 100% matched pattern when comparing Case 1 (Doylestown) to Case 2 (Quakertown), again similar to the other scales of measurement. Finally, the analysis revealed a low rate of pattern matching when comparing Case 2 (Quakertown) to Case 3 (Bristol); in fact, none of the predictions proved accurate. The overall average of matched patterns for all three scales of measurement, however, was 72%, suggesting a fairly high positive correlation between the independent and dependent variables, especially when one considers that the percentage was 100% between the two towns with identical local preservation policies in place.

Predicted:
(Avg. Points per Structure) - Doylestown > (Avg. Points per Structure)-Quakertown > (Avg. Points per Structure)-Bristol
(% of 1 Var.)-Doylestown < (% of 1 Var.)-Quakertown < (% of 1 Var.)-Bristol
(% of 2 Var.)- Doylestown > (% of 2 Var.)- Quakertown > (% of 2 Var.)- Bristol
(% of 3 Var.)- Doylestown > (% of 3 Var.)- Quakertown > (% of 3 Var.)- Bristol
(Rate of Neglect)- Doylestown < (Rate of Neglect) - Quakertown < (Rate of Neglect) - Bristol

Actual:
(Avg. Points per Structure)-Doylestown > (Avg. Points per Structure) - Quakertown < (Avg. Points per Structure) - Bristol
(% of 1 Var.)-Doylestown < (% of 1 Var.)-Quakertown > (% of 1 Var.)- Bristol
(% of 2 Var.)- Doylestown > (% of 2 Var.)- Quakertown < (% of 2 Var.)- Bristol
(% of 3 Var.)- Doylestown > (% of 3 Var.)- Quakertown < (% of 3 Var.)- Bristol
(Rate of Neglect)- Doylestown < (Rate of Neglect) - Quakertown = (Rate of Neglect) - Bristol

| Cross Case Analysis Results | Doyles-town | Quaker-town | Bristol |
|---|---|---|---|
| ***Avg. Pts per Structure*** | 11.23 | 10.56 | 10.57 |
| ***% of 1 Variables*** | 24% | 35% | 31% |
| ***% of 2 Variables*** | 28% | 29% | 27% |
| ***% of 3 Variables*** | 48% | 36% | 42% |
| ***Rate of Neglect*** | 25% | 30% | 30% |

**Table 6: Cross-Case Comparison Results**

| Scale of Measurement/Variable | Matched Pattern Rate | Difference: Doylestown vs Quakertown | Difference: Quakertown vs Bristol | Difference: Doylestown vs Bristol |
|---|---|---|---|---|
| ***MICRO SCALE*** | ***67%*** | ***93%*** | ***33%*** | ***73%*** |
| *(A) Time Frame of Construction* | 56% | | | |
| pre1900-1940 | | 10.616 | 8.6 | -2.06 |
| 1941-1970 | | 9.552 | 1.2 | -8.352 |
| 1971-present | | 21.248 | -9.8 | 11.448 |
| *(B) Land Use Change* | 56% | | | |
| vacant | | -6.936 | 0.6 | -6.336 |
| alternate | | 3.576 | -10.2 | 13.776 |
| continuous | | 4.44 | -10.8 | -6.36 |
| *(C) Architectural Modification* | 56% | | | |
| modern | | -8.648 | 9.2 | -0.552 |
| modified | | 1.248 | -4.2 | -2.952 |
| authentic | | 8.48 | -5 | 3.48 |
| *(D) Building Condition* | 100% | | | |
| dilapidated | | -2 | -4 | -6 |
| moderate | | -5.712 | -0.6 | -6.312 |
| well conditioned | | 8.792 | 4.6 | 15.792 |
| (E) Assessed Value | 100% | | | |
| *$0-&81,000* | | -9.336 | 1.8 | -7.356 |
| $82,000-$162,000 | | 8.32 | 0.8 | 9.12 |
| $163,000-$243,000 | | 2.096 | -2.6 | -0.54 |
| ***MACRO SCALE*** | ***80%*** | ***100%*** | ***40%*** | ***100%*** |
| (A) Time Frame of Construction | 67% | 15.24 | -0.6 | 14.434 |
| (B) Land Use Change | 67% | 11.536 | -5.8 | 5.736 |
| (C) Architectural Modification | 67% | 10.191 | -8.2 | 1.1991 |
| (D) Building Condition | 100% | 9.984 | 13.8 | 23.784 |
| (E) Assessed Value | 100% | 9.624 | 0.6 | 10.224 |
| ***CROSS CASE ANALYSIS*** | ***67%*** | ***67%*** | ***67%*** | ***67%*** |
| Average Points per Structure | 67% | 0.63 | -0.1 | 0.66 |
| % of 1 Variables | 67% | 9 | 4 | -7 |
| % of 2 Variables | 67% | 1 | 2 | 1 |
| % of 3 Variables | 67% | 8 | -6 | 6 |
| Rate of Neglect | 67% | 5 | 0 | 5 |
| ***MEAN MATCHED PATTERN*** | ***72%*** | ***93%*** | ***33%*** | ***73%*** |

**Table 7: Pattern Matching Results**

***Research Question Assessment***

*Subsidiary Research Questions*

Does peripheral agricultural preservation help to decrease function relocation?

Results for this question showed that there was a slight correlation between the two variables, but, due to other causal factors, the results were somewhat inconclusive. Results from the micro scale analysis showed that the case with the highest amount of preserved farmland had lower vacancy rates and higher continuity of land uses than the other two cases. It also had a higher number of historic structures within its town fabric, suggesting that land use consistency had increased through time as well as the number of buildings which were built between pre1900-1970 which were retained This pattern was repeated for alternate-use comparisons.

On the surface, this outcome indicates that boroughs with high amounts of peripheral preserved agricultural lands have a higher consistency of similar land uses within structures over time, or that they are at least able to keep the existing structures active through adaptive reuse. However, the inconsistency with predicted patterns when comparing the case with the lowest amount of preserved farmland to the case with moderate amounts somewhat disproves this indication. Also, land use change only had a 56% matched pattern rate on the micro scale and a 67% matched pattern rate on the macro scale. These results show relatively small correlations between the two variables, caused by the fact that the predicted comparisons between Quakertown and Bristol were all disproved. It is likely that other important causal factors have a stronger impact than the preserved farmland itself.

Corollary to these findings, existing housing statistics show that the ability to contain population by increasing amounts of preserved farmland could not be proved; in fact, housing statistics are the reverse of predicted patterns. Case 1 (Doylestown) has lost an estimated 100 units of housing since 1990, while Case 2 (Quakertown) has had a 50-unit increase and Case 3 (Bristol) a 100-unit increase. These findings suggest that there may need to be more investigation of which particular uses remain consistent. In other words, there appears to be a stronger correlation with commercial, industrial, or civic uses than with residential uses, as housing statistics diverge from other findings.

Is there a decrease in deferred maintenance as amount of preserved farmland increases? Yes. The strongest correlation between amount of preserved farmland and any explanatory variable was the relationship with building condition, followed by assessed values. Building condition had a 100% matched patterns rate on both the micro and macro scales. Assessed value, on the other hand, had only a 67% matched pattern rate on the micro scale, but 100% matched patterns on the macro scale. These findings suggest that, as the amount of preserved farmland increases, more structures are in good condition, but are not necessarily worth more on the fair market. Given that the case with the highest amount of farmlands preserved also had the lowest vacancy rates and the highest number of the oldest category of structures, one can assume that this maintenance is somewhat continuous. If there had been more modern structures in Case 1 (Doylestown), one might have suspected that the newer buildings were swaying the results of the assessment, but this was not the case.

The assessed values nearly repeated this pattern, as the only disagreements with predicted patterns on a micro scale occurred between Case 2 (Quakertown) and Case 3 (Bristol). On average, the case with the highest amount of preserved agricultural lands (Case 1) had a $56,000 assessed value, as compared to $30,000 for Case 2 (Quakertown) and nearly $35,000 for Case 3 (Bristol). Overall, there was an 83% matched pattern rate for assessed values when both scales of assessment were averaged. We can then assume that, as amount of preserved farmland increased, both building condition and building economic worth improved. It may be that, because many of Bristol's structures are on the riverfront, their assessed values are affected by an additional intervening variable that altered the results.

Does an increase in viability of historic structures necessarily require a decrease in historic integrity? Yes, but only a slight decrease, not to the extent of extreme modernization and change. Results from this study show that, at least on a municipal scale, maintaining the historic fabric of colonial towns does not necessarily require a significant decrease in historic integrity to increase viability. All three cases under investigation had more historic than modern structures and had low vacancy rates, indicating that the majority of the existing historical structures retained both viability and vitality through time. However, in all three cases, modified structures were present in greater numbers than either historic or modern structures. This finding indicates that, to retain both function and utility, some degree of alteration must inevitably occur. More often than not, those buildings that do not receive this maintenance are simply going through the process of demolition by neglect. Small changes and the utility of

renovation, adaptive reuse, and rehabilitation on an individual scale may decrease the integrity of historic structures, but, on a municipal scale, these alterations retain a larger amount of integrity, which contributes to an overall sense of historic character. Most often, unless they are very well-known historic icons, buildings that receive no modification end up experiencing demolition by neglect.

*Overall Conclusions/Testing the Hypothesis*

Has the preservation of peripheral agricultural lands helped to decrease the rate of demolition by neglect in colonial town centers? The initial hypothesis upon which this study was founded was that preserving peripheral agricultural lands aids in decreasing the amount of demolition by neglect of historic structures within a city or town. Based on the aforementioned results, the hypothesis cannot be rejected, because all three scales of measurement showed a positive correlation. Findings indicate that there is an indirect decrease in the process of demolition by neglect when the preservation of peripheral agricultural lands is used in combination with multiple preservation strategies. However, the hypothesis appears to be sustained only when agricultural preservation is used as a piece of an overall preservation policy scheme for a locality. All three scales of measurement showed frequent discrepancies with predicted patterns in that Case 2 (Quakertown) failed to outperform Case 3 (Bristol) in preservation. While Case 1 (Doylestown) and Case 3 (Bristol) had nearly a 100% matched pattern level, and while comparisons between Case 1 (Doylestown) and Case 2 (Quakertown) almost always matched predictions, there was a consistent disagreement with predictions for the

Quakertown (Case 2)-Bristol (Case 3) comparisons, most likely because Quakertown did not employ the same historic preservation strategies as the other two towns.

This result suggests that, although the preservation of peripheral agricultural lands may not decrease the rate of demolition by neglect by itself, it can be applied effectively in combination with other internal preservation strategies. This is an extremely important observation for current preservationists, in that it appears that external land use management practices can help to decrease the loss of historic structures by keeping them active, although exact causality cannot be determined. It could not, however, be shown that preservation of farmlands would cause a town's population to increase, as results showed that the reverse is occurring. In confirming that external strategies can be employed to help in protecting historic structures, the study suggests that the paradigmatic shift in cultural landscape studies, which interprets them as part of larger systems, is accurate.

### *Other Contributions and Future Research Needs*

Overall, this study has made multiple contributions to the field of cultural landscape studies as well as opened the door to future studies on the relationship between a historic structure and its setting. First, it has helped to determine whether means other than structural preservation can contribute toward protecting the cultural resources of our living heritage sites. In particular, this study shows that peripheral land use management policies can actually contribute to a local government's overall preservation scheme when used in combination with other preservation strategies. It also suggests that, the

higher the number of preservation policies employed, the lower the amount of demolition by neglect. Rather than trying to preserve entire landscapes and municipalities by freezing them in time, the use of better contextual land use management policies can aid in preserving historic structures.

Second, the study has generated a method by which to document the process of demolition by neglect and a model to measure the rate of this process. It offers a set of statistics for cultural landscapes that can become a basis for comparison in future longitudinal studies and can be used by other towns to generate quantitative data in a field that has lacked such documentation. This contribution is extremely important in that extensive documentation of the status of historic landscape structures is only beginning to occur. Many preservationists are finding it often difficult to document the precise date of a building's construction due to the inexact interpretive science involved with structural surveys and the fact that modification of these structures can sometimes hinder the determination of accurate findings. Also, there is currently no documentation occurring which exposes the condition of the historic structures. The existence of historic buildings is not always a positive attribute for a landscape to possess. If these structures are in a state of disrepair, planning initiatives which utilize them as part of an overall shame for a municipality may fall short of desired goals.

Third, although some studies on the interrelatedness of town centers and their outskirts exist, this study has shown that the impact of various preservation measures can be separated and studied according to their ecological or cultural functions. The fact that external land use management techniques can at least be correlated with the preservation

of historic structures opens up other avenues of study and historic structure loss prevention. Similar studies could be performed on wilderness preserves, open space preservation programs, riparian corridor preservation strategies, recreational networks, and other peripheral land preservation techniques. Also, as New Ruralism is a relatively new theory in the field, this study may help to establish it as a useful framework for studying landscapes, even though issues of exact causality may require further attention and refinement. This study indicates that there is indeed a positive correlation between agricultural preserves and urbanism (at least with regard to their impact on historic structures).

Fourth, this study broadens the scope of traditional preservationists' attempts to prevent neglect by suggesting that external land use management strategies can be employed to protect historic structures as part of an overall policy framework and helps to shift the paradigm of preservationism to a more hybrid approach incorporating the theoretical notions of cultural geography. The value of linking historic preservation and farmland preservation is great in view of the rapidly declining number of historic structures and the increasingly accelerated rate of farmland conversion in America. Although this documentation is only beginning to occur through what is known as "teardowns," this research helps to reveal those structures which are threatened by becoming a "teardown" and also provides a means in which to help prevent the occurrence. Protection of one of these two types of treasures indirectly but positively supports preservation of the other. In this sense, the study can serve as a catalyst to shift

the paradigm of preservationism from the aesthetics or integrity of an object to an interrelated causal system—to the relationship of a structure to its setting.

In regards to existing causal factors effecting neglect, this study suggests that, of the aforementioned causal variables, other than external land use management strategies in place, internal land use management strategies, external funding, and civic image were shown to be the top three causal factors which influenced neglect. The constant disagreement with predicted patterns between Quakertown (Case 2) and Bristol (Case 3) and the fact that Quakertown (Case 2) did not share the same local preservation strategies as the other two localities suggests that internal land use management strategies may have had the strongest impact on neglect. Also, because Quakertown (Case 2) was not listed on the National Register of Historic Places like the other two cases, and was not eligible for the additional state and local funding that Doylestown (Case 1) and Bristol (Case 3) were, external funding was indicated to be a strong intervening variable on neglect which also helped cause disagreements with predicted patterns. Although all three cases generated revenue from heritage tourism, only Doylestown's (Case 1) tourism based economy utilized heritage tourism as its primary means of income. The extra funding and initiatives to provided to owners to maintain this economic engine prove to be highly influential as Doylestown (Case 1) had the lowest amount of neglect in occurrence.

Surprisingly, the economic condition of the towns themselves, while impactful, did not seem to effect correlation as much as other variables. Although Bristol (Case 3) had the lowest median income (which was significantly below state levels) it still had a lower amount of neglect in occurrence than Quakertown (Case 2). Ownership attitudes

also need to be carefully examined within each town to reveal the impact they have had on neglect. Attitudes toward the preservation of historic structures can vary according to individual values and aspirations. As this variable was not examined in this research, it is recommended that the impact of ownership attitude of each structure sampled be assessed to compare to these findings and address causality of the variable.

## LITERATURE CITED


Alanan, A. & R. Melnick (2000). *Preserving cultural landscapes in America*. Baltimore: Johns Hopkins University Press.

Alderson, C. R. (2006). Responding to context: Changing perspectives on appropriate change in historic settings. *APT Bulletin*, 37(4): 22-33.

Arbor, M. (1994). *Tools and trades of America's past*. Doylestown, PA: Bucks County Historical Society.

Arendt, R. (1994). *Rural by design: Maintaining small town character*. Chicago: Planners Press.

Babbie, Earl. (2005). *The basics of social research*. Belmont, CA: Thompson-Wadsworth.

Banks, J. (2004). Divided culture: Integrating agriculture and conservation biology. *Frontiers in Ecology and the Environment*, 2(10): 537-545.

Berg, S. P. (1988). Documenting and preserving a historic landscape. *APT Bulletin*, 20(1): 41-49.

Birnbaum, C. A. (1994). Protecting cultural landscapes: Planning, treatment and management of historic landscapes. In *Preservation Brief 36* (pp. 1-21). Washington, DC: National Park Service, Preservation Assistance Division.

Birnbaum, C. A. (2007). *Preservation Briefs*. Washington, DC: National Park Service, U.S. Dept. of the Interior.

Bourke, L., Jacob, S., & Luloff, A. E. (1996). Response to Pennsylvania's agricultural preservation programs. *Rural Sociology*, 61(4): 606-629.

Bromley, D. W. & Hodge, I. (1990). Private property rights and presumptive policy entittlements: Reconsidering the premises of rural policy. *European Review of Agricultural Economics*, 17(2), 197-214.

Bucks County Historical Commission. (2005). Doylestown, PA: Land Use and Growth Management Report.

Bucks County Planning Commission. (2005). *Bucks County Agricultural Land Preservation*. Doylestown, PA: Annual Report.

Carr, E. (2005). The noblest landscape problem: Thomas C. Vint and landscape preservation. In Birnbaum, C., & Hughes, M. (Eds.), *Design with culture: Claiming America's landscape heritage* (pp. 157-178). Charlottesville, VA: University of Virginia Press.

Clark, K. Z. (2006). *Images of America: Bucks County*. Charleston, SC: Arcadia Publishing.

Clay, G. (1976). Whose time is this place? The emerging science of garden restoration. *Landscape Architecture Quarterly*, 66(3): 217-218.

Cohen, S. (2008). Greenbelts in London and Jerusalem. *Geographical Review*, 84(1): 74-89.

Cook, R. (1996). Is landscape preservation an oxymoron? *The George Wright Forum*, 13(1): 42-53.

Cooke, R. (2005). *Building in the 21st century*. Malden, MA: Blackwell Publishing.

Collins, R. C., Waters, E. B., & Dotson, A. B. (1991). America's downtowns: Growth, politics, and preservation. Washington, DC: The Preservation Press.

Cronon, W. (1983). *Changes in the land: Indians, colonists, and the ecology of New England.* New York: Hill and Wang.

Daniels, T. (1999). *When city and country collide: Managing growth in the metropolitan fringe.* Washington, DC: Island Press.

Daniels, T.L. & Bowers, D. (1997). Holding our ground: Protecting America's farms and farmland. Washington, DC: Island Press.

Daniels, T. L., & Nelson, A.C. (1986). Is Oregon's farmland preservation program working? *Journal of the American Planning Association*, 52(1): 22-32.

Dick, L.(2000). Commemorative Integrity and Cultural Landscapes: Two National Historic Sites in British Columbia. *APT Bulletin*, 31(4): 29-38.

Duess, M. M. (2007). *Colonial inns and taverns of Bucks County: How pubs, taprooms, and hostelries made revolutionary history*. London, England: History Press.

Duke, J. & Aull-Hyde, R. (2002). Identifying public preferences for land preservation using the analytic hierarchy process. *Ecological Economics*, 42: 131-145.

Fay, B. (1996). *Contemporary philosophy of social science: A multicultural approach.* Malden, MA: Blackwell Publishers.

Fischel, W. (1982). Urbanization of agricultural land: A review of the national agricultural land study. *Land Economics*, 58: 236-259.

Fletcher, S. W. (1955). Pennsylvanian agriculture and country life. Harrisburg, PA: Pennsylvania State University Press.

Francaviglia, R. (2000). Selling Heritage Landscapes. In Alanen, A. & Melnick, R. (Eds.), *Preserving cultural landscapes in America* (pp. 44-69). Baltimore: John Hopkins University Press.

Goldwyn, A. (1995). Demolition by neglect: A loophole in preservation policy. Philadelphia, PA: University of Pennsylvania Press.

Groat, L. & Wang, D. (2002). *Architectural research methods*. New York: Wiley.

Howett, C. (2000). Integrity as a value in cultural landscape preservation. In Alanan, A., & Melnick, R. (Eds.), *Preserving cultural landscapes in America* (pp. 186-208). Baltimore: Johns Hopkins University Press.

Hylton, T. (1995). *Save Our Land, Save Our Towns*. Harrisburg, PA: RB Books.

Jackson, J.B. (1985). *Landscape in Sight: Looking at America*. Helen Lefkowitz Horowitz (Ed). New Haven, CT: Yale University Press.

Jackson, J. B. (1997). The future of the vernacular. In Groth, P. (Ed.), *Understanding ordinary landscapes* (pp. 145-156). New Haven, CT: Yale University Press.

Jacobs, J. (1961). *The death and life of great American cities*. New York: Random House.

Jigyasau, R. (2002). Monuments and sites in their setting: Conserving cultural heritage in changing townscapes and landscapes. India: ICCROM.

Jones, G & Jones, J. (2001). *Farmland preservation case studies for Edey's Landing National Historic Reserve*. Seattle, WA: U.S. Department of the Interior, National Park Service.

King, L. (1984). *Central place theory*. Beverly Hills: Sage Publications.

Klein, L, & Reganold, J (1999). Town government's role in explaining the spatial

variation of the rate of farmland loss. Madison, WI: University of Wisconsin Press.

Kostoff, S. (1992). *The city shaped*. New York: Bullfinch Press.

Kraus, S. (2006). A Call for New Ruralism. Sustainable Agriculture Education Center. Retrieved February 3, 2008 from www.sagecenter.org/new-ruralism, 1-4.

Kyvig, D. E., & Myron, A. M. (2000). *Nearby history: Exploring the past around you*. New York: Altamira Press.

Lehman, T. (1992). Public values, private lands: Origins and ironies of farmland preservation in Congress. *Agricultural History*, 66(2): 257-272.

Library of Congress Map Collection. (2009). U.S. Library of Congress Map Collection Research Link. Retrieved from http://memory.loc.gov/ammem/gmdhtml/ gmdhome.html, January 23, 2009.

Longstreith, R. (2008). *Cultural landscapes: Balancing nature and heritage in preservation practice.* Minneapolis, MN: University of Minnesota Press

Lowenthal, D. (1985). Age and artifact: Dilemmas of appreciation. In Meinig, D. W. (Ed.), *The interpretation of ordinary landscapes* (pp. 103-128). New York: Oxford University Press.

Lynch, L. & Duke, J. (2007). Economic benefits of farmland preservation: Evidence from the United States. Baltimore, MD: University of Maryland.

Lynch, L. & Musser, W. (2001). A relative efficiency analysis of farmland preservation programs. *Land Economics*, 77: 577-594.

Lowenthal, D. (1998). *The heritage crusade and the spoils of history*. New York: Cambridge University Press.

Machado, E., Stoms, D,, & Davis, F. (2003). *A Systematic Framework for Prioritizing Farmland Preservation*. Santa Barbara, CA: National Center for Ecological Analysis and Synthesis.

McConnell, K. E. (1989). The optimal quantity of land in agriculture. *Northeastern Journal of Agricultural and Resource Economics*, (18)2: 63-72.

McNealy, T. (2001). *Bucks County: An illustrative history*. Doylestown, PA: Bucks County Historical Society.

Melnick, R. (2000). Considering nature and culture in historic landscape preservation. In Alanan, A., & Melnick, R. (Eds.), *Preserving cultural landscapes in America* (pp. 22-43). Baltimore: Johns Hopkins University Press.

Moffat, D. (2006). New ruralism: Agriculture at the metropolitan edge. *The University of California eScholoarship Repository.* Retrieved February 3, 2008, from http://repositories.cdlib.org/cgi/viewcontent.cgi?article=2249&context=ced/place, 72-75.

Montello, D. R. & Sutton, P. C. (2006). *An introduction to scientific research methods in geography*. Thousand Oaks, CA: Sage Publications.

Nasar, J. (1998). *The evaluative image of the city*. Thousand Oaks, CA: Sage Publications.

National Agricultural Statistics Service. (2007). U.S. Department of Agriculture-Pennsylvania Statistics. Retrieved from http://www.agcensus.usda.gov/ Publications/2007/Full_Report/Census_by_State/\Pennsylvania/index.asp, February 14, 2009.

National Register of Historic Places. (2010). National Register of Historic Places Official Web Site. Retrieved from www.nps.gov/nr/about.htm, January 12, 2010.

National Trust for Historic Preservation. (2008). Teardown resource guide: Teardowns by State and Community. Retrieved from www.preservationnation.org/teardowns on August 3, 2008.

National Trust for Historic Preservation. (2010). Main Street Program. Retrieved from www.preservationnation.org/main-street/on January 12, 2010.

New Castle City Council (2005). *Productivity Commission Inquiry onto the Conservation of the Historic Built Environment.* New Castle, England: City Council Submission, 29 July 2005.

Nickerson, C. & Lynch, L. (2001). The effect of farmland preservation programs on farmland prices. *American Journal of Agricultural Economics*, 83(2): 341-351.

Noble, A. (1984). *Wood, brick, and stone: The North American settlement landscape.* Amherst, MA: University of Massachusetts Press.

Olson, R. & Lyson, T. (1999). *Under the blade: The conversion of agricultural landscapes*. Boulder, CO: Westview Press.

Pennsylvania Historical and Museum Information (2009). Agricultural Census Information Research Link. Retrieved from www.portal.state.pa.us/portal/ server.pt/community/agricultural_census_information/2586.

Pennsylvania Historical and Museum Collection (2008). *Agriculture in Pennsylvania*. Retrieved from www.phmc.state.pa.us/ppet/ agriculture/page1.asp?secid=31, November 12, 2008.

Peterson, J. (2003). *The Birth of City Planning in the United States*. Baltimore: Johns Hopkins University Press.

Pilecki, J. & Potser, C. (2002). *Images of America: Quakertown*. Charleston, SC: Arcadia Publishing.

Pollard, D. (1989). Empirical processes. *Statist,* Sci.(4), 341-346

Ravencroft, N. (2000). The vitality and viability of town centers. *Urban Studies*, 37(13): 2533-2549.

Reed, T. & Carpenter, S. (2002). Comparisons of p-yield, riparian buffer strips, and land cover in six agricultural watersheds. *Ecosystems*, 5(6), 568-577.

Riesenweber, J. (2008). Landscape preservation and cultural geography. In Longstreith, R. (Ed.), *Cultural landscapes: Balancing nature and heritage in preservation practice*. Minneapolis, MN: University of Minnesota Press, 23-35.

Rivinus, W. (1972). *Old stonework in Bucks County: A survey of stonemasonry during the 18th and 19th centuries in Bucks County, PA*. Doylestown, PA: Bucks County Historical Society.

Roberts, E. F. (1982). *The law and the preservation of agricultural lands*. New York: Northeast Regional Center for Rural Development.

Roe, B., Irwin, E., & Morrow-Jones, H. (2004). The effects of farmland preservation and other neighborhood amenities on housing values and residential growth. *Land Economics*, 80(1): 55-75.

Root, D. (2003). *Pennsylvania*. Philadelphia, PA: Fodors.

Shi, J. Y., & Phipps, T. (1997). Agricultural land values under urbanizing influences. *Land Economics,* 73(1): 90-100.

Singleton, R. A., and Straits, B. C. (1999). *Approaches to social research*. New York: Oxford University Press.

Smith, K. (1999). Southeastern Pennsylvania: Can agriculture be sustained? In Olson, R., & Lyson, T. (Eds.), *Under the blade: The conversion of agricultural landscapes* (pp. 287-294). Boulder, CO: Westview Press.

Soderlund, J. (1983) *William Penn and the founding of Pennsylvania, 1680-1684 : A Documentary History*. Philadelphia, PA : University of Pennsylvania Press and Historical Society of Pennsylvania.

Stocker, F. (1963). Taxing farmland in the urban fringe. *Journal of Farm Economics*, 45(5): 1131-1137.

Strauss, C., & Quinn, N. (1997). *A cognitive theory of cultural meaning.* New York: Cambridge University Press.

Stilgoe, J. (1983). *Metropolitan corridor: Railroads and the American scene*. London: Yale University Press.

Tashakkori, A., & Teddlie, C. (1994). *Mixed methodology: Combining qualitative and quantitative approaches.* Thousand Oaks, CA: Sage Publications.

The Center for Rural Pennsylvania. (2009). Zoning for farming: A guidebook for Pennsylvania municipalities on how to protect valuable agricultural lands. Harrisburg, PA: The Center for Rural Pennsylvania.

Transportation Research Board, National Research Council. (2002). The costs of sprawl. Transit Cooperative Research Program at Rutgers University. Washington, DC: National Academy Press.

Tse-Chuan. Y. & Snyder, A. R. (2007). Population Change in the Northeast, 2000-2005. Durham, New Hampshire: *NERCD* Issues Brief.

U.S. Census Bureau. (2009). County business patterns home page: Bucks County, PA. Retrieved from www.census.gov, January 23, 2009.

U.S. Census Bureau (2009). Pennsylvania Population Change Report. Retrieved from www.censusscope.org/us/s42/c17/chart_popl.html, January 23, 2009

U.S. Department of Agriculture (2005). *Urban Ecosystem Analysis of the Delaware River Valley: Calculating the value of Nature.* Washington, DC: American Forests.

U.S Dept. of Agriculture. (2007). 2007 Census of Agriculture in Pennsylvania. USDA National Ag Statistics Service, Marc Tosaino (Director). Retrieved from http://

www.dep.state.pa.us/dep/subject/advcoun/ag/2009/apr2009/Presentations/AgCensus.pdf, February 4, 2009.

U.S. Department of the Interior, National Park Service (2007). Historic Agricultural Resources of Pennsylvania c1700-1960. *National Register of Historic Places Continuation Sheet.* NPS Form 10-900-a OMB No. 1024-0018 (8-86).

Vandermeer, J. (1995). The ecological basis of alternative agriculture. *Annual Review of Ecology and Systematics,* 26: 201-224.

Vogel, R., & Hahn, A. (1972). On the preservation of agricultural land. *Land Economics,* 48(2): 190-193.

Watts, D. (2001). Habitat connectivity and matrix restoration: the wider implications of agri-environment schemes. *Journal of Applied Ecology*. 43(2), 209-218.

Wallace, P. & Franchetti, A. (2007). Heritage at risk: Addressing the issue of the demolition by neglect of historic heritage in New Zealand. (NZHPT) *New Zealand Historic Places Trust*, Wellington: Sustainable management of Historic Heritage, Discussion paper No. 6, August.

Wegner, J., & Merriam, G. (1979). Movements by birds and small mammals between a woodland and adjoining farmland habitats. *The Journal of Applied Ecology*, 16(2): 349-357.

Wolfram, G. (1981). The sale of development rights and zoning in the preservation of open space: Lindahl equilibrium and a case study. *Land Economics,* 57(3): 398-413.

Yin, R. (2009). *Case study research: Design and methods.* Thousands Oaks, CA: Sage Publications.

# APPENDICES

*Appendix 1 – Survey of Neglect Rate for Historic Properties*

## Survey of Neglect Rate for Historic Properties

Case :_____

***Galen Newman***

*Site No:*_____

**Clemson University, PhD of PDBE**

Dissertation Research Form

**Reconnaissance Survey**

---

### *Identification*

Historic Name (if available):_____

Current Name:_____

Address/Location:_____

City:_____ County:_____

### *Function*

**Economics:**

Assessed Property Value:_____

**National Determination**:

1 Listed Individually
2 Listed as contributing to a historic district
3. Pending as individual/contributing to a historic district
4. Not Listed

**Historical Use**:

1. Single family dwelling
2. Multi family dwelling
3. Commercial
4. Industrial

**Current Use**:

1. single family dwelling
2. multi family dwelling
3 commercial
4. industrial

5. Vacant
6. Other

5. Vacant
6. Other

***Property Description***

Construction Date:_____
Alteration Date:_____
Earliest Mapping Date:_____

**Height**:
1 1 Story
2 2 Stories
3 3 Stories
4 4 Stories
5 5 Stories
0 Other:_____

**Construction Method**:
1 Masonry
2 Frame
3 Log
4 Steel
0 Other:_____

**Historic Core Shape**:
1 Rectangular
2 Square
3 L
4 T
5 U
6 H
7 Octagonal
8 Irregular
0 Other:_____

**Exterior Walls**:
1 Weatherboard
2 Beaded Weatherboard
3 Shiplap
4 Flushboard
5 Wood Shingle
6 Stucco
7 Tabby
8 Brick
9 Brick Veneer
10 Stone Veneer
11 Cast-Stone
12 Marble
13 Asphalt roll
14 Synthetic siding
15 Asbestos shingle
16 Pigmented Structural Glass
17 Other:_____

**Roof Features**:

Shape:_____

**Foundation**:
1 Not Visible
2 Brick Pier
3 Brick Pier with Fill
4 Brick
5 Stuccoed Masonry
6 Stone Pier
7 Stone
8 Concrete Block
9 Slab Construction
10 Basement
11 Raised Basement
12 Other:_____

Materials:_____

Significant Architectural Features:_____

_____

_____

_____

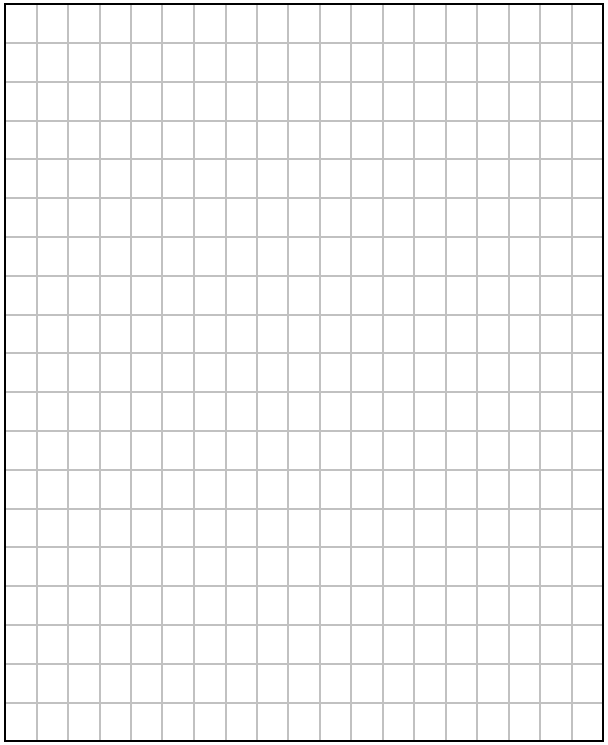
## Historical Information

Source of Information:

| X | + | ***Physical Condition Checklist*** (Cooke, 2001) |
|---|---|---|
| | | **Front Elevation** |
| | | *Roof - coverings/protrusions/chimney/flashings/abutments* |
| | | *Guttering/Fascia/Soffit* |
| | | *Upper Storey Walling* |
| | | *Upper Storey Windows* |
| | | *Lower Storey Walling* |
| | | *Lower Storey Windows and Doors* |
| | | *Down Water Pipes* |
| | | **Left or Right Flank Wall if Applicable** |
| | | *Roof/Protrusions/Chimneys* |
| | | *Guttering/Fascia/Soffit/Verge* |
| | | *Upper Walling/Gable* |
| | | *Upper Storey Windows* |
| | | *Lower Storey Walling* |
| | | *Lower Storey Windows and Doors* |
| | | *Down Water Pipes* |
| | | **Rear Elevation if Applicable** |
| | | *Roof/Protrusions/Chimneys* |

| | | |
|---|---|---|
| | | *Guttering/Fascia/Soffit* |
| | | *Upper Storey Walling* |
| | | *Upper Storey Windows and Doors* |
| | | *Lower Storey Windows and Doors* |
| | | *Down Water Pipes* |

## Window Data



**Physical Condition**:

1. Well Conditioned
2. Moderate
3. Dilapidated

**Program Management**

**Recorded by:** Galen Newman_____

x_____

Date Recorded: _____

Additional Comments

***Appendix 2 – Historic Building Materials Reference***

Roof Styles:

*Clay Tile* – Mid 17th Century
*Movarian Tile* – Mid 18th Century
*Flat Tile* – 17th-19th Century
*Sheet Metal* – Mid 19th Century
*Slate* – Mid 17th Century
*Wood Shingles* – 17th – 18th Century
*Asphalt Shingles* – 20th Century
*Metal* – 19th Century
*Copper* – 18th Century

Construction Techniques:

*Timber Framing* – Early 1600's
*Load Bearing Masonry* – 1700's
*Balloon Framing* – Early 1800's
*Platform Framing* – 1950's
*Steel I Beam* – Late 1800's
*Concrete Slab* – 1900's

Window Pane Styles:

*12/12*: *9/9* – 1700-1800
*6/6* – 1790-1860
*4/4* – 1840-1870
*2/2* – 1865-1900
*1/1* – 1885-1940
*Queen Anne* – 1885-1910
*Colonial Revival (12-6/1)* – 1890-1940
*Arts & Crafts (1x1x1)* – 1910-1930
*Chicago Style* – 1910-1940

Wall and Foundation Materials:

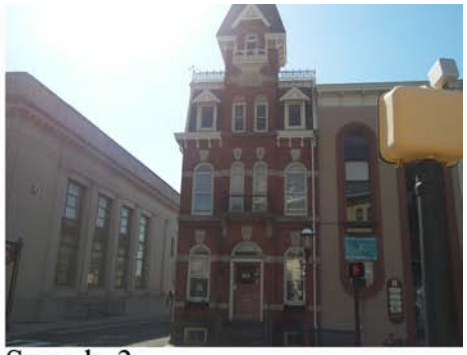
*Shiplap* – Pre 1870's
*Terra Cotta* – 1870's to 1930's
*Wood* – 1750's
*Stucco* – post1950's
*Tabby* – 1700's to 1850's
*Brick* – pre1870's–hand made
1870's–machine made
*Stone* – Pre1600's to present
*Cast Stone* – 1860 – 1940
*Glass Block* – post 1930

***Appendix 3 – Sampled Structures***

*a. Doylestown*

Sample 1

Sample 2



Sample 3

Sample 4

Sample 5

Sample 6

Sample 7

Sample 8


Sample 9

Sample 10


Sample 11


Sample 12


Sample 13


Sample 14


Sample 15


Sample 16


Sample 17


Sample 18

Sample 19

Sample 20


Sample 21

Sample 22

Sample 23

Sample 24

Sample 25

Sample 26


Sample 27


Sample 28


Sample 29


Sample 30


Sample 31


Sample 32


Sample 33


Sample 34


Sample 35


Sample 36


Sample 37


Sample 38


Sample 39


Sample 40


Sample 41


Sample 42


Sample 43


Sample 44


Sample 45


Sample 46


Sample 47


Sample 48


Sample 49


Sample 50


Sample 51


Sample 52


Sample 53


Sample 54


Sample 55


Sample 56


Sample 57


Sample 58


Sample 59


Sample 60


Sample 61


Sample 62


Sample 63

*b. Quakertown*


Sample 1


Sample 2


Sample 3


Sample 4


Sample 5


Sample 6


Sample 7


Sample 8


Sample 9

Sample 10


Sample 11


Sample 12


Sample 13


Sample 14


Sample 15


Sample 16


Sample 17


Sample 18

Sample 19

Sample 20


Sample 21

Sample 22

Sample 23

Sample 24

Sample 25

Sample 26

Sample 27

Sample 28

Sample 29

Sample 30

Sample 31

Sample 32

Sample 33

Sample 34

Sample 35

Sample 36

Sample 37


Sample 38


Sample 39

Sample 40


Sample 41


Sample 42


Sample 43


Sample 44


Sample 45

Sample 46

Sample 47


Sample 48

Sample 49

Sample 50

Sample 51

Sample 52

Sample 53

Sample 54


Sample 55


Sample 56


Sample 57


Sample 58


Sample 59


Sample 60


Sample 61


Sample 62

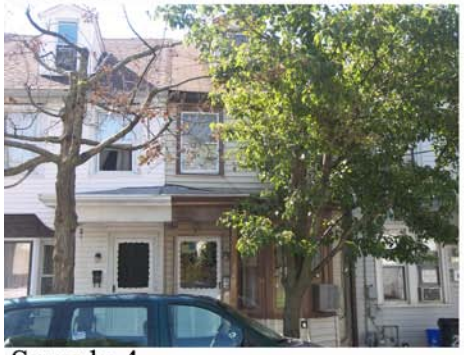

Sample 63

*c. Bristol*


Sample 1


Sample 2


Sample 3


Sample 4


Sample 5


Sample 6


Sample 7


Sample 8


Sample 9

Sample 10

Sample 11

Sample 12

Sample 13

Sample 14

Sample 15

Sample 16

Sample 17

Sample 18

Sample 19


Sample 20


Sample 21


Sample 22


Sample 23


Sample 24


Sample 25

Sample 26


Sample 27

Sample 28

Sample 29

Sample 30

Sample 31

Sample 32

Sample 33

Sample 34

Sample 35

Sample 36

Sample 37

Sample 38

Sample 39

Sample 40

Sample 41

Sample 42

Sample 43


Sample 44

Sample 45

Sample 46

Sample 47

Sample 48

Sample 49

Sample 50

Sample 51

Sample 52

Sample 53

Sample 54

Sample 55

***Appendix 4 - Assessed Values***

*a. Doylestown*

## Case 1 - Doylestown

| SITE # | ADDRESS | ASSESSED VALUE (AssVal / .097 = Market value) |
|---|---|---|
| 1 | 6 E Court St | **39,200** |
| 2 | 8 E Court St | **119,600** |
| 3 | 10 E Court St | **110,000** |
| 4 | 14 E Court St | **191,900** |
| 5 | 18 E Court St | **66,800** |
| 6 | 20 E Court St | **219,160** |
| 7 | 30 E Court St | **36,800** |
| 8 | 26 E State St | **57,600** |
| 9 | 20 E State St | **63,320** |
| 10 | 18 E State St | **48,400** |
| 11 | 15 N Main St | **28,800** |
| 12 | 17 N Main St | **48,400** |
| 13 | 33 So Main St | **50,000** |
| 14 | 15 E Oakland Ave | **28,800** |
| 15 | 54 E Oakland Ave | **75,000** |
| 16 | 52 E Oakland Ave | **77,240** |
| 17 | 41 Taylor Ave | **31,920** |
| 18 | 63 Pine St | **20,800** |
| 19 | 30 So Pine St | **40,000** |
| 20 | 66 E Oakland Ave | **24,760** |
| 21 | 62 E Oakland St | **54,560** |
| 22 | 103 So Main St | **34,800** |
| 23 | 123 So Main St | **127,280** |
| 24 | 120 So Main St | **100,000** |
| 25 | 131 So Main St | **90,000** |
| 26 | 149 So Main St | **94,800** |
| 27 | 27 Bridge St | **13,800** |
| 28 | 29 Bridge St | **13,360** |
| 29 | 88 So Main St | **75,200** |
| 30 | 78 So Main St | **96,100** |
| 31 | 76 So Main St | **33,600** |
| 32 | 68 So Main St | **57,600** |
| 33 | 64 So Main St | **111,800** |
| 34 | 56 So Main St | **38,800** |
| 35 | 50 So Main St | **79,000** |
| 36 | 75 So Clinton St | **680** |
| 37 | 81 So Clinton St | **22,800** |
| 38 | 87 So Clinton St | **16,000** |
| 39 | 93 So Clinton St | **38,400** |
| 40 | 47 W Ashland St | **60,000** |

| | | |
|---|---|---|
| 41 | 39 W Ashland St | **98,800** |
| 42 | 35 W Ashland St | **20,400** |
| 43 | 149 Union St | **42,520** |
| 44 | 104 Shewell Ave | **16,800** |
| 45 | 198 Shewell Ave | **15,600** |
| 46 | 202 Shewell Ave | **16,400** |
| 47 | 206 Shewell Ave | **16,400** |
| 48 | 210 Shewell Ave | **16,400** |
| 49 | 214 Shewell Ave | **16,400** |
| 50 | 15 W State St | **48,250** |
| 51 | 10 N Main St | **196,280** |
| 52 | 12 N Main St | **23,200** |
| 53 | 18 N Main St | **82,400** |
| 54 | 22 N Main St | **56,800** |
| 55 | 24 N Main St | **56,400** |
| 56 | 22 N Main St | **56,800** |
| 57 | 1 E State St | **60,000** |
| 58 | 106 E State St | **61,200** |
| 59 | 100 E State St | **73,600** |
| 60 | 90 E State St | **58,000** |
| 61 | 82 E State St | **20,900** |
| 62 | 76 E State St | **18,800** |
| 63 | 72 E State St | **27,600** |
| 64 | 37 So Clinton St | **15,200** |
| 65 | 77 W Oakland Ave | **17,600** |

*b. Quakertown*

## Case 2 - Quakertown

| SITE # | ADDRESS | ASSESSED VALUE (AssVal / .097 = Market value) |
|---|---|---|
| 1 | 8 Front St | **21,002** |
| 2 | 44 Front St | **48,490** |
| 3 | 42 Front St | **48,000** |
| 4 | 40 Front St | **16,400** |
| 5 | 36 Front St | **30,000** |
| 6 | 32 Front St | **26,800** |
| 7 | 28 Front St | **19,200** |
| 8 | 801 Juniper St | **41,200** |
| 9 | 52 S 8th St | **30,000** |
| 10 | 32 S 8th St | **12,800** |
| 11 | 30 S 8th St | **14,830** |
| 12 | 28 S 8th St | **36,400** |
| 13 | 28 S 8th St | **36,400** |
| 14 | 24 S 8th St | **10,800** |
| 15 | 731 W Broad St | **20,600** |
| 16 | 729 W Broad St | **16,000** |
| 17 | 725 W Broad St | **29,200** |
| 18 | 721 W Broad St | **16,800** |
| 19 | 719 W Broad St | **11,200** |
| 20 | 717 W Broad St | **7,200** |
| 21 | 711 W Broad St | **14,800** |
| 22 | 628 Juniper St | **34,000** |
| 23 | 626 Juniper St | **19,200** |
| 24 | 622 Juniper St | **16,800** |
| 25 | 618 Juniper St | **14,000** |
| 26 | 614 Juniper St | **14,800** |
| 27 | 610 Juniper St | **9,600** |
| 28 | 606 Juniper St | **18,800** |
| 29 | 528 W Broad St | **13,600** |
| 30 | 526 W Broad St | **15,600** |
| 31 | 524 W Broad St | **21,500** |
| 32 | 520 W Broad St | **22,800** |
| 33 | 516 W Broad St | **37,600** |
| 34 | 510 W Broad St | **33,120** |
| 35 | 508 W Broad St | **11,600** |
| 35 | 24 N 4th St | **11,600** |
| 37 | 415 W Broad St | **18,000** |
| 38 | 415 W Broad St | **18,000** |
| 39 | 1905 John Fries Highway | **15,000** |
| 40 | 505 W Broad St | **11,600** |
| 41 | 511 W Broad St | **26,400** |
| 42 | 519 W Broad St | **22,720** |

| | | |
|---|---|---|
| 43 | 326 W Broad St | **50,400** |
| 44 | 322 W  Broad St | **138,600** |
| 45 | 320 W Broad St | **207,600** |
| 46 | 318 W Broad St | **150,000** |
| 47 | 312 W Broad St | **54,000** |
| 48 | 310 W Broad St | **51,600** |
| 49 | 308 W Broad St | **51,600** |
| 50 | 106 E Broad St | **18,000** |
| 51 | 116 E Broad St | **33,600** |
| 52 | 108 E Broad St | **36,720** |
| 53 | 122 E Broad St | **36,720** |
| 54 | 128 E Broad St | **12,800** |
| 55 | 134 E Broad St | **21,600** |
| 56 | 138 E Broad St | **20,000** |
| 57 | 602 W Broad St | **13,600** |
| 58 | 600 W Broad St | **48,400** |
| 59 | 16 So 6th St | **12,400** |
| 60 | 20 So 6th St | **22,800** |
| 61 | 24 So 6th St | **12,400** |
| 62 | 28 So 6th St | **14,400** |
| 63 | 34 So 6th St | **14,400** |
| 64 | 241 Juniper St | **32,800** |
| 65 | 37 So 3rd St | **30,000** |
| 66 | 35 3rd St | **30,000** |

*c. Bristol*

## Case 3 – Bristol

| SITE # | ADDRESS | ASSESSED VALUE (AssVal / .097 = Market value) |
|---|---|---|
| 1 | 254 Cedar St | **17,600** |
| 2 | 248 Cedar St | **8,400** |
| 3 | 246 Cedar St | **9,200** |
| 4 | 244 Cedar St | **9,600** |
| 5 | 242 Cedar St | **9,200** |
| 6 | 240 Cedar St | **9,200** |
| 7 | 238 Cedar St | **8,800** |
| 8 | 128 Market St | **18,800** |
| 9 | 129 Radcliffe St | **18,800** |
| 10 | 125 Radcliffe St | **15,000** |
| 11 | 119 Radcliffe St | **19,200** |
| 12 | 117 Radcliffe St | **26,000** |
| 13 | 111 Radcliff St | **25,760** |
| 14 | 104 Radcliff St | **25,760** |
| 15 | 4 Mill St | **82,400** |
| 16 | 100 Mill St | **72,120** |
| 17 | 118 Mill St | **72,120** |
| 18 | 130 Mill St | **25,000** |
| 19 | 134 Mill St | **26,400** |
| 20 | 200 Mill St | **40,000** |
| 21 | 101 Cedar St | **25,000** |
| 22 | 123 Wood St | **4,900** |
| 23 | 312 Market St | **8,400** |
| 24 | 318 Market St | **10,000** |
| 25 | 324 Market St | **11,600** |
| 26 | 329 Mill St | **34,440** |
| 27 | 329 Mill St | **34,440** |
| 28 | 327 Mill St | **24,400** |
| 29 | 260 Wood St | **15,000** |
| 30 | 240 Mulberry St | **13,200** |
| 31 | 234 Mulberry St | **176,000** |
| 32 | 232 Mulberry St | **9,200** |
| 33 | 230 Mulberry St | **9,200** |
| 34 | 222 Mulberry St | **10,000** |
| 35 | 218 Mulberry St | **18,000** |
| 36 | 316 Radcliff St | **50,000** |
| 37 | 300 Radcliff St | **37,600** |
| 38 | 254 Radcliff St | **33,600** |
| 39 | 244 Radcliff St | **193,170** |
| 40 | 220 Radcliff St | **30,610** |
| 41 | 214 Radcliff St | **25,600** |
| 42 | 200 Radcliff St | **241,200** |

| | | |
|---|---|---|
| 43 | 247 Mill St | **41,400** |
| 44 | 235 Mill St | **17,640** |
| 45 | 233 Mill St | **9,840** |
| 46 | 231 Mill St | **14,000** |
| 47 | 229 Mill St | **15,000** |
| 48 | 225 Mill St | **21,200** |
| 49 | 215 Mill St | **15,600** |
| 50 | 200 Pond St | **27,600** |
| 51 | 210 Pond St | **32,400** |
| 52 | 214 Pond St | **18,800** |
| 53 | 216 Pond St | **18,800** |
| 54 | 220 Pond St | **60,760** |
| 55 | 250 Pond St | **50,000** |

***Appendix 5–Survey Spreadsheets***

*a. Micro Scale – Case 1: Doylestown*

| | | |
|---|---|---|
| a1 = 1971-present | | |
| a2 = 1941-1970 | *Condition* | |
| a3 =pre100-1940 | | *1* |
| b1 = Vacant | *A* | |
| b2 = Alternate Use | $a_1$ | 0 |
| b3 = Continuous | $a_2$ | 0 |
| c1 = Modern | $a_3$ | 1 |
| c2 = Modified | *B* | |
| c3 = Authentic | $b_1$ | 0 |
| d1 = Dilapidated | $b_2$ | 1 |
| d2 = Moderate | $b_3$ | 0 |
| d3 = Well Conditioned | *C* | |
| e1 = $0 - $81,000 | $c_1$ | 0 |
| e2 = $82,000 - 162,000 | $c_2$ | 1 |
| e3 = $163,000 - $243,000 | $c_3$ | 0 |
| | *D* | |
| 1 = Accepts Characteristic | $d_1$ | 0 |
| 0 = Does Not Accept Characteristic | $d_2$ | 0 |
| | $d_3$ | 1 |
| A = Time Frame of Construction | *E* | |
| B = Land Use Change | $e_3$ | 1 |
| C = Architectural Modification | $e_2$ | 0 |
| D = Building Condition | $e_3$ | 0 |
| E = Assessed Value | **Frequency** | **5** |

| *2* | *3* | *4* | *5* | *6* | *7* | *8* | *9* |
|---|---|---|---|---|---|---|---|
| 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| 0 | 1 | 1 | 0 | 1 | 0 | 1 | 1 |
| 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| 1 | 1 | 0 | 0 | 0 | 0 | 0 | 1 |
| 0 | 0 | 1 | 0 | 1 | 1 | 1 | 0 |
| 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| 1 | 1 | 0 | 1 | 1 | 0 | 1 | 1 |
| 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 |
| 1 | 1 | 1 | 1 | 0 | 0 | 1 | 1 |
| 0 | 0 | 0 | 1 | 0 | 1 | 1 | 1 |
| 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 |
| **5** | **5** | **5** | 5 | 5 | 5 | 5 | 5 |

| *10* | *11* | *12* | *13* | *14* | *15* | *16* | *17* | *18* |
|---|---|---|---|---|---|---|---|---|
| 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 0 |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| 1 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 1 |
| 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 |
| 0 | 0 | 1 | 1 | 0 | 1 | 1 | 1 | 0 |
| 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 |

| 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 |
|---|---|---|---|---|---|---|---|---|
| 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 1 |
| 0 | 0 | 0 | 1 | 1 | 1 | 0 | 1 | 0 |
| 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| 0 | 1 | 0 | 1 | 0 | 0 | 1 | 1 | 0 |
| 1 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 1 |
| 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0 | 1 | 0 | 1 | 0 | 1 | 1 | 1 | 1 |
| 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 |
| 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 1 |
| 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 0 |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 |

## Micro Analysis Table - Case 1

*Structure*

| *28* | *29* | *30* | *31* | *32* | *33* | *34* | *35* | *36* |
|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0 | 1 | 0 | 1 | 0 | 1 | 1 | 1 | 1 |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| 1 | 0 | 1 | 1 | 1 | 1 | 0 | 1 | 1 |
| 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| 0 | 1 | 1 | 1 | 0 | 0 | 1 | 1 | 1 |
| 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0- | 0 |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 |
| 1 | 1 | 0 | 1 | 1 | 0 | 1 | 1 | 1 |
| 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 |

| *37* | *38* | *39* | *40* | *41* | *42* | *43* | *44* | *45* |
|---|---|---|---|---|---|---|---|---|
| 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 1 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 0 |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| 1 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 1 |
| 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 1 |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| 1 | 0 | 1 | 1 | 1 | 1 | 1 | 0 | 1 |
| 1 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 1 |
| 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 |

| *46* | *47* | *48* | *49* | *50* | *51* | *52* | *53* | *54* |
|---|---|---|---|---|---|---|---|---|
| 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 |
| 1 | 1 | 1 | 1 | 0 | 1 | 0 | 1 | 1 |
| 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 0 |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| 1 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 1 |
| 1 | 1 | 1 | 1 | 1 | 0 | 1 | 0 | 1 |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 |

| 55 | 56 | 57 | 58 | 59 | 60 | 61 | 62 | 63 |
|---|---|---|---|---|---|---|---|---|
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0 | 1 | 1 | 0 | 0 | 1 | 1 | 0 | 1 |
| 1 | 0 | 0 | 1 | 1 | 0 | 0 | 1 | 0 |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 1 | 0 | 1 | 1 | 1 | 0 |
| 1 | 1 | 1 | 0 | 1 | 0 | 0 | 0 | 1 |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 0 |
| 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 1 |
| 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 |

| *64* | *65* | **Total** | Adjusted (1.032) |
|---|---|---|---|
| 0 | 0 | 12 | 12.384 |
| 1 | 0 | 14 | 14.448 |
| 0 | 1 | 39 | 40.248 |
| 0 | 0 | 2 | 2.064 |
| 0 | 0 | 18 | 18.576 |
| 1 | 1 | 45 | 46.44 |
| 0 | 0 | 11 | 11.352 |
| 0 | 0 | 39 | 40.248 |
| 1 | 1 | 15 | 15.48 |
| 0 | 0 | 0 | 0 |
| 0 | 0 | 9 | 9.288 |
| 1 | 1 | 56 | 57.792 |
| 1 | 1 | 52 | 53.664 |
| 0 | 0 | 10 | 10.32 |
| 0 | 0 | 3 | 3.096 |
| 5 | 5 | 325 | |

*b. Micro Scale – Case 2: Quakertown*

| | | |
|---|---|---|
| a1 = 1971-present | | |
| a2 = 1941-1970 | *Condition* | |
| a3 =pre100-1940 | | *1* |
| b1 = Vacant | *A* | |
| b2 = Alternate Use | $a_1$ | 0 |
| b3 = Continuous | $a_2$ | 1 |
| c1 = Modern | $a_3$ | 0 |
| c2 = Modified | *B* | |
| c3 = Authentic | $b_1$ | 1 |
| d1 = Dilapidated | $b_2$ | 0 |
| d2 = Moderate | $b_3$ | 0 |
| d3 = Well Conditioned | *C* | |
| e1 = $0 - $81,000 | $c_1$ | 0 |
| e2 = $82,000 - 162,000 | $c_2$ | 1 |
| e3 = $163,000 - $243,000 | $c_3$ | 0 |
| | *D* | |
| 1 = Accepts Characteristic | $d_1$ | 1 |
| 0 = Does Not Accept Characteristic | $d_2$ | 0 |
| | $d_3$ | 0 |
| A = Time Frame of Construction | *E* | |
| B = Land Use | $e_3$ | 1 |
| C = Architecture | $e_2$ | 0 |
| D = Aesthetics | $e_3$ | 0 |
| E = Assessed Value | **Frequency** | **5** |

| *2* | *3* | *4* | *5* | *6* | *7* | *8* | *9* |
|---|---|---|---|---|---|---|---|
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 1 | 1 | 0 | 1 | 0 | 1 | 0 | 0 |
| 0 | 0 | 1 | 0 | 1 | 0 | 1 | 0 |
| 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 1 | 1 | 1 | 0 | 1 | 1 |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| 0 | 1 | 1 | 0 | 1 | 0 | 0 | 1 |
| 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 |
| 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **5** | **5** | **5** | 5 | 5 | 5 | 5 | 5 |

| *10* | *11* | *12* | *13* | *14* | *15* | *16* | *17* | *18* |
|---|---|---|---|---|---|---|---|---|
| 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 |
| 0 | 1 | 0 | 1 | 1 | 0 | 1 | 1 | 0 |
| 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 1 | 0 | 0 | 0 | 1 | 1 | 0 |
| 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1 | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 1 |
| 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 |
| 1 | 1 | 1 | 0 | 0 | 0 | 1 | 1 | 0 |
| 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| 1 | 0 | 1 | 1 | 1 | 1 | 1 | 0 | 1 |
| 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 |

| *19* | *20* | *21* | *22* | *23* | *24* | *25* | *26* | *27* |
|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0 | 1 | 1 | 1 | 1 | 0 | 1 | 0 | 1 |
| 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 |
| 1 | 1 | 1 | 0 | 1 | 0 | 1 | 1 | 1 |
| 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 1 |
| 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| 1 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 1 |
| 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 |

## Micro Analysis Table - Case 2

*Structure*

| *28* | *29* | *30* | *31* | *32* | *33* | *34* | *35* | *36* |
|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 0 | 1 | 1 | 0 | 1 | 1 | 1 |
| 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 |
| 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0 | 1 | 1 | 1 | 0 | 1 | 0 | 0 | 0 |
| 1 | 0 | 0 | 0 | 1 | 0 | 1 | 1 | 1 |
| 1 | 0 | 0 | 0 | 1 | 0 | 1 | 1 | 1 |
| 0 | 1 | 1 | 1 | 0 | 1 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 1 | 0 | 1 | 1 | 0 | 0 | 0 |
| 1 | 1 | 0 | 1 | 0 | 0 | 1 | 1 | 1 |
| 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 |

| 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 |
|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 0 | 0 | 1 | 1 | 0 | 1 | 1 |
| 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 |
| 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| 0 | 0 | 1 | 0 | 1 | 0 | 0 | 1 | 0 |
| 1 | 1 | 0 | 1 | 0 | 1 | 0 | 0 | 1 |
| 1 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 1 |
| 0 | 1 | 0 | 0 | 0 | 0 | 1 | 1 | 0 |
| 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 |

| *46* | *47* | *48* | *49* | *50* | *51* | *52* | *53* | *54* |
|---|---|---|---|---|---|---|---|---|
| 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 1 | 1 | 1 | 1 | 0 | 1 | 1 | 0 | 0 |
| 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1 | 0 | 1 | 1 | 0 | 1 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 1 | 0 | 1 | 1 | 1 |
| 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 |
| 0 | 1 | 1 | 1 | 0 | 1 | 1 | 0 | 1 |
| 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 1 | 1 | 0 | 0 | 1 | 0 | 1 |
| 1 | 1 | 0 | 0 | 1 | 1 | 0 | 1 | 0 |
| 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 |

| 55 | 56 | 57 | 58 | 59 | 60 | 61 | 62 | 63 |
|---|---|---|---|---|---|---|---|---|
| 1 | 1 | 1 | 0 | 0 | 1 | 1 | 0 | 0 |
| 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 |
| 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 |
| 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 1 | 1 | 1 | 0 | 0 | 1 | 1 | 0 | 0 |
| 0 | 0 | 0 | 1 | 1 | 0 | 0 | 1 | 1 |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| 1 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 1 |
| 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 |

| *64* | *65* | *66* | Total |
|---|---|---|---|
| 0 | 0 | 1 | 23 |
| 0 | 1 | 0 | 24 |
| 1 | 0 | 0 | 19 |
| 0 | 0 | 0 | 9 |
| 0 | 0 | 0 | 15 |
| 1 | 1 | 1 | 42 |
| 0 | 0 | 1 | 20 |
| 1 | 1 | 0 | 39 |
| 0 | 0 | 0 | 7 |
| 0 | 0 | 0 | 2 |
| 0 | 0 | 0 | 15 |
| 1 | 1 | 1 | 49 |
| 1 | 1 | 1 | **63** |
| 0 | 0 | 0 | 2 |
| 0 | 0 | 0 | 1 |
| 5 | 5 | 5 | 330 |

*c. Micro Scale – Case 3: Bristol*

| | | |
|---|---|---|
| a1 = 1971-present | | |
| a2 = 1941-1970 | *Condition* | |
| a3 =pre100-1940 | | *1* |
| b1 = Vacant | *A* | |
| b2 = Alternate Use | $a_1$ | 0 |
| b3 = Continuous | $a_2$ | 1 |
| c1 = Modern | $a_3$ | 0 |
| c2 = Modified | *B* | |
| c3 = Authentic | $b_1$ | 0 |
| d1 = Dilapidated | $b_2$ | 0 |
| d2 = Moderate | $b_3$ | 1 |
| d3 = Well Conditioned | *C* | |
| e1 = $0 - $81,000 | $c_1$ | 0 |
| e2 = $82,000 - 162,000 | $c_2$ | 1 |
| e3 = $163,000 - $243,000 | $c_3$ | 0 |
| | *D* | |
| 1 = Accepts Characteristic | $d_1$ | 0 |
| 0 = Does Not Accept Characteristic | $d_2$ | 0 |
| | $d_3$ | 1 |
| A = Time Frame of Construction | *E* | |
| B = Land Use | $e_3$ | 1 |
| C = Architecture | $e_2$ | 0 |
| D = Aesthetics | $e_3$ | 0 |
| E = Assessed Value | **Frequency** | **5** |

| *2* | *3* | *4* | *5* | *6* | *7* | *8* | *9* |
|---|---|---|---|---|---|---|---|
| 0 | 1 | 0 | 0 | 1 | 0 | 1 | 0 |
| 1 | 0 | 1 | 1 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 |
| 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 |
| 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 |
| 1 | 0 | 1 | 1 | 0 | 1 | 0 | 1 |
| 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 |
| 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **5** | **5** | **5** | 5 | 5 | 5 | 5 | 5 |

| *10* | *11* | *12* | *13* | *14* | *15* | *16* | *17* | *18* |
|---|---|---|---|---|---|---|---|---|
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 1 |
| 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 1 |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 |
| 1 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| 0 | 0 | 1 | 0 | 0 | 0 | 1 | 1 | 1 |
| 1 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 1 |
| 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 |

**Micro Analysis Table - Case**

*Structure*

| 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 |
|---|---|---|---|---|---|---|---|---|
| 0 | 1 | 1 | 1 | 0 | 0 | 1 | 0 | 0 |
| 1 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 1 |
| 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| 0 | 0 | 0 | 1 | 0 | 0 | 1 | 1 | 0 |
| 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1 | 0 | 1 | 0 | 1 | 1 | 0 | 0 | 1 |
| 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 |
| 1 | 1 | 0 | 0 | 1 | 1 | 0 | 0 | 0 |
| 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 1 |
| 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 1 | 0 | 0 | 0 | 1 | 1 | 1 |
| 1 | 1 | 0 | 0 | 1 | 1 | 0 | 0 | 0 |
| 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 |

**3**

| *28* | *29* | *30* | *31* | *32* | *33* | *34* | *35* | *36* |
|---|---|---|---|---|---|---|---|---|
| 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 |
| 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 |
| 1 | 1 | 1 | 1 | 0 | 0 | 0 | 1 | 0 |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 |
| 0 | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 0 |
| 1 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 |
| 1 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 1 |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 |

| *37* | *38* | *39* | *40* | *41* | *42* | *43* | *44* | *45* |
|---|---|---|---|---|---|---|---|---|
| 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| 1 | 1 | 0 | 0 | 1 | 0 | 1 | 1 | 1 |
| 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 1 |
| 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 |
| 0 | 1 | 0 | 0 | 1 | 1 | 1 | 1 | 1 |
| 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 |
| 1 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 0 |
| 1 | 1 | 0 | 1 | 1 | 0 | 1 | 1 | 1 |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 |
| 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 |

| *46* | *47* | *48* | *49* | *50* | *51* | *52* | *53* | *54* |
|---|---|---|---|---|---|---|---|---|
| 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| 1 | 0 | 1 | 1 | 1 | 1 | 0 | 1 | 1 |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 |
| 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1 | 0 | 1 | 1 | 1 | 1 | 1 | 0 | 1 |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 1 |
| 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 |

| *55* | Total | Adjusted (1.2) |
|---|---|---|
| | | |
| 0 | 12 | 14.4 |
| 0 | 19 | 22.8 |
| 1 | 24 | 28.8 |
| | | |
| 0 | 7 | 8.4 |
| 0 | 4 | 4.8 |
| 1 | 44 | 52.8 |
| | | |
| 0 | 9 | 10.8 |
| 0 | 36 | 43.2 |
| 1 | 10 | 12 |
| | | |
| 0 | 5 | 6 |
| 0 | 13 | 15.6 |
| 1 | 37 | 44.4 |
| | | |
| 1 | 51 | 61.2 |
| 0 | 1 | 1.2 |
| 0 | 3 | 3.6 |
| 5 | 275 | |

*Macro Scale*

| Condition | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|
| A | 3 | 2 | 3 | 3 | 2 | 3 |
| B | 2 | 2 | 2 | 3 | 1 | 3 |
| C | 2 | 2 | 2 | 3 | 2 | 2 |
| D | 3 | 3 | 3 | 3 | 3 | 3 |
| E | 1 | 2 | 2 | 3 | 1 | 3 |
| **Total** | **11** | **11** | **12** | **15** | 9 | 14 |

| Condition | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|
| A | 2 | 2 | 2 | 3 | 2 | 3 |
| B | 1 | 1 | 2 | 3 | 1 | 3 |
| C | 2 | 2 | 2 | 2 | 2 | 2 |
| D | 1 | 3 | 2 | 2 | 3 | 2 |
| E | 1 | 1 | 1 | 1 | 1 | 3 |
| **Total** | **7** | **9** | **9** | **11** | 9 | 13 |

| Condition | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|
| A | 2 | 2 | 2 | 2 | 2 | 1 |
| B | 3 | 1 | 2 | 3 | 3 | 3 |
| C | 2 | 2 | 2 | 2 | 2 | 1 |
| D | 3 | 3 | 2 | 3 | 3 | 3 |
| E | 1 | 1 | 1 | 1 | 1 | 1 |
| **Total** | **11** | **9** | **9** | **11** | 11 | 9 |

| 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 |
|---|---|---|---|---|---|---|---|
| 1 | 3 | 3 | 3 | 3 | 3 | 3 | 1 |
| 3 | 3 | 2 | 3 | 3 | 3 | 3 | 3 |
| 1 | 2 | 2 | 3 | 3 | 2 | 2 | 1 |
| 2 | 3 | 3 | 3 | 2 | 3 | 3 | 3 |
| 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 8 | 12 | 11 | 13 | 12 | 12 | 12 | 9 |

| 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 |
|---|---|---|---|---|---|---|---|
| 1 | 3 | 3 | 3 | 3 | 3 | 2 | 1 |
| 3 | 3 | 2 | 3 | 3 | 3 | 3 | 3 |
| 1 | 2 | 2 | 3 | 3 | 2 | 3 | 1 |
| 2 | 3 | 3 | 3 | 2 | 3 | 3 | 3 |
| 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 8 | 12 | 11 | 13 | 12 | 12 | 12 | 9 |

| 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 |
|---|---|---|---|---|---|---|---|
| 3 | 1 | 3 | 3 | 2 | 2 | 2 | 2 |
| 3 | 1 | 2 | 2 | 3 | 3 | 3 | 1 |
| 1 | 4 | 2 | 2 | 2 | 2 | 2 | 2 |
| 3 | 1 | 2 | 2 | 2 | 3 | 1 | 1 |
| 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 11 | 8 | 10 | 10 | 10 | 11 | 9 | 7 |

| 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 |
|---|---|---|---|---|---|---|---|---|
| 3 | 3 | 3 | 1 | 1 | 1 | 2 | 3 | 3 |
| 2 | 3 | 3 | 3 | 3 | 2 | 3 | 2 | 3 |
| 2 | 2 | 2 | 1 | 1 | 2 | 3 | 2 | 3 |
| 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 |
| 11 | 12 | 12 | 9 | 9 | 9 | 12 | 11 | 14 |

| 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 |
|---|---|---|---|---|---|---|---|---|
| 3 | 3 | 3 | 1 | 2 | 1 | 2 | 3 | 3 |
| 2 | 3 | 3 | 3 | 3 | 2 | 3 | 2 | 3 |
| 2 | 2 | 2 | 1 | 2 | 2 | 2 | 2 | 3 |
| 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 |
| 11 | 12 | 12 | 9 | 11 | 9 | 11 | 11 | 14 |

| 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 |
|---|---|---|---|---|---|---|---|---|
| 3 | 2 | 2 | 2 | 2 | 1 | 1 | 1 | 2 |
| 3 | 3 | 3 | 3 | 3 | 2 | 3 | 1 | 3 |
| 2 | 2 | 2 | 2 | 2 | 2 | 1 | 3 | 2 |
| 2 | 3 | 3 | 3 | 3 | 3 | 2 | 1 | 3 |
| 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 12 | 11 | 11 | 11 | 11 | 9 | 8 | 7 | 10 |

**Macro Analysis Tabl**

| 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 |
|---|---|---|---|---|---|---|---|---|
| 3 | 2 | 3 | 2 | 1 | 3 | 2 | 3 | 1 |
| 1 | 2 | 2 | 3 | 3 | 2 | 3 | 3 | 3 |
| 2 | 2 | 2 | 2 | 1 | 2 | 2 | 2 | 1 |
| 3 | 3 | 3 | 2 | 3 | 3 | 3 | 3 | 3 |
| 2 | 2 | 2 | 1 | 1 | 1 | 2 | 1 | 1 |
| 11 | 11 | 12 | 10 | 9 | 11 | 12 | 12 | 9 |

**Macro Analysis**

| 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 |
|---|---|---|---|---|---|---|---|---|
| 3 | 2 | 3 | 2 | 1 | 3 | 2 | 3 | 1 |
| 1 | 2 | 2 | 3 | 3 | 2 | 2 | 3 | 3 |
| 2 | 2 | 2 | 2 | 1 | 2 | 2 | 2 | 1 |
| 3 | 3 | 3 | 3 | 3 | 3 | 2 | 3 | 3 |
| 1 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 10 | 11 | 11 | 11 | 9 | 11 | 9 | 12 | 9 |

**Macro Analysis Table - Case 3**

*Structure*

| 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 |
|---|---|---|---|---|---|---|---|---|
| 3 | 1 | 2 | 2 | 3 | 3 | 3 | 3 | 1 |
| 3 | 1 | 1 | 3 | 3 | 3 | 3 | 3 | 3 |
| 2 | 1 | 3 | 3 | 3 | 3 | 2 | 2 | 1 |
| 3 | 2 | 2 | 2 | 3 | 2 | 2 | 1 | 3 |
| 1 | 1 | 1 | 1 | 1 | 1 | 1 | 3 | 1 |
| 12 | 6 | 9 | 11 | 13 | 12 | 11 | 12 | 9 |

**e - Case 1**

*Structure*

| 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 |
|---|---|---|---|---|---|---|---|---|
| 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| 2 | 2 | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| 2 | 2 | 2 | 2 | 2 | 2 | 2 | 3 | 2 |
| 3 | 3 | 3 | 2 | 3 | 2 | 3 | 3 | 3 |
| 1 | 1 | 1 | 3 | 1 | 1 | 1 | 1 | 2 |
| 11 | 11 | 12 | 13 | 12 | 11 | 12 | 13 | 13 |

**Table - Case 2**

*Structure*

| 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 |
|---|---|---|---|---|---|---|---|---|
| 3 | 3 | 3 | 3 | 3 | 3 | 2 | 3 | 1 |
| 3 | 2 | 3 | 3 | 3 | 3 | 2 | 3 | 2 |
| 3 | 2 | 2 | 2 | 2 | 2 | 3 | 3 | 1 |
| 3 | 3 | 3 | 2 | 3 | 3 | 3 | 3 | 3 |
| 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 14 | 11 | 12 | 11 | 12 | 12 | 11 | 13 | 8 |

| 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 |
|---|---|---|---|---|---|---|---|---|
| 2 | 2 | 3 | 1 | 3 | 3 | 1 | 1 | 3 |
| 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| 1 | 2 | 3 | 1 | 3 | 2 | 1 | 1 | 2 |
| 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| 1 | 1 | 1 | 1 | 1 | 1 | 3 | 1 | 1 |
| 10 | 11 | 13 | 9 | 13 | 12 | 11 | 9 | 12 |

| 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 |
|---|---|---|---|---|---|---|---|---|
| 3 | 1 | 3 | 2 | 1 | 1 | 1 | 1 | 2 |
| 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 2 |
| 3 | 1 | 3 | 3 | 1 | 1 | 1 | 1 | 2 |
| 3 | 3 | 2 | 3 | 3 | 3 | 3 | 3 | 3 |
| 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 13 | 9 | 12 | 12 | 9 | 9 | 8 | 9 | 10 |

| 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 |
|---|---|---|---|---|---|---|---|---|
| 1 | 2 | 1 | 1 | 3 | 3 | 3 | 3 | 1 |
| 3 | 1 | 2 | 3 | 2 | 1 | 2 | 2 | 3 |
| 1 | 2 | 2 | 1 | 3 | 2 | 2 | 2 | 1 |
| 3 | 3 | 3 | 3 | 3 | 3 | 2 | 2 | 3 |
| 1 | 1 | 2 | 3 | 2 | 1 | 1 | 1 | 1 |
| 9 | 9 | 10 | 11 | 13 | 10 | 10 | 10 | 9 |

| 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 |
|---|---|---|---|---|---|---|---|---|
| 2 | 3 | 3 | 3 | 3 | 1 | 3 | 3 | 3 |
| 3 | 1 | 1 | 3 | 3 | 3 | 3 | 3 | 3 |
| 2 | 2 | 2 | 2 | 2 | 1 | 2 | 2 | 2 |
| 3 | 2 | 3 | 2 | 3 | 3 | 3 | 3 | 3 |
| 3 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 13 | 9 | 10 | 11 | 12 | 9 | 12 | 12 | 12 |

| *51* | *52* | *53* | *54* | *55* | *56* | *57* | *58* | *59* |
|---|---|---|---|---|---|---|---|---|
| 3 | 3 | 3 | 3 | 3 | 2 | 2 | 3 | 3 |
| 3 | 2 | 3 | 3 | 3 | 3 | 3 | 2 | 3 |
| 2 | 2 | 2 | 3 | | 3 | 2 | 2 | 2 |
| 3 | 2 | 3 | 3 | 3 | 3 | 2 | 3 | 3 |
| 3 | 1 | 2 | 1 | 1 | 1 | 1 | 1 | 1 |
| 14 | 10 | 13 | 13 | 10 | 12 | 10 | 11 | 12 |

| *51* | *52* | *53* | *54* | *55* | *56* | *57* | *58* | *59* |
|---|---|---|---|---|---|---|---|---|
| 3 | 3 | 2 | 2 | 1 | 1 | 1 | 3 | 2 |
| 2 | 3 | 3 | 3 | 1 | 3 | 3 | 3 | 3 |
| 2 | 2 | 2 | 2 | 1 | 1 | 1 | 2 | 2 |
| 3 | 2 | 2 | 2 | 3 | 3 | 3 | 3 | 2 |
| 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 11 | 11 | 10 | 10 | 7 | 9 | 9 | 12 | 10 |

Adj (1.2) 825

| *51* | *52* | *53* | *54* | *55* | **Total** | |
|---|---|---|---|---|---|---|
| 3 | 2 | 3 | 3 | 3 | 123 | 147.6 |
| 3 | 3 | 3 | 2 | 3 | 144 | 172.8 |
| 2 | 2 | 3 | 2 | 3 | 111 | 133.2 |
| 3 | 3 | 2 | 3 | 3 | 141 | 169.2 |
| 1 | 1 | 1 | 1 | 1 | 62 | 74.4 |
| 12 | 11 | 12 | 11 | 13 | 581 | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | | | | | | Adj (1.032) 975 |
| *60* | *61* | *62* | *63* | *64* | *65* | Total | |
| 2 | 2 | 3 | 2 | 2 | 3 | 157 | 162.024 |
| 2 | 2 | 2 | 3 | 3 | 3 | 173 | 178.536 |
| 2 | 2 | 2 | 3 | 3 | 3 | 131 | 135.191 |
| 3 | 3 | 3 | 3 | 3 | 3 | 187 | 192.984 |
| 1 | 1 | 1 | 1 | 1 | 1 | 82 | 84.624 |
| 10 | 10 | 11 | 12 | 12 | 13 | 730 | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | | | | | | |
| *60* | *61* | *62* | *63* | *64* | *65* | *66* | **Total** |
| 1 | 1 | 2 | 3 | 3 | 2 | 1 | 147 |
| 3 | 3 | 3 | 3 | 3 | 3 | 3 | 167 |
| 1 | 1 | 2 | 2 | 2 | 2 | 1 | 125 |
| 3 | 3 | 3 | 3 | 3 | 3 | 3 | 183 |
| 1 | 1 | 1 | 1 | 1 | 1 | 1 | 75 |
| 9 | 9 | 11 | 12 | 12 | 11 | 9 | 697 |