INSTITUTIONAL INSCRIPTION IN THE MINORCAN QUARTER OF SAINT AUGUSTINE, FLORIDA

By

Shawn Michael Baldwin

A Thesis Presented to the

FACULTY OF THE USC GRADUATE SCHOOL

DORNSIFE COLLEGE OF ARTS, LETTERS AND SCIENCES

UNIVERSITY OF SOUTHERN CALIFORNIA

In Partial Fulfillment of the Requirements for the Degree

MASTER OF SCIENCE

GEOGRAPHIC INFORMATION SCIENCE AND TECHNOLOGY

MAY 2014

Acknowledgements

The author is indebted to a number of people whose insight and support have made this thesis even more enjoyable to construct. From my thesis committee at the University of Southern California, Dr. Philip J. Ethington of the Departments of History and Political Science, Dr. Katsuhiko Oda, and Dr. Jordan Hastings (committee chairman for this thesis) of the Spatial Sciences Institute, provided excellent insight regarding cartographic representation of the theory of Institutional Inscription. Also of the Spatial Sciences Institute: Dr. Robert Vos for his guidance in getting this thesis off the ground; Dr. Tarek Rashed, Dr. Darren Ruddell, Dr. Yao-Yi Chiang, and Dr. Edward Pultar for their willingness to share their knowledge of and passion for geography.

Credit also goes to the team at the St. Johns County, Florida GIS Department that provided the vast majority of the data behind the cartographic portfolio itself.

With regards to the historic research involved in this thesis, the author also thanks Mr. Michael Gallen, director of Library Services and the staff at the Proctor Library at Flagler College as well as the folks at the St. Augustine Foundation's Center for Historic Research for their direction in navigating the resources available for this historic city; Mr. Carl Halbirt, City Archaeologist for St. Augustine; the team at the St. Augustine Historical Society Research Library: Chief Librarian Robert Nawrocki, Senior Research Librarian Charles Tingley, and Assistant Librarian Debra Willis. Their depth of knowledge and insight regarding the city's history is priceless.

And finally, my wife, Laura; thank you.

For Ruth

List of Figures

(All photographs taken by the author)

List of Tables

Cartonomicon

Table of Contents

Abstract

This thesis started as a cartographic history of St. Augustine, Florida; seventeen maps appear throughout the main text and appendices, as listed in the cartonomicon. In crafting these maps, I was struck by the remarkable persistence of a 4-block area just north of the center of town known as the Minorcan Quarter. Research revealed interesting cultural background and economic conditions in this area, but the persistence of these conditions lacked explanation. Although substantially reshaped by tourism and commercialism in the 20th century, the Minorcan Quarter is still an identifiable neighborhood of St. Augustine today.

The theory of *institutional inscription* (Ethington, 2013) holds that cultures leave definitive imprints in the regions where they are established; its foremost application has been to the Los Angeles Basin of California. Here, I apply this theory to the much smaller area of St. Augustine, particularly the Minorcan Quarter, to demonstrate and quantify the institutional imprints at the block and sub-block levels during successive periods of Spanish, British, and American settlement and occupation over a 250-year period (1764-2013).

A quantified rating system for the persistence of institutional inscription is introduced and demonstrated within the Minorcan Quarter of St. Augustine. This metric, which takes into account both land parcel configuration and land use, varies only from 5 to 7 (on a ten-point scale) within the quarter. By comparison, persistence ratings of 3 to 5 apply to the late 19th and 20th century subdivisions to the southwest while a stable rating of 9 applies to the imposing fortress to the northeast of the quarter. A cartonomicon, including a 'ghost' map and transsection diagram (after Ethington) and a tree-ring diagram (this work), is developed to analyze and explain the persistence of the Minorcan Quarter in St. Augustine, Florida.

CHAPTER 1: Introduction

Founded in 1565 by Spanish explorers, St. Augustine holds the distinction of being the oldest continuously occupied European settlement in the United States (Harvey, 1997, p. 5) and has had quite a diverse population throughout its history. St. Augustine has seen prosperity and security as well as economic stagnation and physical destruction. The continuity of the former and recovery from the latter would not have been possible without the presence of various groups of people during key points in history; the societal systems that these groups of people established are known as institutions (Ethington, forthcoming).

Throughout much of the second half of St. Augustine's nearly 500-year history, an area in the north of town, known today as the Minorcan Quarter, was occupied by an ethnic group known as the Minorcans, settlers from Mediterranean islands (notably Minorca in the Balearic Islands) and nearby coastal areas. The focus of this study is between Tolomato Lane and Hypolita Street on either side of Spanish Street, four blocks in total (Map 1, pink-shaded area) within the context of the institution of private property.

Map 1: Central St. Augustine - 2013. The Minorcan Quarter is shaded in light red

One might expect to find that considerable change would occur in a place as spatially confined as the Minorcan Quarter of St. Augustine during a 250-year period of colonial competition, conquest, and cessation. However, the opposite has occurred here: through various political administrations and economic regimes, both the street network and patterns of land use and subdivision have remained firmly imprinted with the original Spanish design.

My working hypothesis is that cadastral arrangements put in place shortly after the founding of St. Augustine, i.e., the long-lot orientation of land parcels that were used as small, in-town farmsteads, and significantly reinforced by the Minorcan settlers, became persistent through institutional inscription, with the institution being that of social customs (Ethington, forthcoming). I assess this hypothesis using quantitative metrics of parcel configuration (shape

and size) and land use in the Minorcan Quarter, based on a map series by Drost (1954) that document tenancy in the quarter for the years 1764, 1788, 1800, and 1834. Supplementing this series for temporal continuation are maps for 1904 (Ranson, 1904) and 2013 (St. Johns County GIS Office, 2013).

Theoretical studies are important to understanding the geography of a region in relation to the development of human history in that region (Montello and Sutton, 2006, p. 11). Mastery of the use of GIS and cartographic tools and concepts aids spatial thinking in quotidian as well as academic environments (Cowen and Jones, 2006, p. 238). The importance of geography does not stop there; government and military organizations have an obligation to understand the geography of both domestic and foreign lands and the tools and concepts needed to achieve the highest results possible [1] (Davies – Part I, 2007, p. 26).

[1] The article referenced here involves the global mapping program of the former Soviet Union with particular attention to efforts in the British Isles. Given the secret nature of these maps, the Soviets undoubtedly recognized the importance of understanding the geography of potential areas of operations, particularly in the West. It is a cautionary tale, to be sure, about the importance of geography.

CHAPTER 2: Conceptual and Technical Background

2.1 Cartography and Semiotics

Classically, cartography is the art and practice of producing maps (including embedded text and images) that successfully communicate spatial information via a graphical model of reality. Most cartography deals with mapping of features on the earth's surface; however, maps of solar systems, electrical schematic diagrams, structures within an organism, etc., are also cartographic creations. All cartography involves *graphicacy*, which is the innate human capability to master visual and spatial communication (Balchin, 1976, p. 33).

Semiotics is the study of cartographic symbols in relation to the way that maps communicate information regardless of the subject of the map (Brewer, 2005, p. 4). Coloring Antarctica in white, for example, evokes an image of ice and snow (commonly associated with the Antarctic region). Recently, the technological platforms on which maps are displayed have become semiologically significant (Hoarau, 2010, p. 1), particularly the display size on mobile platforms. With regards to the maps of St. Augustine presented here, two semiological considerations are feature recognition and preservation of St. Augustine's historical uniqueness (Chapter 4).

2.2 Analytical Cartography and GIS

Analytical cartography (Clarke and Cloud, 2000, p. 195) deals with the math of cartography: everything from pre-processing the data to be shown on a map to the post-facto computations done on that map (Slocum et al, 2009, p. 31). This definition puts cartography squarely in the realm of science as counterpart to cartography as an art (with the map itself

considered as an art object). However, cartography is neither a science nor an art per se, but a *craft* that combines the best of both these realms. It is analytical cartography that enables geographic information systems (GIS). Hence, the importance of understanding cartographic principles in order to communicate through GIS cannot be overstated (Clarke, 1988, p. 16).

2.3 Institutional Inscription

In his presentation "Metropolitan Region Institutional Inscription, Segregation, and Transsection", Ethington (forthcoming) describes his work on human settlement in the Los Angeles Basin during the last 13,000 years. An institution is defined as a "…regularized or crystallized principle of conduct, action, or behavior that governs a crucial area of social life and endures over time." Inscription is defined as "…the act of attaching institutions to geohistorical locations". Region then becomes "…the cumulative inscription of institutions into terrestrial landscapes." (Ethington, forthcoming). One goal of this thesis is to test the application of Ethington's theory to the relatively microscale Minorcan Quarter within St. Augustine, Florida.

Within this thesis, I argue that three tiers of social organization, which Ethington (forthcoming) calls Levels of Inscribed Geo-institutional Durability, exist. The most significant of these is the Municipal Jurisdiction, which is embodied by the official government structure responsible for establishing and maintaining the rules by which everyone lives and works. Socioeconomic Wealth is the next tier which affects inscription by property usage and ownership within the constraints of the rules set forth by the Municipal Jurisdiction. The last tier of is Race-Ethnic Residency which affects inscription by cultural imprints, again, within Municipal Jurisdiction constraints. The spatial extents of a region, the level of economic achievement, and

the racial/ethnic context of a jurisdiction exist independently of the durability of inscription by an institution within a given region.

2.4 Time on Paper

Communicating temporal and spatial change simultaneously is a significant challenge for geographers, cartographers in particular (Gregory and Ell, 2007, p. 143). The main problem geographers and cartographers have to solve lies in finding ways to effectively communicate the story told by the data, particularly over large areas and data types in which the accuracy of conclusions may become questionable (*ibid*, p. 123). Strategies used to meet the challenge in this thesis are to limit the geographic extent of the study area to the Minorcan Quarter, using specific years to study (six, in this thesis), and focusing on the most important attributes that are vital to institutional inscription. However, these strategies are considered to contain certain flaws, chief of which is the idea that institutional inscription may only be valid in micro-local places such as the Minorcan Quarter and may not be scalable to larger areas (*ibid*, p. 122). These flaws are largely mitigated, however, due to the intended scope of this thesis: studying how the theory of institutional inscription can be applied in the Minorcan Quarter.

Cartographic means commonly used to communicate spatial change across time are the *small-multiple mapset* and the *planimetric map*. Three alternative strategies are implemented in this thesis: the *ghost map* and *transsection diagram* (Ethington) and the *tree-ring diagram* (Baldwin – this work).

2.4.1 The Small-Multiple Mapset

Where change with time is being mapped, the small-multiple strategy is frequently employed. Each attribute of interest is shown individually on a separate copy of a common basemap. The individual maps represent the attribute at a point in time, e.g., census year, range of time (a disease epidemic or military campaign). The collection of individual attribute maps in turn is arranged on a single page (sometimes two facing pages in atlases). The idea behind this strategy is that the reader can make quick analysis of patterns of occurrence or density (Slocum et al, 2009, p. 335). However, detailed analysis is usually difficult due to the need to compare separate maps, particularly non-adjacent maps (e.g., multiple pages).

2.4.2 Planimetric Map

Overlaying the maps from a small-multiple mapset into one comprehensive map is the strategy behind the planimetric map. The overlay can be done effectively through the use of unique and appropriate colors, symbols, and/or patterns, then tilted sideways so each layer can be viewed individually within the context of the whole, which allow for a more detailed analysis of the data presented (Slocum et al, 2009, p. 335). To depict attribute change over time on maps, geographically weighted regression can be employed with location-based averages acting as variables (Gregory & Ell, 2007, p. 174).

2.4.3 Ghost Map

A new mapping form incorporating the planimetric concept is the ghost map (Ethington, forthcoming). As the author puts it:

> Ghost maps are hand-crafted composites of archival analog cartography and vector-based digital GIS layers. They are designed visually to reveal time, change, events, and motion through the symbolic languages of color, shape, iconography, and textual annotation (Ethington, forthcoming).

The ghost map starts with a base map of the area upon which thematic layers, usually with varied transparency settings, are stacked on top; a sort of collapsed version of the planimetric map (Figure 9). It is this transparency attribute that gives the map its 'ghost' quality. Incorporated in the map are pictures and/or other graphics relevant to the area, data, and topic of study. These images can be placed along a thoroughfare of interest (such as a transsection axis; see section 2.4.4), along a map frame, or around the periphery of a region of study within the map. Optionally, graphs and charts that summarize data can be included in the margins or even within the map itself (i.e., centered in an administrative region in which the data applies). The ghost map has the potential to become a valuable tool in the historian's arsenal (Ethington, forthcoming).

2.4.4 Transsection Diagram

Another new approach, showing spatial change through time along a linear axis, is the transsection diagram (Ethington, forthcoming):

> Transsections enable a visualization of the cross-sectional transitions across sub-metropolitan regions, showing differential durability of inscriptions by social formation. (Ethington, forthcoming).

A transsection diagram is constructed by assigning a road, river, or other quasi-linear feature to be the graphic axis placed as the centerline of the page. Features such as buildings or property

parcels that are adjacent to the axis and that have attributes relevant to the topic of study are shown in the diagram. Along the periphery of the page and parallel to the axis are small line graphs, sometimes called “sparklines”, that show quantitative changes, for example, with regard to the building count or parcel size over time. Each line graph displays a defined time increments, such as decades of the census (Ethington, forthcoming).

2.4.5 Tree-Ring Diagram

The tree-ring diagram employs a central axis with rings about the center (therefore, representing uniform magnitude) and spokes fanned out in time where measurements are placed. The diagram takes on a half-circle shape to prevent the perception of a cyclic time scale. Attributes that are unchanging with time will approach a semi-circular shape on the diagram; anything else will be misshapen. Attributes that have an ordinal scale, such as parcel size categories or land usage ratings (see Chapter 5) are conveniently displayed on a tree-ring diagram.

CHAPTER 3: Historical Background

3.1 The Spanish (1565-1763)

On the eighth of September, 1565, near the native Timucuan village of Seloy, Admiral Pedro Menendez de Aviles of the Spanish navy founded the city of St. Augustine, Florida. The event was part of the larger Spanish effort during the previous fifty years to counter French colonial expansion in the southeastern portion of North America (Griffin, 1983, p. 22). Earlier attempts to colonize Florida (by both Spain and France) had met with failure, but the attempt by France along the east coast of the peninsula in the 1560s looked promising, so King Philip II of Spain ordered a new operation to eliminate what was considered a grave threat to Spanish territorial and religious ambitions (*ibid*, p. 24).

Figure 1: The cross (208') marking the landing of Admiral Pedro Menendez de Aviles. The settlement of Saint Augustine was founded here September 8, 1565

With its position literally on the frontier of the New World, St. Augustine required a fort to provide for the defense of the settlement. Early fortifications were made of wood and were easily destroyed by hurricanes, termites, and raids by local natives and English privateers (such as Sir Francis Drake in 1586) (Bushnell, 1983, p. 42). The disastrous raid by Robert Searles in 1668 prompted the Spanish government to order the construction of a masonry and coquina stone[2] fortress: the Castillo de San Marcos (*ibid*, p. 55). Construction began in 1672 with completion in 1695; from that point on, the fortress was never again taken by force and exists today as the oldest masonry fortification in the United States.

Figure 2: The Castillo de San Marcos (construction begun 1672; completed 1695), viewed from the old presidio.

A new threat in the form of increased English colonial presence to the north called for additional defensive options. Established in 1738 at the blessing of local Spanish authorities, Fort Mose (pronounced *mo-ZAY)* was the first free-black settlement in what would become the

[2] Coquina is a fairly rare limestone that is composed primarily of sand, seashell matter, and carbon. It was quarried from sea-level deposits in the southern portion of Anastasia Island across the Matanzas River from the Castillo. Coquina works well against wood-destroying organisms, fire, wind,… and cannonballs. When dried and hardened, coquina rendered projectiles effectively harmless. (U.S. Dept. of Interior, http://www.nps.gov/casa/historyculture/construction.htm).

United States. Fort Mose evolved from a military outpost approximately 5 miles north of St. Augustine to a separate town populated by people who were offered sanctuary from slavery in the British plantations in Georgia and South Carolina (Landers, 1992, p. 4). There were strings attached, however, the most significant of which was the requirement of the men to serve in the militia, making Fort Mose an effective buffer against British incursions from the north. Fort Mose was abandoned in 1740 following war with the Georgia and Carolina colonies, and the fort's residents retreated to St. Augustine, forever changing the ethnic composition of the city (*ibid*, p. 19) - substantially strengthening it.

The settlement of St. Augustine itself was established on the long-standing Spanish concept of the city-state within the context of the Laws of the Indies, promulgated from 1512 in an effort to control exploration, colonization, and economic activities in the New World (Britannica, http://geoanalyzer.britannica.com/ebc/article-9042315). Two of these laws were of particular importance in the case of St. Augustine: the Ordinances for Town Planning and the Ordinances of Governance (Bushnell, 1983, p. 33), which guided the formation of the original 1572 street and land parcel layout of St. Augustine and settlement in the hinterland of what is now St. Johns County, respectively. Together, these concepts (institutions) formed the basic foundation on which the development of the town would be carried out over much of the next 250 years.

3.2 The British (1763-1784)

Starting with the 1702 attack by Governor James Moore of the Carolina colony, control of Florida was one of the objectives continually being pursued by the British (Waterbury, 1983, p. 64). By the middle of the 17th century, the British had become a major player in the North

American colonial game. Despite numerous sieges of the St. Augustine presidio itself and attacks throughout the hinterland, the Castillo de San Marcos held out, though the rest of the buildings of the presidio and the adjacent lands were usually lost. Only with the signing of the First Treaty of Paris in 1763 (ending the Seven Years' War[3]) did St. Augustine and the entire Florida colony become a British possession (Wright, 1975, p. 1). At that point, most of the original Spanish residents of the city, along with the displaced residents of Fort Mose, left for Cuba and other areas in the Spanish Main (*ibid*, p. 5). Upon the presidio's transfer, St. Augustine was designated capital of the British colony of East Florida (with the capital of West Florida in St. Francisville (Louisiana)) (http://www.exploresouthernhistory.com/stfrancisville.html), the formerly Spanish Franciscan and Catholic institutions were repurposed as Anglican and Protestant (respectively), and the Castillo was renamed Fort St. Marks.

By 1775, the American Revolution had begun, but the Loyalist Florida colonies continued to support Britain (Wright, 1975, p. 19). The most significant effect of the war on British St. Augustine was the increase in the population, mostly due to loyalists leaving colonies to the north (*ibid*, p.19). Supplementary troops were garrisoned at Fort St. Marks (the British name for the Castillo), providing increased support for naval vessels now operating in the area (*ibid*, p. 25). The British occupation of St. Augustine turned out to be a striking example of a nearly total institutional shift where many of the civic customs of one nationality (Spanish) were literally replaced by another (British). Particularly significant was the re-arrival of slavery, which had been outlawed in the region while under Spanish control. One institution, however,

[3] The Seven Years' War involved many European colonial powers with battles at home as well as abroad. In the North American colonies, the war was known as the French and Indian War. The Treaty of Paris resulted in numerous territorial ownership changes, the Florida colonies and the island of Minorca of Spain to Great Britain among them (Encyclopaedia Britannica, http://www.britannica.com/EBchecked/topic/536559/Seven-Years-War).

that persisted was the Spanish Ordinance of Town Planning vis-à-vis the street network and property parcel arrangement prescribed by it. The British possessed St. Augustine for only 21 years, for the day and situation too short a time for a new land division or street system to be put in place.

3.3 The Minorcans (from 1777)

In 1777, new arrivals appeared in St. Augustine: the Minorcans, people from the islands and coastal areas throughout the Mediterranean Basin including the Balearic Islands, notably Minorca. When the British colony of New Smyrna, approximately 75 miles south of St. Augustine, was abandoned, about 700 of these settlers made their way to St. Augustine (Wright, 1975, p. 31). While the more affluent Minorcan families moved into the predominantly British center of St. Augustine, the lower- and middle-class families were granted an area in the north of the city called Little San Felipe (Griffin, 1991, p. 162), popularly known today as the Minorcan Quarter.

The people of Minorca, as well as many of those from other areas who opted for the journey to British Florida in 1768, lacked both personal and natural resources. Indeed, the island of Minorca in the middle 18th century saw the potentially lethal combination of high population and low harvests (Griffin, 1991, p.18). These conditions provided the basis for taking the risk of a trans-ocean voyage to seek better fortunes, as had been offered by Dr. Andrew Turnbull and his efforts to start up a plantation in Florida (*ibid*, p. 5). Regrettably, the Minorcans fared no better at Turnbull's New Smyrna indigo plantation. It was at this point, nine years later, that the majority of the colonists left for St. Augustine (*ibid*, p. 100).

So who exactly were the Minorcans? These were a people of close-knit extended families, the majority of whom were Catholic (Griffin, 1991, 70). While men held a monopoly on positions of authority in British culture, Minorcan women were just as likely as men to play key roles in social and religious events (*ibid*, p. 77). It was this attitude of community and equality (the institution of community) that buttressed the Minorcans' ability to survive great hardships time and again; in the decades to come this ability would be demonstrated at New Smyrna and later, St. Augustine.

3.4 The Spanish Redux (1784-1821)

In 1784, Spain recovered control of Florida from Britain as part of the Second Treaty of Paris, ending the American Revolutionary War. The exchange was a sort of side-deal in the treaty as Spain was involved in the war against Britain in an effort to regain hegemony in the Gulf of Mexico region (J. C. Brown Library of Brown University, http://www.brown.edu/Facilities/John_Carter_Brown_Library/florida/pages/reconnaissance.html). Now, the British departed; however, many of the Minorcan colonists, particularly those originally from Minorca (a Spanish possession prior to the 1763 treaty with Britain) stayed on, excited at the prospect of becoming Spanish subjects yet again. Even many of the Italian, Greek, and other non-Spanish colonists requested Spanish citizenship (Griffin, 1991, p. 112). At this juncture, too, many of the former Fort Mose residents made their way back to St. Augustine, supplementing the largely Minorcan population of the city as the original Spanish inhabitants (or their heirs) did not return to St. Augustine right away and Fort Mose was never re-established (Landers, 1992, p. 27). Several former Fort Mose residents moved into the southern portion of the Minorcan Quarter (south of Cuna Street) on their return starting in the mid-1780s. The relatively habitable condition of

available structures in this area is generally accepted as contributory to this pattern of relocation (Carl Halbirt, city archaeologist - St. Augustine, Florida, May 2013, pers. comm.).

Thus, twice in the space of 20 years, the institution of community (fomenting 'stick-tuitiveness') enabled the Minorcans to "keep the lights on" in St. Augustine, reducing the likelihood of abandonment of the city (Griffin, 1983, p. 131).

3.5 The Americans (from 1821)

Though the Florida colonies were on the periphery of both the Spanish Main and British holdings in North America, they were considered strategically important by the United States for economic as well as military reasons (Buker, 1983, p. 151). Control of Florida (with St. Augustine as the territorial capital until 1824), was transferred from Spain to the United States on July 10, 1821. The Castillo de San Marcos was renamed, again, to Fort Marion, and the U. S. Army established a base there from which to conduct operations during the Seminole Wars[4] (*ibid*, p. 171).

The American military presence in St. Augustine continued past Florida statehood (March 3, 1845) into the 1860s. Upon the secession of Florida and the outbreak of the Civil War, control of St. Augustine changed yet again with the arrival Confederate forces in March, 1862 to occupy Fort Marion. Only six months later, however, Union forces were again in control of the presidio (Buker, 1983, p. 175). Little combat occurred in the region apart from small raids for the duration of the war due to St. Augustine's being far from the front lines (Arana, 1986, p. 61).

[4] The Seminole Wars were a series of conflicts in Florida that actually started during the late second Spanish Period and ended just prior to the outbreak of the Civil War. Many of the skirmishes and battles of the 1830s and 1840s occurred near St. Augustine. The ultimate endgame was the removal of many Native Americans to the southern part of Florida or out to the Indian Territory (Buker, 1983, p. 171).

Several fundamental institutional shifts occurred during the period 1821-1880 with the American takeover of St. Augustine. Greater religious diversity arrived with different Protestant-based and other faiths, as opposed to the predominantly Roman Catholic community that had existed over most of the previous 250 years. The English language became the primary language of commerce and government, replacing Spanish (Buker, 1983, p. 159). Finally, the black residents of the city (as well as the nation at large) were re-emancipated as slavery was ended as an economic practice everywhere (*ibid*, p. 179).

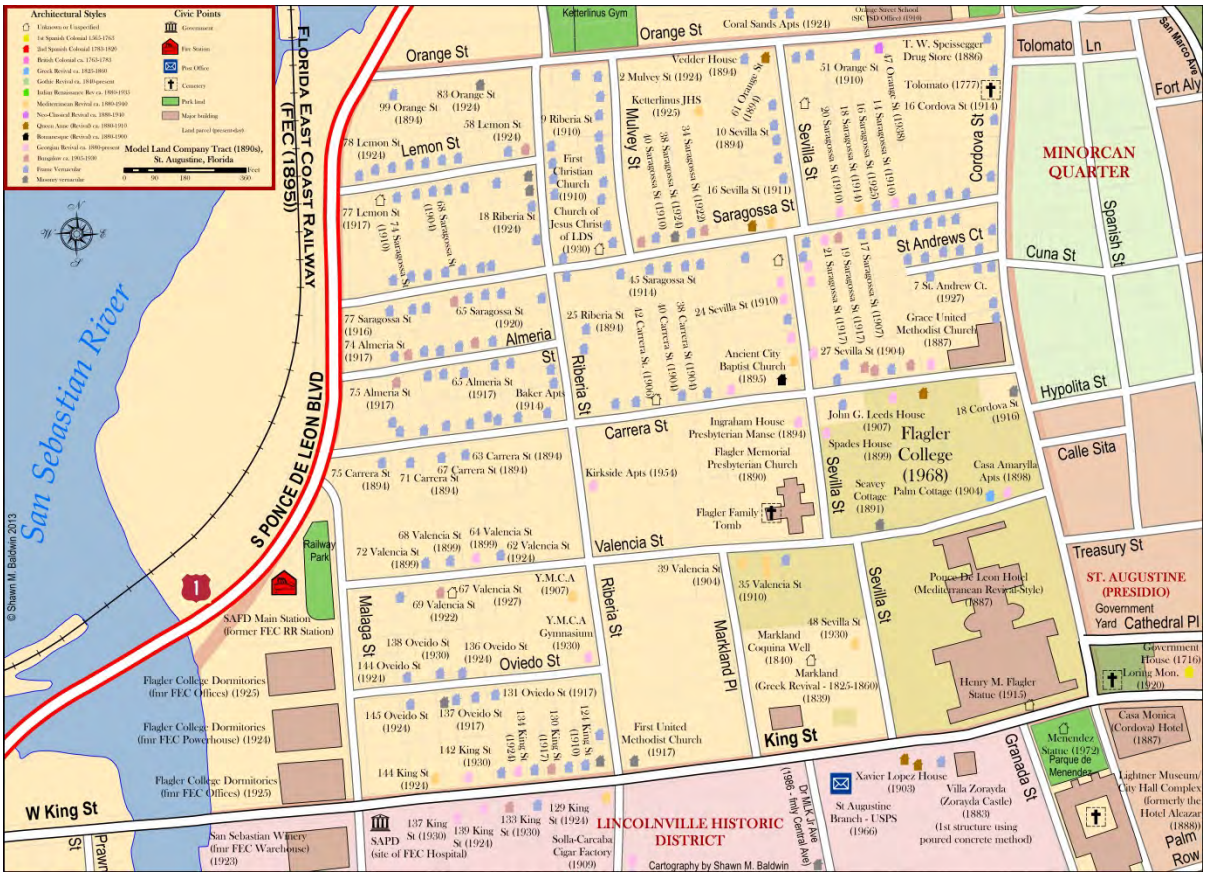
Of particular note, however, is the continued persistence of land parcel arrangement that originated with the Spanish Ordinance for Town Planning in 1572. In subsequent decades, the land parcel arrangement of the Minorcan Quarter would be reorganized, reflecting the increase of population in the city. Parcels that once stretched from Spanish Street to St. George Street, for example, would be split in half, but the basic long-lot orientation concept set forth in the Spanish Ordinance of Town Planning of 1572 would persist even through these changes.

3.6 The Henry Flagler Era (1883-1913)

The rare circumstance where an individual single-handedly effects institutional change in a place occurred for St. Augustine in the person of Mr. Henry Morrison Flagler (1820 - 1913). Flagler's commitment to the city in his later years gave St. Augustine a new identity as well as a new lease on life. After a visit in 1884, Flagler saw the potential for bringing hotels and resorts to the area (Reynolds, 1892, p. 98), and to get the guests to the town and its resorts, he built a railroad. The institution of commercialism brought to St. Augustine by Flagler essentially saved the region from economic stagnation and potential abandonment, a situation that had been developing since the end of the Civil War (Graham, 1983, p. 188). Along with the resorts and

railroads came the necessary support services such as health care, education, and churches (Martin, 1977, p. 129). The majority of the buildings that were erected by Flagler still stand today, though many of them have been repurposed. The Ponce de Leon Hotel (1888) is a notable case in point; it now houses Flagler College (established 1968).

Flagler's influence was felt city-wide and almost immediately. The arrival of the new institution of tourism- and transportation-related commerce had the potential to repurpose areas of long-time inscription residential parcel blocks. However, the neighborhood known as the Model Land Company Tract, adjacent to the Minorcan Quarter's west side, was where preservation (indeed, extension) of the general land parcel system in the 1572 Ordinance of Town Planning occurred. This tract, open land on which Flagler built the railroad, hotels, and other structures supporting his businesses, was controlled by the Model Land Company, a subsidiary of the Florida East Coast Railway (whose railroad marked the tract's western boundary), starting in 1896 (Harvey, 1997, p. 113). As well, other citizens found desirable the location between the railroad and the city center (*ibid*, p. 113), eliminating the need for land in the old St. Augustine presidio east of Cordova Avenue (including the Minorcan Quarter). The situation effectively preserved the by now 300-year old institutional inscription of property ownership (vis-à-vis land parcel arrangement), which was re-emphasized in fact in the new Model Land Company Tract (see Map 2).



Map 2: Model Land Company Tract Historic District – 2013. Established in the 1880s, the area of St. Augustine developed by Henry Flagler for residential and business use. The basic form of parcel arrangement existing in the original presidio was adopted for most of the tract, extending the influence of the institution of land ownership established by the Spanish in 1572

Figure 3: Statue of Henry Flagler (right) at main entrance to Flagler College (formerly the Ponce de Leon Hotel, completed in 1887)

Figure 4: St. Augustine City Hall and the Lightner Museum. Built in 1888 by Flagler as the Hotel Alcazar (one of his three hotels in town), Otto C. Lightner of Chicago took it over in 1946 for his myriad collections. By the mid-1970s, the city offices took up residence. Flagler's third hotel, the Casa Monica, is at left

Figure 5: Grace United Methodist Church. Built by Henry Flagler in 1886 to replace the original structure occupying the desired site of the Hotel Alcazar, it was the second structure in St. Augustine to be built using the Poured Concrete method (note the horizontal striations in the walls caused by the molds used when pouring and setting the concrete)

3.7 The 20th Century

Even after Henry Flagler's death in 1913, the resort and rail industries he brought to St. Augustine continued to develop and thrive. Additional tourism and convalescence resorts were the foundation of the local economy during the early twentieth century (Dow, 1983, p. 212), deepening further the mark of Flagler's legacy on the landscape.

America's emergence from the Great Depression, followed by entry into World War II saw the return of larger civilian government and military presence in the city. The concepts and results of many projects by the Works Progress Administration (WPA) and the US Army Corps of Engineers (USACE), among others, still exist in St. Augustine today, serving as a foundation of sorts for current historic awareness projects (Dow, 1983, p. 233). The military presence in the city during this time was in the form of a U. S. Coast Guard training base (*ibid*, p. 237). Today, this presence remains in the form of the Florida National Guard Headquarters.

Since the 1960s, significant institutional shifts experienced in the rest of the United States have shaped St. Augustine's history and society. For example, in May 1964, a chapter in the Civil Rights movement was written in the Lincolnville neighborhood[5] of St. Augustine through a high-profile visit by Dr. Martin Luther King, Jr. (Dow, 1983, p. 240). In 1986, Central Avenue, which serves as the north-south axis through Lincolnville (for maps, see Appendix B), was renamed to Dr. Martin Luther King, Jr. Avenue to honor this remarkable chapter in St. Augustine's history. Today, preservation and commemoration efforts continue in Lincolnville vis-à-vis the ACCORD Freedom Trail (ACCORD Inc., 2013, web).

[5] Established in the 1870s, Lincolnville is a neighborhood in the southern part of St. Augustine originally settled by freedmen and ex-slaves from Southern plantations. During the mid-1960s, this area was the staging and support base for the Civil Rights movement activities in St. Augustine (Dow, 1983, p.240). Many homes from the late 19th and early 20th centuries still stand.

Also since the 1960s, significant historic preservation efforts have been underway to recognize and protect the history of St. Augustine. This includes how existing and new building exteriors are refurbished or styled. Significantly, a paint color requirement for historic structures exists in St. Augustine (not unlike the color-coding adopted for my cartonomicon), in part for preservation efforts. The Triay House of 1806 (Figure 6) in the Minorcan Quarter is one such example of this mandate in practice. Color is part of historic preservation efforts underway since the 400th anniversary (1965) of the founding of the city. This, in turn, enhances the preservation of the past: inscriptional persistence.

Figure 6: The Triay House in the Minorcan Quarter. Built in the Spanish Colonial Style in 1806 (during the second Spanish Period), it is painted in a color typical of the period (mauve/terra cotta) as mandated by the City of St. Augustine

During the first 200 years of its existence St. Augustine was an isolated Spanish outpost in the New World. In 1777, the city had been transformed into a cultural melting pot, the nexus of which became known as the Minorcan Quarter. Even during the first decade or so after the departure of the British, St. Augustine's cultural identity retained its uniquely Minorcan cultural institutional composition. Over time, many of the Minorcan elements faded into the cultural fabric of the community as other people arrived, particularly after 1821 and the transfer of the city to the Americans (Griffin, 1991, p. 195). Persisting through the centuries, however, is the common thread of the institution of land ownership inscribed on the landscape of St. Augustine.

Figure 7: The Spanish colonial battle flag over the San Agustin Bastion of the Castillo de San Marcos. This flag (not the Stars and Stripes) is flown in honor of the fact that the Castillo was never taken in battle

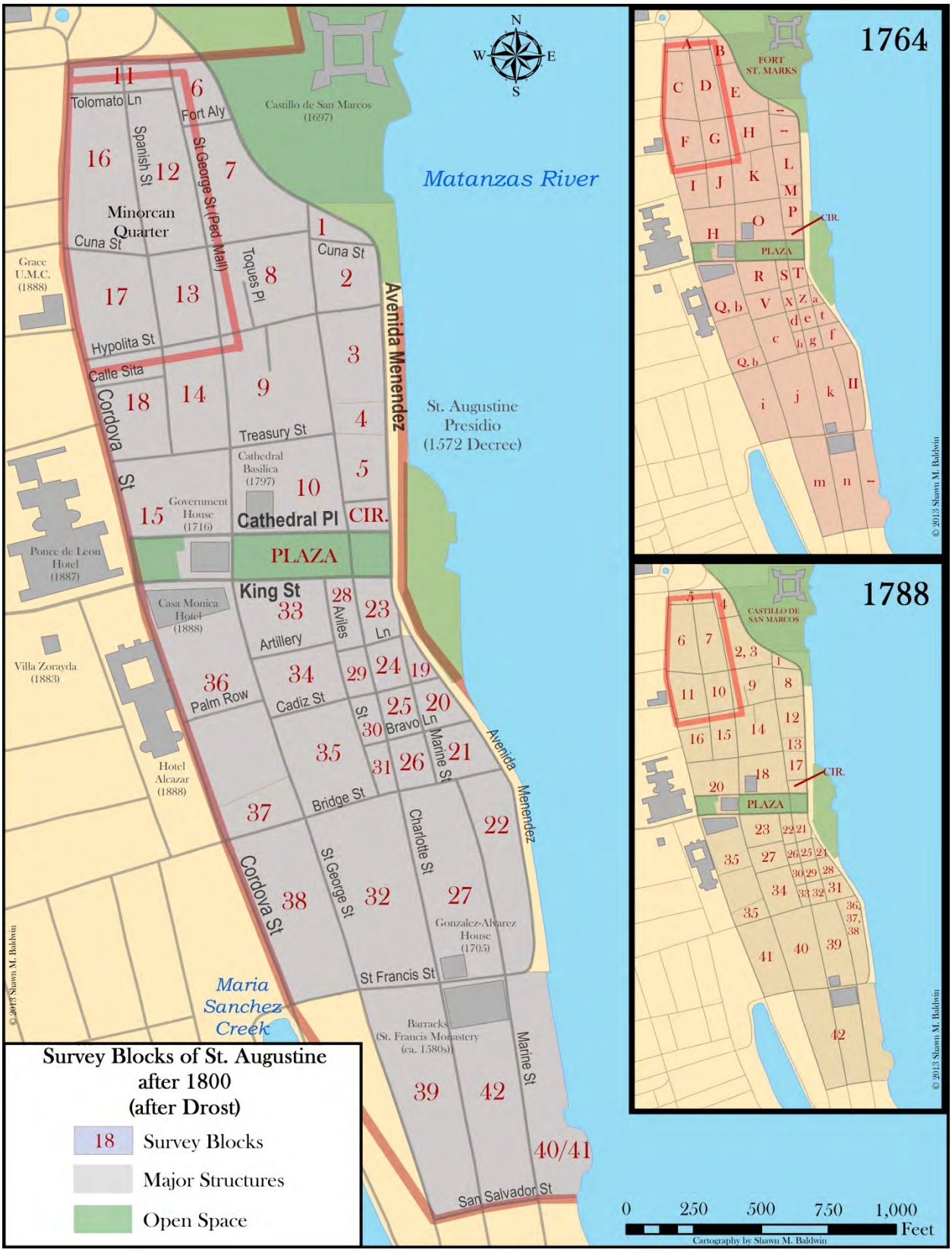
CHAPTER 4: GIS Methodology

To understand how institutional inscription manifests in the Minorcan Quarter, the arrangement of land parcels is studied with attention on four particular years from the mid-eighteenth to early nineteenth centuries: 1764, 1788, 1800, and 1834. During this period, control of the Florida Territory shifted three times, from the British, back to the Spanish, thence to the emerging United States of America. With each shift came different mapping methods and frameworks. Map 3 shows map survey blocks for St. Augustine, including the Minorcan Quarter. The fundamental question explored in this chapter is: "Can GIS work to communicate institutional inscription persistence over a wide temporal range within a relatively small space?"

Tax records surviving from this period exist for these years enabled Ramola H. Drost, a 20th century cartographer and resident of St. Augustine, to compile her landmark collection known as the Drost Overlays, thus providing a solid foundation from which to determine an institutional inscription pattern (vis-à-vis land parcel organization) (SAHS Research Library, 2013). The overlays, compiled in 1953-1954, were made in an effort to catalog parcel boundaries for the entire city during the four years described earlier (Drost, 1954). Mr. Charles Tingley, Senior Research Librarian at the St. Augustine Historical Society, puts it this way:

> It is my understanding that she (Drost) took the Official City Map from 1938 as her base. She then "overlayed" historic lot boundaries using a system of varied dots and dashes to indicate from which historic source she used to draw the boundary. The data was taken from the following: Puente Map 1764, Rocque Map 1788, ca. 1800 Tax List (not a map), and the Clements Survey Map of 1834.[6] (Nawrocki, 2013, p.c.).

[6] Juan Josef Eligio de la Puente (1764); Mariano de la Rocque (1788); Quesada Tax List of 1790 & Tax Assessors List of 1803 (1800); Benjamin & J. B. Clements Survey (1834).



Map 3: Index of Survey Blocks in St. Augustine presidio (after Drost)

To accomplish this thesis, I digitized the Drost (1954) maps so they could be manipulated in GIS. Four specific years were extracted for parcel geometry and orientation study and are shown on Maps 4 through 7 below: 1764 (during the British Period), 1788, 1800 (both Second Spanish Period), and 1834 (U.S. Territorial Period). I also digitized the Ranson (1904) map of the Minorcan Quarter, Map 8, reflecting the land parcel configuration during the Flagler Era.

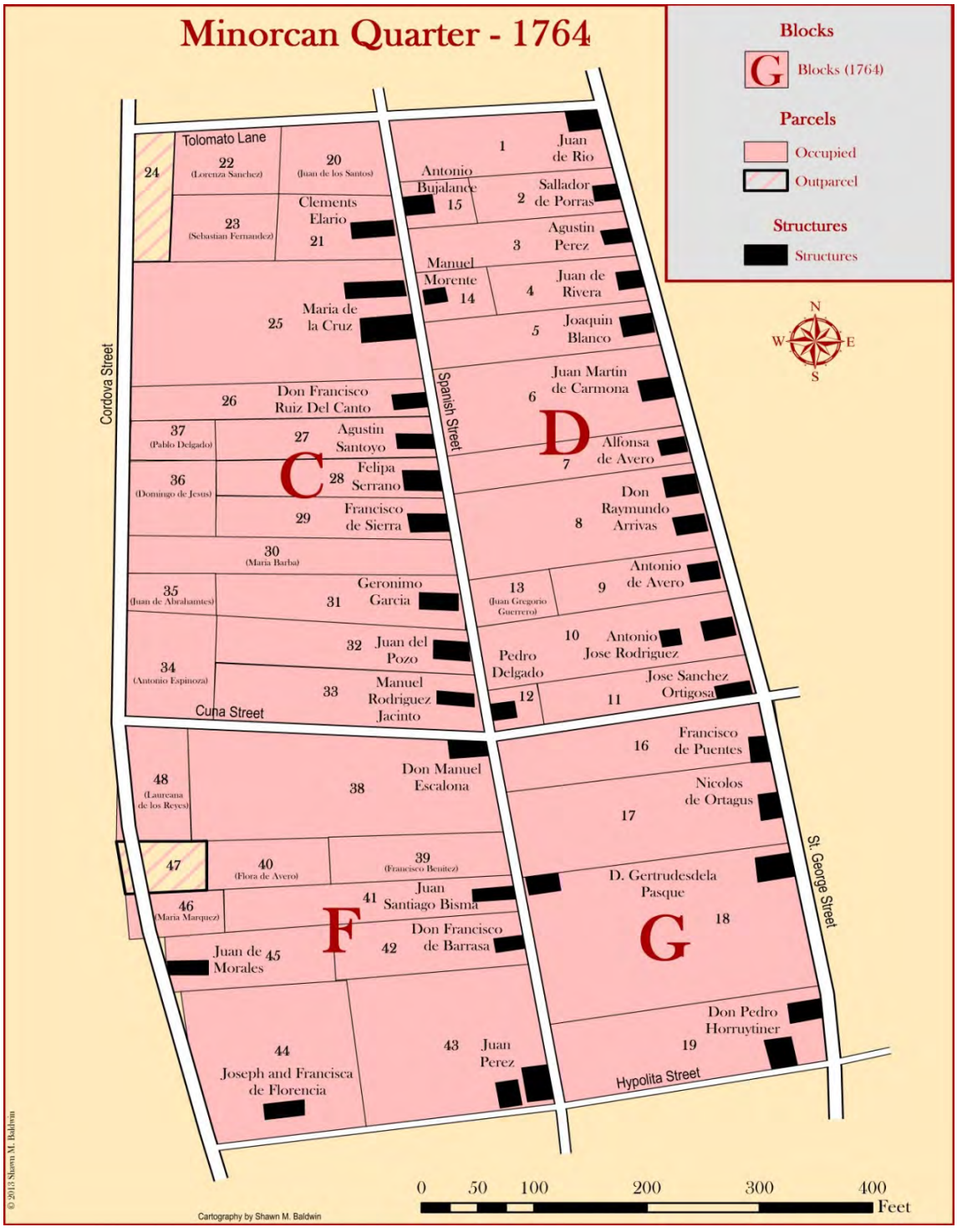
To craft the Minorcan Quarter maps, I had to georeference raster images (scans) of the original maps to the project area coordinates prior to digitization. The coordinate system and projection matching that of the data used to create the other maps in the cartonomicon (NAD 1983 State Plane Florida East FIPS 0901 (US Feet); Transverse Mercator Projection) was applied in order to register the scans. A series of control points at each street intersection within the extents of the Minorcan Quarter – nine in all – was then established with the coordinates for each control point, georeferencing the scans. The pixelated nature of these scans was countered by simply approximating the centers of corners and lines consistently.

Street linework and parcel polygon geometry were manually digitized; attribute fields containing data critical to this study (including populating the attribute fields for these features) were subsequently populated. For each year represented on the Drost and Ranson maps, care had to be taken to follow the correct line for the intended year as all four years were on one scan. After the digitization was complete, a special trip was made to the Research Library at the St. Augustine Historical Society (a five-hour round trip by car) to review the original paper map collection by Drost to verify the correct boundaries were used for the correct year and make changes on draft printouts of the maps for subsequent revisions. The Ranson map was of better initial digital quality and did not have the overlay component the Drost collection did.

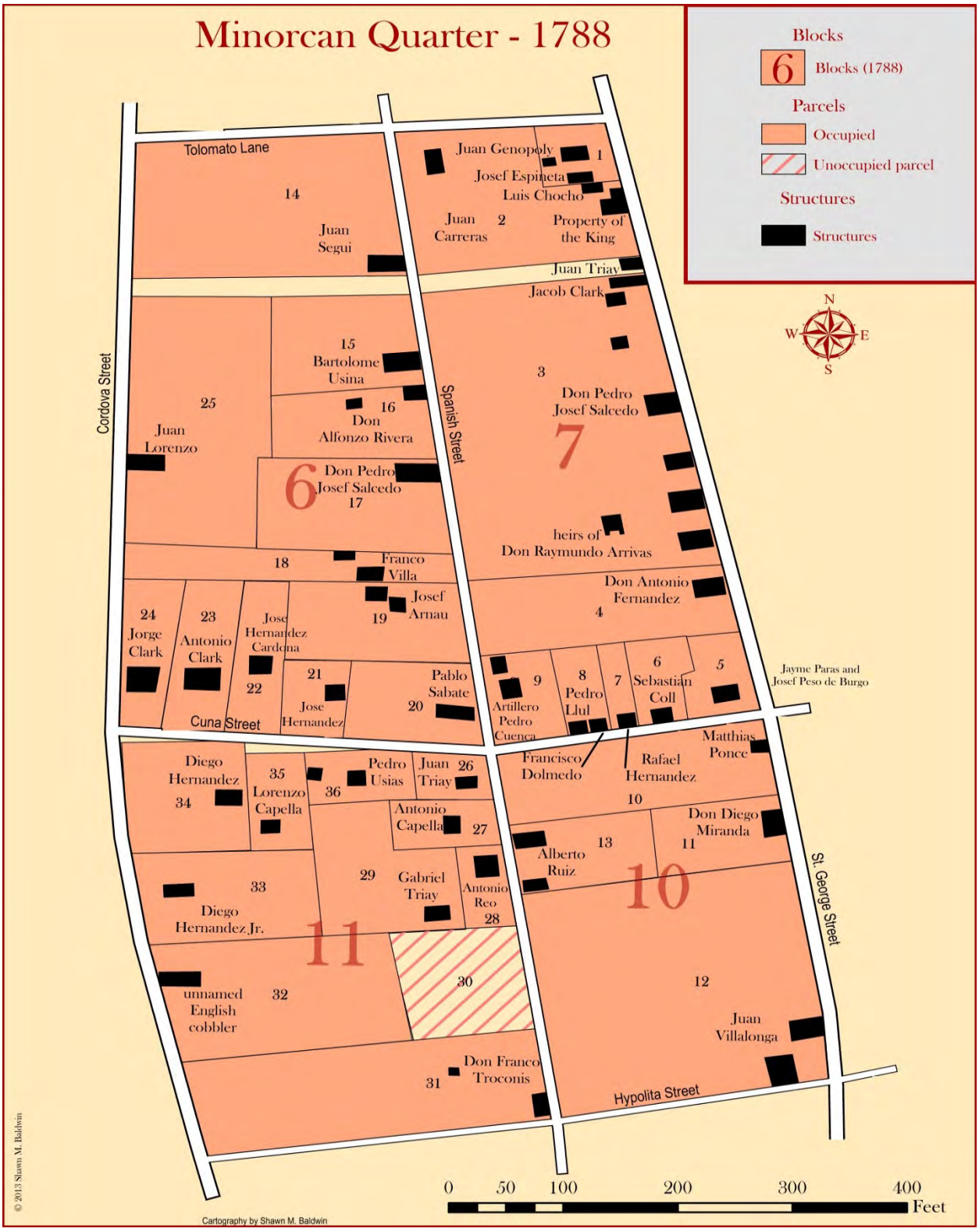
Four of the five maps that were digitized required an average of 3 hours (including attribute field population and proofreading) to complete; the 1904 Ranson map required almost 5 hours for these tasks due to the larger dataset involved. The 2013 map data from St. Johns County required no digitization tasks due to its 'off-the-shelf' (OTS) format.

The majority of the data used in this cartonomicon (Appendix A) were downloaded via the Internet from the St. Johns County, Florida Geographic Information Systems Department website (http://www.co.st-johns.fl.us/gis/index.aspx) in individual shapefile format. A file geodatabase was created to contain the feature classes derived from the downloaded shapefiles and was designed to maintain the spatial reference native to the data (NAD 1983 State Plane Florida East FIPS 0901 (US Feet); Transverse Mercator Projection).

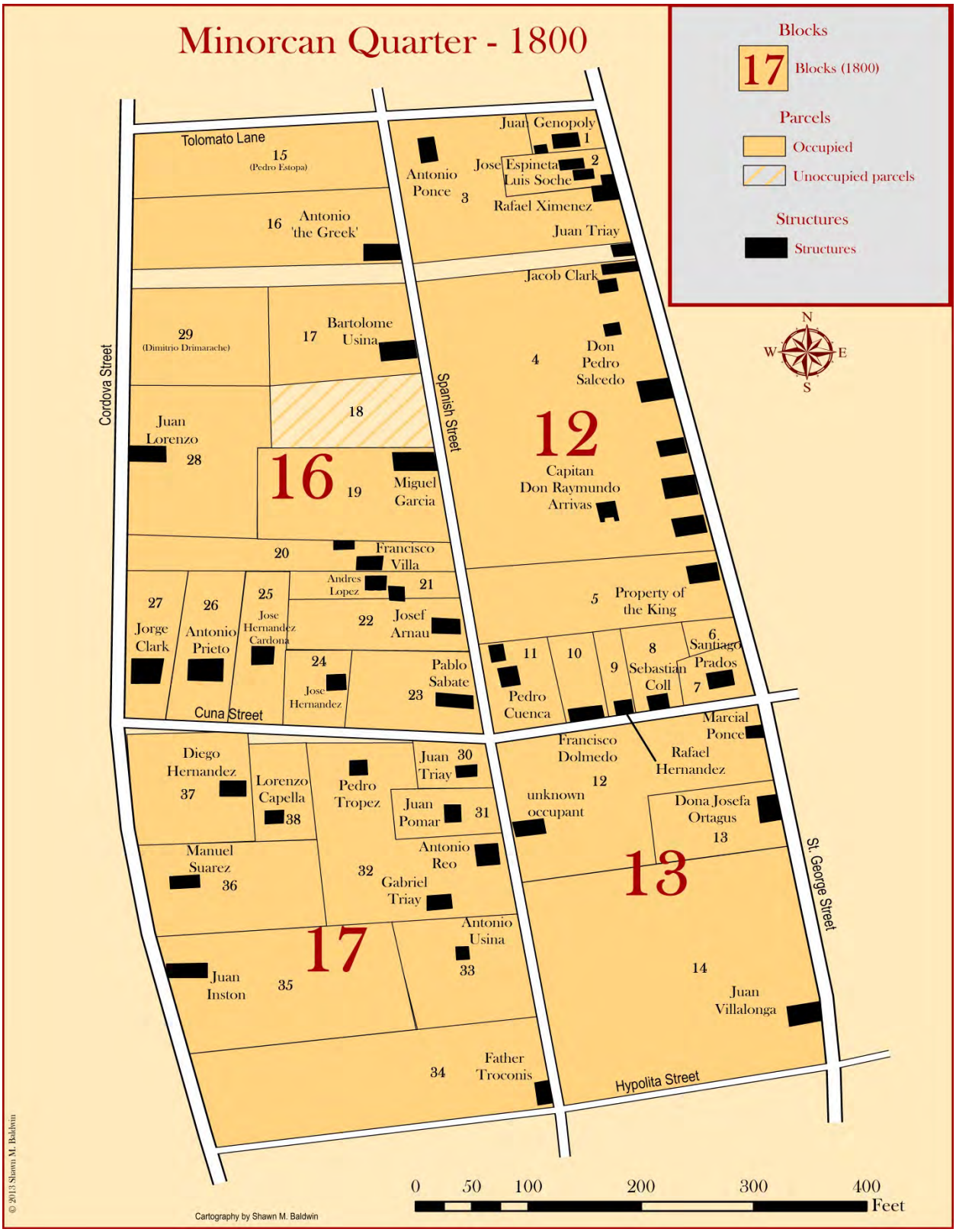
The shapefile for the Intracoastal Waterway that appears on the St. Augustine and St. Johns County maps (Maps 12 and 13) was constructed by the author. Data capture for the Intracoastal Waterway in the St. Johns County area consisted of simply observing the signs posted by the U.S. Army Corps of Engineers at bridges crossing the designated waterways.



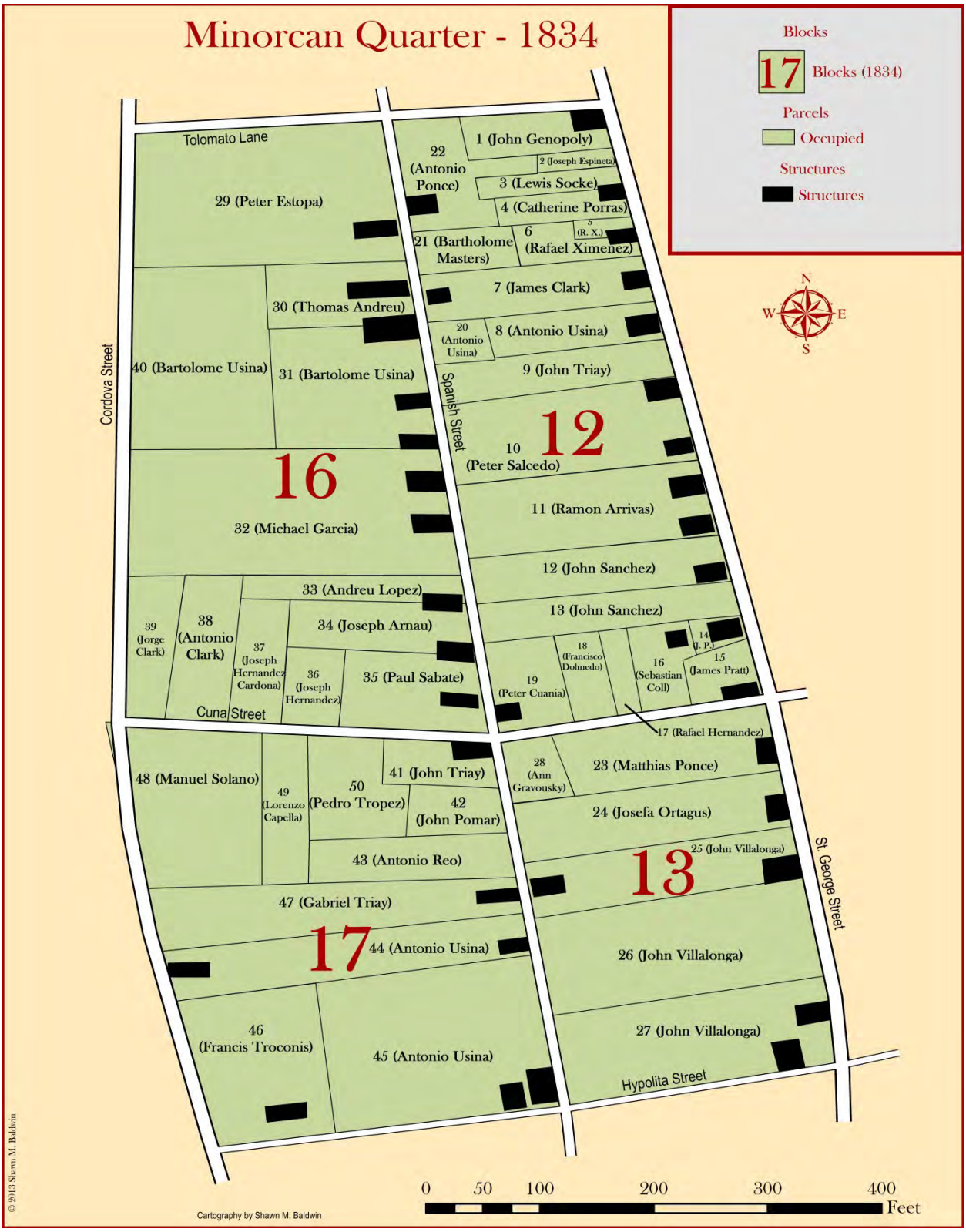
Map 4: The Minorcan Quarter – 1764. The first full year of British occupation of St. Augustine, with owners of record from the First Spanish Period. British settlement was still in early stages



Map 5: The Minorcan Quarter – 1788. The first full year after the British ceded St. Augustine back to Spain, with Minorcan settlement (and English who had not left the town)



Map 6: The Minorcan Quarter - 1800. Sporadic Spanish re-settlement was underway during this time



Map 7: The Minorcan Quarter – 1834. During the early years of American territorial Florida

Two classical cartographic approaches are now applied to visualize change through time in the Minorcan Quarter: *small-multiple* maps and a composite *planimetric* map. It is this second approach that is taken one step further – the *Ghost Map* (Ethington, forthcoming) when studying institutional inscription. These maps are crafted by adding layers containing thematic information (such as land parcel boundary configurations at different points in time) and overlaying them on a current base map. Additionally, the *transsection diagram* and the *tree-ring diagram*, which use transsection axes and concentric rings to depict inscriptional persistence, will be implemented. These three approaches will be presented in Chapter 5.

4.1 Small-Multiple Mapset

One form of multivariate mapping is the *small-multiple*. From a single-attribute-across-time analysis perspective, such as parcel change in the Minorcan Quarter over a seventy-year period, the small-multiple format organizes maps of the same area across time onto a single page for high-level comparison. The difficulty of negotiating space between widely spaced, finer points on the page comes into play when detailed analysis of the same particular area on the maps is needed (Slocum et al, 2009, p. 335).

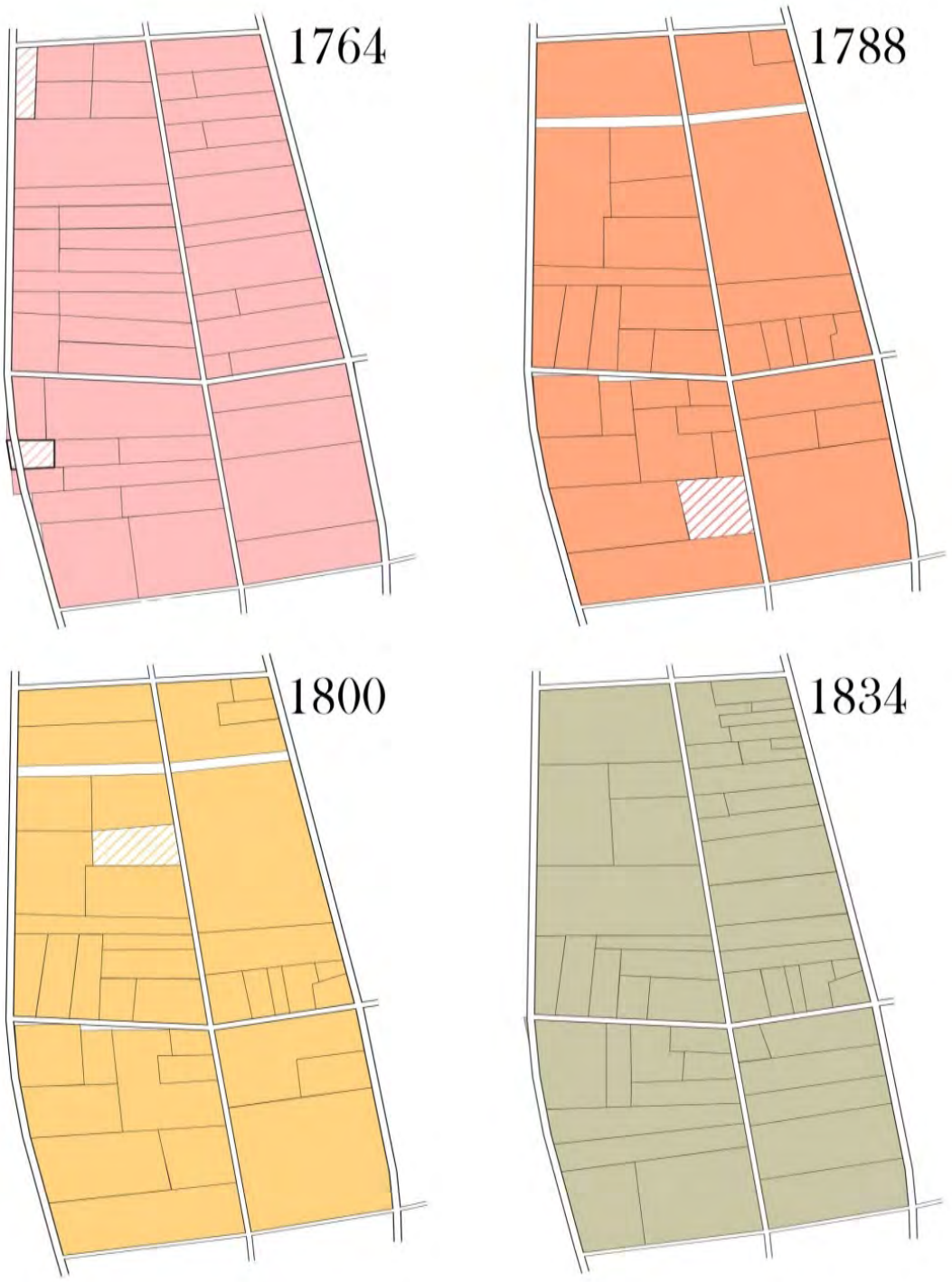


Figure 8: Minorcan Quarter parcels through time (1764 – 2013) – *Small Multiples* (after Drost). Unoccupied parcels are shown in the diagonal hatching pattern

4.2 Planimetric Map

An alternative to using small-multiples when analyzing spatio-temporal data, a multivariate combination called a *planimetric map* can be used (Dent, 1990, p. 225). The maps for each year of study are placed on individual planar surfaces to depict spatial change through time along a vertical line-of-sight axis. Arranging maps in this fashion yield two significant benefits: the conversion of the disparate nature of small multiples into a more streamlined analytical environment (which reduces extraneous eye movement) and the option of adding more maps to the series for analysis (Slocum et al, 2009, p. 335).

Like the small-multiples map before, parcel and street data were retained since the focus is on parcel change through time. Labels for parcels were omitted for this illustration as they were deemed non-essential and would add clutter; labels for streets were also omitted. The map sequence was arranged from top to bottom by earliest year to latest year which establishes a visual hierarchy, enabling more effective communication of spatial data (Dent, 1990, p. 336).

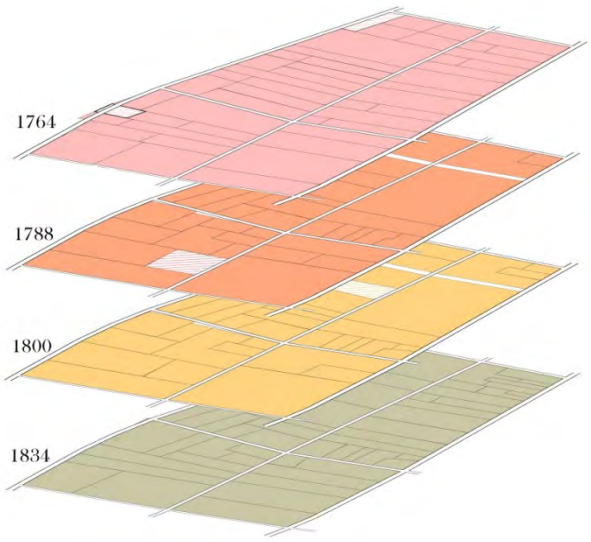


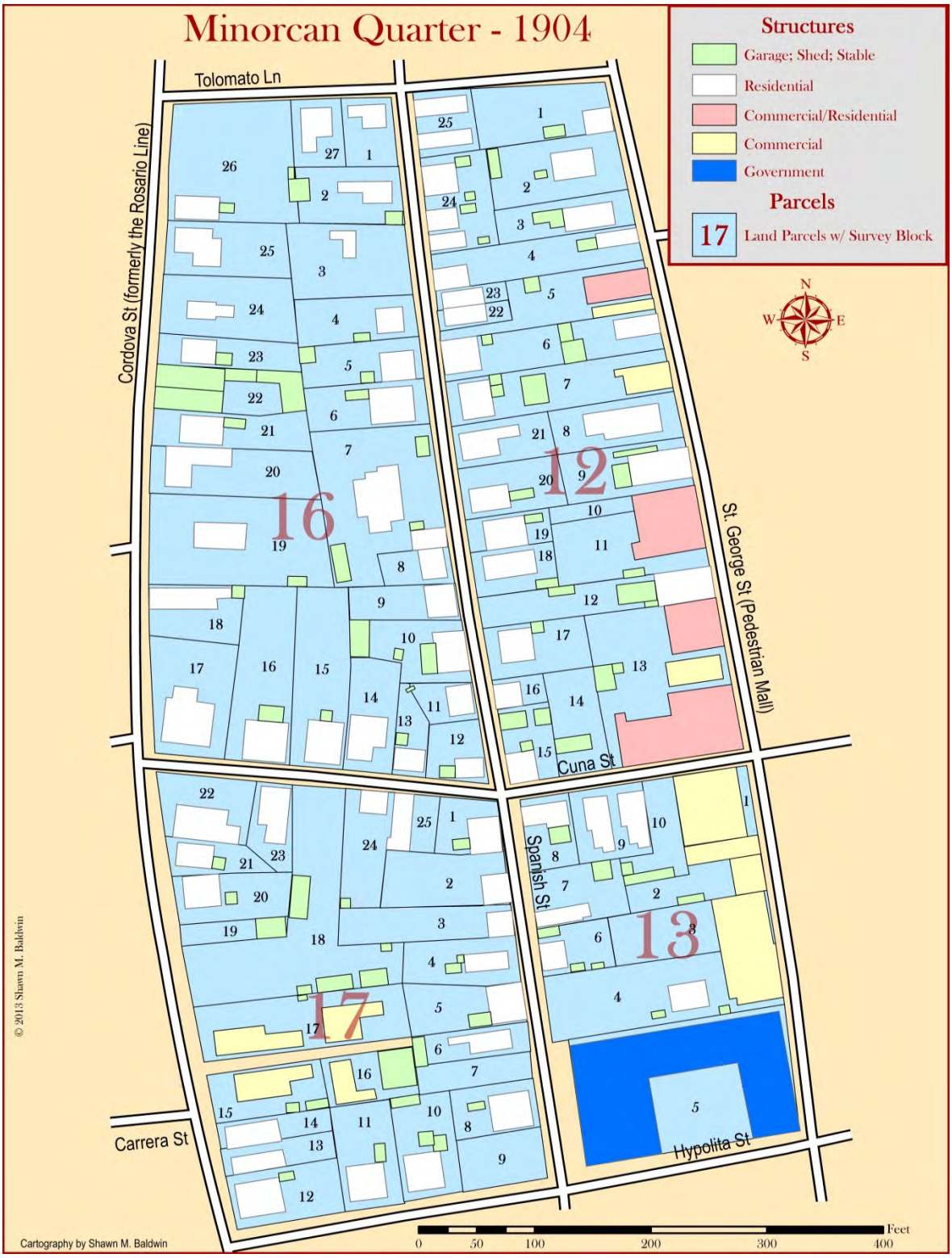
Figure 9: Minorcan Quarter parcels through time (1764 – 2013) - *Planimetric*

Map 8 (Ranson) and Map 9 (SJCGIS) depicting the Minorcan Quarter parcel and structure situation respectively, have been included for the purpose of linking past and present institutional landscapes. Although the Ranson map is temporally offset from the first four maps by 70 years, and the SJCGIS map by a further 109 years, the overall extents of the Minorcan Quarter is still intact, though with the emergence of an interesting development: the considerable increase in the number of land parcels within. Statistics pertaining to the land parcel situation in the Minorcan Quarter can be found in Table 1.

From Maps 4 - 7 and Table 1, a pattern of parcel amalgamation and re-division emerges. It is likely that as the national status of the Minorcan Quarter fluctuated during the 1764-1834 period, this pattern followed old tradition of empty or abandoned parcels being absorbed by new arrivals owning adjacent parcels. This would be followed by the re-establishment of original parcel boundaries (that weren't already occupied by the Minorcans) on the return of the previous owners (Schafer, 1983, p. 123). Considerable shifts in land usage patterns also have emerged by this time, the significance of which to the Minorcan Quarter will be discussed in Chapter 5.

Table 1: Statistics of Land Parcels in the Minorcan Quarter – 1764-2013

BLOCK 12	PARCEL COUNT	AVG. PARCEL SIZE (sq. ft.)	PRIMARY LAND USE(ES)
1764	15	8662.12	Residential/Small-scale agriculture
1788	9	13817.25	Residential/Small-scale agriculture
1800	11	11303.89	Residential/Small-scale agriculture
1834	22	5805.51	Residential/Small-scale agriculture
1904	25	3923.81	Mixed Residential/Commercial
2013	43	2752.82	Mixed Residential/Commercial
BLOCK 13			
1764	4	22132.92	Residential/Small-scale agriculture
1788	4	22003.37	Residential/Small-scale agriculture
1800	3	29323.8	Residential/Small-scale agriculture
1834	6	14578.49	Residential/Small-scale agriculture
1904	10	5915.16	Res/Commercial/Government
2013	17	3817.57	Commercial
BLOCK 16			
1764	18	8817.87	Residential/Small-scale agriculture
1788	12	12933.48	Residential/Small-scale agriculture
1800	15	10331.85	Residential/Small-scale agriculture
1834	12	13299.65	Residential/Small-scale agriculture
1904	27	5482.53	Residential
2013	39	3653.77	Commercial/Some Residential
BLOCK 17			
1764	11	11529.71	Residential/Small-scale agriculture
1788	11	11090.76	Residential/Small-scale agriculture
1800	9	13537.4	Residential/Small-scale agriculture
1834	10	12501.81	Residential/Small-scale agriculture
1904	25	3728.14	Residential/Some commercial
2013	42	2534.36	Mixed Commercial/Residential



Map 8: The Minorcan Quarter – 1904. The City Hall and City Jail were located in the blue building at this time

Map 9: The Minorcan Quarter - 2013

CHAPTER 5: Persistence of Institutional Inscription

In examining Figure 8, questions immediately come to mind. Why did parcel shape so significantly change from long-lots to more square shapes between 1764 and 1788 (and, subsequently, 1800)? And why did parcel shapes change back to something like long-lots between 1800 and 1834 (an equivalent span of time), particularly on the east side of Spanish Street? Were different land uses associated with the changes in parcel shape over time? Was the shift in land uses the cause of change in parcel shape somehow, and if so, why?

To answer such questions, it is essential first to establish an objective metric of how significant apparent changes in *property structure,* i.e., the combination of parcel shape and land usage, really are. Property structure is a principal indicator of institutional inscription (Ethington, forthcoming). Thus, a metric of the permanence of institutional inscription is the objective.

5.1 Inscriptional Persistence

To determine the "staying power" of a cultural institution within the context of the theory of institutional inscription, I have developed a rating system called *inscriptional persistence* (IP). IP rates the permanence of cultural features in a region. In the case of St. Augustine's history (and this thesis), the configuration of land parcels in the Minorcan Quarter is examined.

I define an arbitrary but intuitive system of parcel usage categories in Table 2. The basis

of this system is that parcels in use by public-facing institutions, where policy is set either *de facto* or *de jure*, have inherently stronger influences on the regions in which they occur than do parcels in use for private purposes only. In effect, parcel usage is a direct measure of the strength of institutional inscription at a point in time.

Table 2: Structure and Land Usage Categories

USAGE RATING	STRUCTURE/LAND USE CATEGORY
0	Unoccupied/Vacant (Long-term)
1	Storage ('Dead': sheds, barns, garages, parking lots, etc.)
2	Storage ('Live': stables, coops, pens, relatively small fields, etc.; small park lands can be included in this category)
3	Dwelling only (single or multi-family)
4	Dwelling with gardens or small fields adjacently placed (horticultural component)
5	Dwelling with workshop or storefront (commercial component)
6	Dwelling with both horticultural and commercial components
7	Primarily commercial use structure with residential component (e.g., apartment or dwelling upstairs or in back of property)
8	Dedicated commercial use structure (e.g., factory, store, bank, inn, service for hire, etc.) or large tracts of crop/ranch/park land
9	Government (including public safety & law enforcement) or religious institution or facility, including schools *

*The term 'school' being included in the Government structure use category reflects 20th & 21st century American terminology where public schools are generally administered at the county government level. Similarly, private schools (commonly associated with religious institutions) are more frequently regulated at the state level.

Next, I consider *changes* in parcel usage reflecting increase or decrease in the strength of institutional inscription over time. Smaller changes (or the absence of change (i.e., *stability*)), for any usage category, reflect as higher (or stronger) persistence. However, changes in public-facing usage categories are more significant than changes in private usage categories because it is these public institutions (chiefly government- and commerce-related) that have the greatest impact on the development and sustainability of a settlement. Changes in public-facing institutions (where official policy is set for a place), therefore, tend to have greater effect on that place, although all changes are important.

The period of time over which change accumulates is also relevant; the longer a settlement exists, the more significant the accumulation. Taken together, the formula for IP that I adopt is:

$$IP = 10 \times \{ 1 - \text{sum} (|u_{t1}-u_{t0}|/\hat{u}) \times (1 - 1/(t_0-t_1)) \}; \hat{u} = \max (1, [u_{t1}+u_{t0}]/2) \quad \text{Eqn 1}$$

Where the sum is taken over all parcels in the region of interest, for which u_1 and u_2 are the individual parcel usage categories and t_1 and t_2 represent time. IP is scaled to 10 for ease of manipulation. The first term, involving u_1 and u_2, reflects the contribution of parcel usage change; the second term, involving t_1 and t_2, reflects the contribution of time. Table 3 gives a linguistic interpretation of IP.

Table 3: Inscriptional Persistence Index Ratings System

RATING SCORE	INSCRIPTIONAL PERSISTENCE RATING	GENERAL CRITERIA
10	Intact	The feature or area exists in its original form and function or has just been established in its planned purpose.
9	Very Strong	Little has changed regarding the purpose, use, or appearance of the feature/area over time.
8	Strong	The feature or area has existed for some time with only minor changes to it (i.e., routine maintenance or minor amendments) while still retaining its original appearance or being used as originally intended.
7	Significant	Although the feature exists (or has been maintained to appear) in its original form, a multipurpose quality has been added to some extent.
6	Somewhat Significant	More noticeable physical changes have occurred to the feature or area (due to comprehensive maintenance or aggressive development), but overall original function or appearance exists.
5	Fair	Additional uses/purposes and/or physical components have been added to such a degree that the fundamental appearance or condition of the feature can no longer be considered 'original'.
4	Somewhat Marginal	The original purpose/use may still exist in some way, but considerable changes have occurred to the feature or area; its physical condition may show considerable weathering or lack of maintenance over time.
3	Marginal	Little of the original purpose/use exists and the surrounding environment has changed in such a way over a given period of time that the context of the feature or area is not obvious.
2	Faint	The feature or area has changed to such a degree in both its functional and physical conditions that its initial identity is difficult to discern without documentation or local knowledge.
1	Very Faint	Only token reminders of the feature or area that once existed in the vicinity remain, regardless of importance or age of that feature.
0	Extinct	The feature or area has been completely obliterated and/or replaced by an entirely new and/or different feature or purpose. Any evidence of its former existence is found in archives.

5.2 Parcel Configuration Effects

The number of parcels in a region, hence the average parcel size, clearly affects IP, but more qualitatively than quantitatively, I argue. In a region of, say, twenty parcels, ten (half of the inventory) undergoing usage change would signify a broader, more credible change than if the same region had ten parcels with five undergoing usage change. The magnitude of the change is still most important, however. My equation reflects this bias, as it considers parcel quantity, ignoring parcel size.

In an urban setting, parcel size tends to be positively correlated with land usage, particularly in the higher ratings; commercial and government facilities occupy large parcels. Actual parcel dimensions, therefore, influence persistence ratings less significantly than the land usage rating of that parcel (and the structures upon it). Rather, it is the number of parcels that can influence persistence ratings. The change in *quantity* of parcels in a local area (e.g., a large partially residential parcel subdivided into several entirely residential parcels, perhaps in response to population pressure) from one chronological milestone to another is the parcel size-related factor that would influence IP ratings of a place.

Parcel size, parcel arrangement (e.g., systematic lots versus eclectic lots), and even individual parcel shapes also affect IP. While parcel size by itself has a minimal influence in determining the magnitude of inscriptional persistence, parcel size change over time can indicate population change. However, these considerations are beyond the scope of this thesis.

5.3 Sample Data and Graphics

Table 4 tabulates the land usage categories for the parcels with frontage on Spanish Street for all four blocks of the Minorcan Quarter (Figure 8) at six points in time: 1764, 1788, 1800,

1834 (from the Drost maps), 1904 (from the Ranson map), and 2013 (from SJCGIS). These data are displayed graphically below in the transsection diagram (Figure 10, after Ethington) and the tree-ring diagram (Figure 11).

Table 4: Land Use Ratings (pertaining to transsection) of Minorcan Quarter parcels

LAND USE RATINGS																	
BLOCK 12	north															south	
1764	2	3	2	3	2	2	2	2	2	2	2	2	0	2	2	3	
1788	3	2	2	2	2	2	2	2	2	2	2	2	2	2	4	2	
1800	4	2	2	2	2	2	2	2	2	2	2	2	2	2	5	2	
1834	4	2	3	2	3	2	2	2	2	2	2	2	2	2	2	3	
1905	8	5	5	3	3	1	3	3	3	3	3	3	3	1	3	5	
2013	8	7	7	0	0	1	1	1	1	1	3	3	3	0	8	8	
sum	29	21	21	12	12	10	12	12	12	12	14	14	12	9	24	23	
BLOCK 13	north				south												
1764	2	2	2	2	6												
1788	2	4	2	2	6												
1800	2	4	2	8	8												
1834	3	2	2	2	6												
1905	3	5	3	5	8												
2013	1	1	1	1	7												
sum	13	18	12	20	41												
BLOCK 16	north												south				
1764	0	3	0	4	0	4	4	4	4	0	4	4	4				
1788	2	2	3	2	3	4	2	2	4	4	2	2	3				
1800	0	0	4	4	0	4	2	2	4	4	3	2	3				
1834	2	3	2	3	2	3	2	2	4	2	4	3	3				
1904	3	3	3	3	3	3	1	1	3	3	3	3	3				
2013	1	1	1	1	1	1	1	1	3	3	3	3	0				
sum	8	12	13	17	9	19	12	12	20	16	19	17	16				
BLOCK 17	north								south								
1764	4	0	0	4	4	0	0	0	0	3							
1788	3	3	3	2	0	0	0	2	2	3							
1800	3	3	4	4	2	3	2	2	2	4							
1834	3	3	3	3	3	3	0	0	4	4							
1904	3	3	3	3	3	3	1	1	8	8							
2013	3	8	3	7	3	1	8	1	8	8							
sum	19	20	16	23	15	10	11	6	24	30							

Changes in inscriptional persistence can also be tracked over time pairs (e.g., 1764-1788, 1788-1800, etc.) by determining an average change value across the parcels within a block. Table 5 depicts this concept, using the land parcels of Block 12:

Table 5: IP Change over time (Transsection) in Block 12, Minorcan Quarter

Year	Landuse (parcels) as L	IP 10-Avg L)	Landuse Rating change (Delta) between years	Avg Delta	TimeScale
1764	2 3 2 3 2 2 2 2 2 2 2 2 2 0 2 2 3				
1788	3 2 2 2 2 2 2 2 2 2 2 2 2 2 4 2	7.44	0.4 0.4 0 0.4 0 0 0 0 0 0 0 0 2 0 0.7 0.4	0.27	0.96
1800	4 2 2 2 2 2 2 2 2 2 2 2 2 2 5 2	9.71	0.3 0 0 0 0 0 0 0 0 0 0 0 0 0 0.2 0	0.03	0.92
1834	4 2 3 2 3 2 2 2 2 2 2 2 2 2 2 3	8.75	0 0 0.4 0 0.4 0 0 0 0 0 0 0 0 0 0.9 0.4	0.13	0.97
1905	8 5 5 3 3 1 3 3 3 3 3 3 1 3 5	5.40	0.7 0.9 0.5 0.4 0 0.7 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.7 0.4 0.5	0.47	0.99
2013	8 7 7 0 0 1 1 1 1 1 3 3 3 0 8 8	3.17	0 0.3 0.3 2 2 0 1 1 1 1 0 0 0 1 0.9 0.5	0.69	0.99
	North to South along Spanish St.				

Looking at the period 1788 to 1800 for Block 12 in Table 5 shows how persistence can vary within a given range of time in two ways. The IP rating change deviates little from base 10, indicating little change between the British exodus and relatively slow return of the Spanish during this period. Additionally, the actual period of time is only twelve years. The length of time measured in a settlement is related to IP change; shorter periods will experience less change on average than longer ones; thus, the Time Scale value will be slightly less than 1 (0.92 for this period). Conversely, the period 1904 to 2013 (99 years) saw significantly more IP change, and the Time Scale factor does not discount it (0.99 for this period).

With regard to change in parcel shape leading up to 1800 and the subsequent reversion in 1834, it was a *cultural* change of the population that most affected parcel shape (and size) in St. Augustine. The arrival of the Minorcans in 1777 is what fomented this cultural change, continuing through the end of the Second Spanish Period in 1821. A comparison of the Spanish-owned parcels on the 1764 map with the consolidated Minorcan claims in 1788 show an increase in the dimensions of Minorcan Quarter land parcels. Subsequent analysis of the 1800 and 1834 maps shows a return to smaller sizes of land parcels in the Minorcan Quarter (particularly in the eastern half) following the arrival of yet another group: the Americans.

In later years, particularly in the late-19th century following the Flagler industrial and commercial renaissance (Graham, 1983, p. 207), parcel sizes in the Minorcan Quarter became

even smaller (as seen in the 1904 map), though the long-lot orientation (originally implemented by the Spanish back in the late 1500s) was generally retained.

5.3.1 Ghost Map

Ghost maps are used to view institutions directly (Ethington, forthcoming). However, this thesis proposes the use of a numerical value (rating) using parcel and land use attributes, resulting in much less to display. So, to study the inscriptional persistence of parcel boundary configuration during the time frame covered by the Drost map series (1764-1834), the parcel boundary polygon and survey block feature classes are used. Layer arrangement starts with the most recent parcel layer (1834) as the highest layer with the oldest in the series (1764) atop the survey blocks layer. The basemap layer composed of the streets and structures in the Minorcan Quarter during the study time period is the dataset foundation. It is important to note that inscriptional persistence statistics for the entirety of all parcels within each survey block are considered; in the transsection diagram following (section 5.3.2), only those parcels adjacent to the transsection axis are considered (including the parcels that have been truncated in order to focus on the localized nature inherent in transsection). Ghost maps have a tendency to be considered “dense” as far as maps or other graphics are concerned (Ethington, forthcoming), which is why only two attributes were used.

The parcel boundary linework retains the color-coding for each year in Maps 4 - 7. Boundary linework thickness is increased from the lowest to highest layer, making coincident boundaries visible against each other. Cross-hatched patterns are used for the interior areas of the parcels, indicating the particular IP rating for each year and allowing the map reader to see parcel boundary changes over time. Pictures (taken by the author) of the area along Spanish

Street, which is the axis of transsection in the Minorcan Quarter (section 5.3.2) are included as a "silent narrative" (Ethington, forthcoming) of the vicinity.

Two observations emerge in the ghost map. The first is the relative stability of residential land usage in each of the four blocks during the 1764-1834 timeframe. Despite this seeming stability, however, examination of parcel boundary configurations and quantities from study year to study year reveals a lack of continuity in the institution of government. The common thread during this timeframe is the persistence of the long-lot orientation of land parcels in the Minorcan Quarter despite three changes in sovereignty.

The images along the right map-edge are photographs taken by the author in the Spanish Street vicinity and show portions of the Minorcan Quarter today (2013). These images provide the socio-historical context important in understanding the history of a place (Ethington, forthcoming) as well as the geography of that place.

Map 10: Inscriptional Persistence in the Minorcan Quarter cast in a ghost map (after Ethington)

Persistence is a key concept in spatio-temporal change, so the ghost map concept can apply to inscriptional persistence statistics, rendering them less “dense” when presented cartographically. By studying several attributes and arriving at a ratings scale beforehand, those attributes need not be included in the map. The actual change of the ratings spatially and temporally can then be viewed and considered more easily without having to sift through additional data, tightening up the historical context of the area and timeframe being studied.

It is worth pointing out that, Ms. Drost used a ghost map-like process when compiling her map series. The variety of dashed-line styles (a series of dots and dashes) she used were often along a single parcel boundary, placed parallel and closely to each other (Drost, 1954).

5.3.2 Transsection Diagram

One graphical approach to visualizing the progress of time in an area is the transsection diagram (Ethington, forthcoming). The axis of transsection for the Minorcan Quarter runs along Spanish Street between Tolomato Lane (north end) and Hypolita Street (south end). For the purpose of examining inscriptional persistence over the years (centuries, in this case), a feature count of land parcels adjacent to Spanish Street is taken for 2013 as a foundation. For each year of available data, including 2013, parcel utilization (as judged from buildings that existed on them as far as available data records show) are then examined in an offset series of line graphs. A Structure and Land Usage value from Table 2 is assigned to each 2013 parcel. If a parcel during an earlier year was larger, a value is assigned to the section of that parcel that is covered by the 2013 parcel adjacent to Spanish Street. The purpose of this strategy is to account for what would become future land development (which directly relates to the concept of inscriptional persistence) and preserve the focus of land usage inside the Minorcan Quarter (localization). For

parcels that extend across the entire block from the Spanish Street axis, the half section adjacent to Spanish Street is considered for the transsection study (again, taking into account future land development) and is considered sufficient for establishing persistence ratings locally in the Minorcan Quarter in this study.

An average value is then taken for parcels adjacent to Spanish Street for each of the block fractions in the study area (four blocks, in this case). The sum of the usage values is divided by the total number of parcels in the block, yielding the average usage value. The difference between the lowest and highest usage values are then examined for a range of use over time figure. The sum of these figures is again divided by the parcels in each block. The result is the Inscriptional Persistence Index Rating (Table 3).

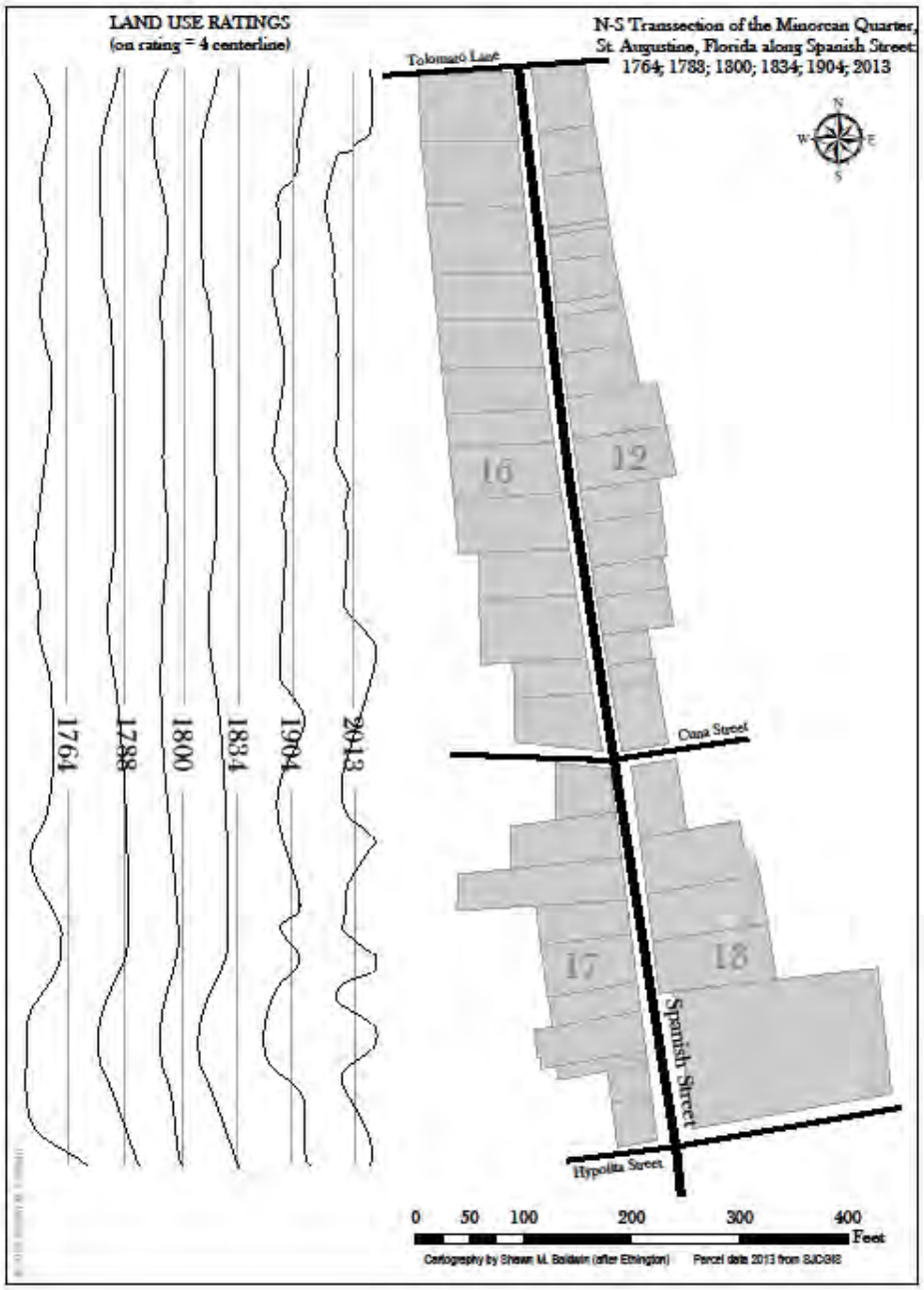


Figure 10: Transsection Diagram of the Minorcan Quarter. Lower land use ratings are left of the median line for each year and increase to the right for each year

In the Transsection Diagram (Figure 10), a basic pattern containing both temporal and spatial threads emerges. During the early years studied, overall land usage ratings stay relatively consistent (i.e., flat) with only minor fluctuations occurring in parcels closer to the center of town (south). With increased population, commensurate increase in parcel quantities, and simultaneous expansion of commercial activities in the early 20th century, the range of land use ratings becomes more volatile (jagged), particularly toward the southern end of the Spanish Street transsection.

What these temporal and spatial patterns show is an institutional shift along Spanish Street from what might be considered primarily residential that persisted well over 300 years (if 1764 land use characteristics could be retroactively applied to circa 1590) to significantly commercialized with the arrival of Henry Flagler in the 1880s (Martin, 2010, p. 104). The shift is accompanied by an increase of population in the Minorcan Quarter, reflecting the arrival of tourism-oriented businesses as well as support services for these businesses (e.g., banks, repair shops, additional city services, etc.). As well, the volatility of land use ratings ranges in the southern end of the Spanish Street transsection is maintained, though becoming more pronounced, reflecting the continued importance of the city center.

5.3.3 Tree-Ring Diagram

As another approach to the issue of time in GIS, the tree-ring diagram (Figure 11) summarizes the Structure and Land Use Rating for all of the parcels in each of the four blocks of the Minorcan Quarter. The diagram takes on a half-circle shape with time progressing clockwise and downward, as indicated by the “spokes” on the right. Accounting for the time variable, the most recent parcel data is used as the basis since the present day (2013) marks the end of the

250-year period that is the subject of study. In some areas, one parcel existed where today there are several. To account for the previous land use, the present day parcel boundaries are transposed onto the older map and land usage ratings assigned to that sub-parcel, depicting land use through time. Two such cases where parcel boundary transposition was implemented are Parcel 3 on the 1788 map and Parcel 4 on the 1800 map.

In this diagram, the rings represent the average land usage rating in the study area with radial lines representing each year of the study. Different colors are then employed to represent the average land use rating for each survey block in the Minorcan Quarter for each year in the study.

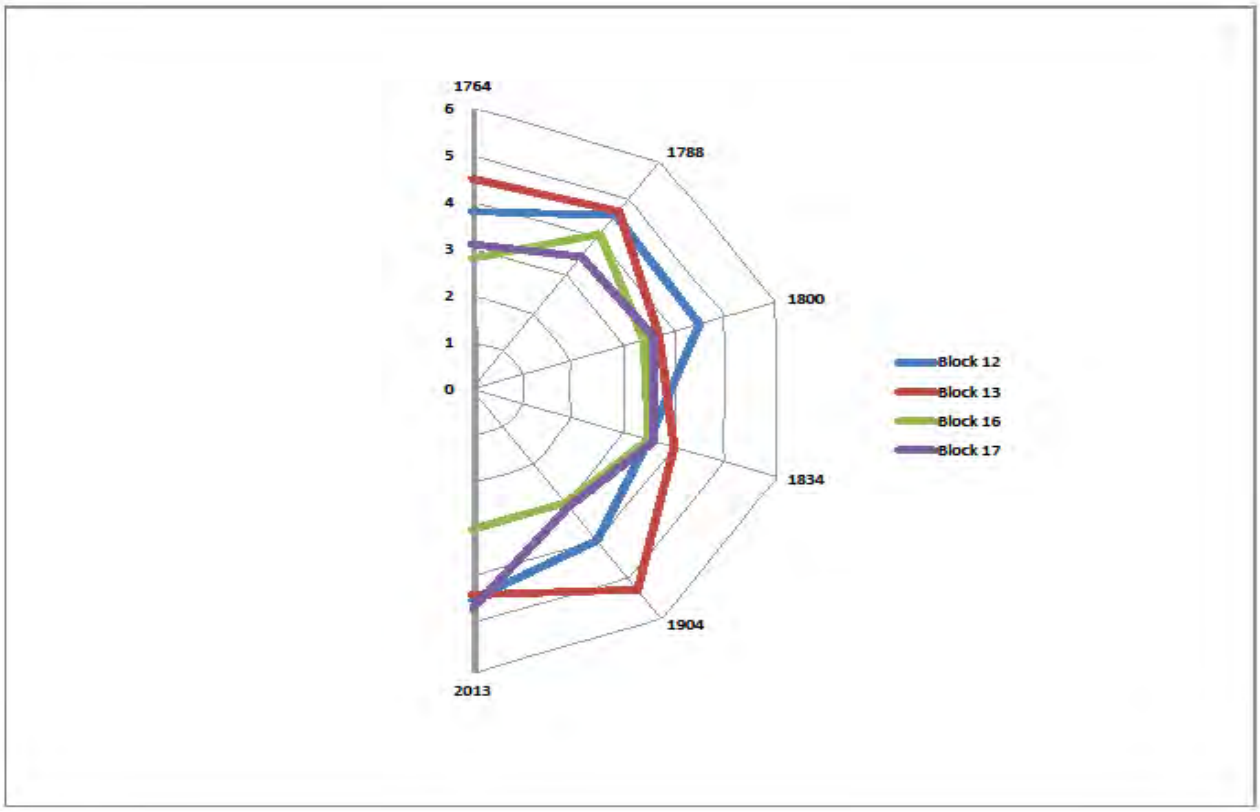


Figure 11: Tree-Ring Diagram of Land Use persistence in the Minorcan Quarter

In the tree-ring diagram (Figure 11), the pattern of overall land usage persistence within each block in the Minorcan Quarter over the past 250 years becomes more discernable. Early on, land parcels have been predominantly residential with only minimal commercial or multiple use parcels present. A more persistent land usage situation would be indicated by a relatively concentric shape of an average ratings line for each block. The significant deviation from this concentricity during the 1834-1904 period and lasting to 2013 indicates the influx of commercialism and tourism (along with population and parcel quantity increases) during the late 19th and early 20th centuries, particularly in Block 13.

The institutional shift from mostly residential land use to increased commercialization (with continued importance of the city center) observed in the transsection diagram (Figure 10) is evident in the tree-ring diagram as well. The volatility of this shift, however, is expressed in the concentricity of rings as opposed to the straightness of lines. The tree-ring diagram possesses the added feature of exhibiting (by way of concentricity) these persistence patterns among each survey block through time in one graphic. One notable observation made in this diagram of land usage persistence occurs in Block 13 during the 1904 - 2013 timeframe. The apparent decline in land use rating here occurs because some residential parcels were razed back to dead storage facilities – parking lots.

5.4 Sample Inscriptional Persistence (IP) Calculations

Based on the data of Table 5, calculations of IP were made for each successive pair of dates, and for the Drost period overall by averaging the IPs of the first three pairs. These results appear in Table 6.

Table 6: Inscriptional Persistence Ratings in the Minorcan Quarter

Block 12:	7 (persistence rating of Significant)
Block 13:	7 (persistence rating of Significant)
Block 16:	5 (persistence rating of Fair)
Block 17:	6 (persistence rating of Somewhat Significant)

To put this idea in the wider context of St. Augustine, IP is also calculated for areas elsewhere in central St. Augustine. Supporting data appear in Appendix C.

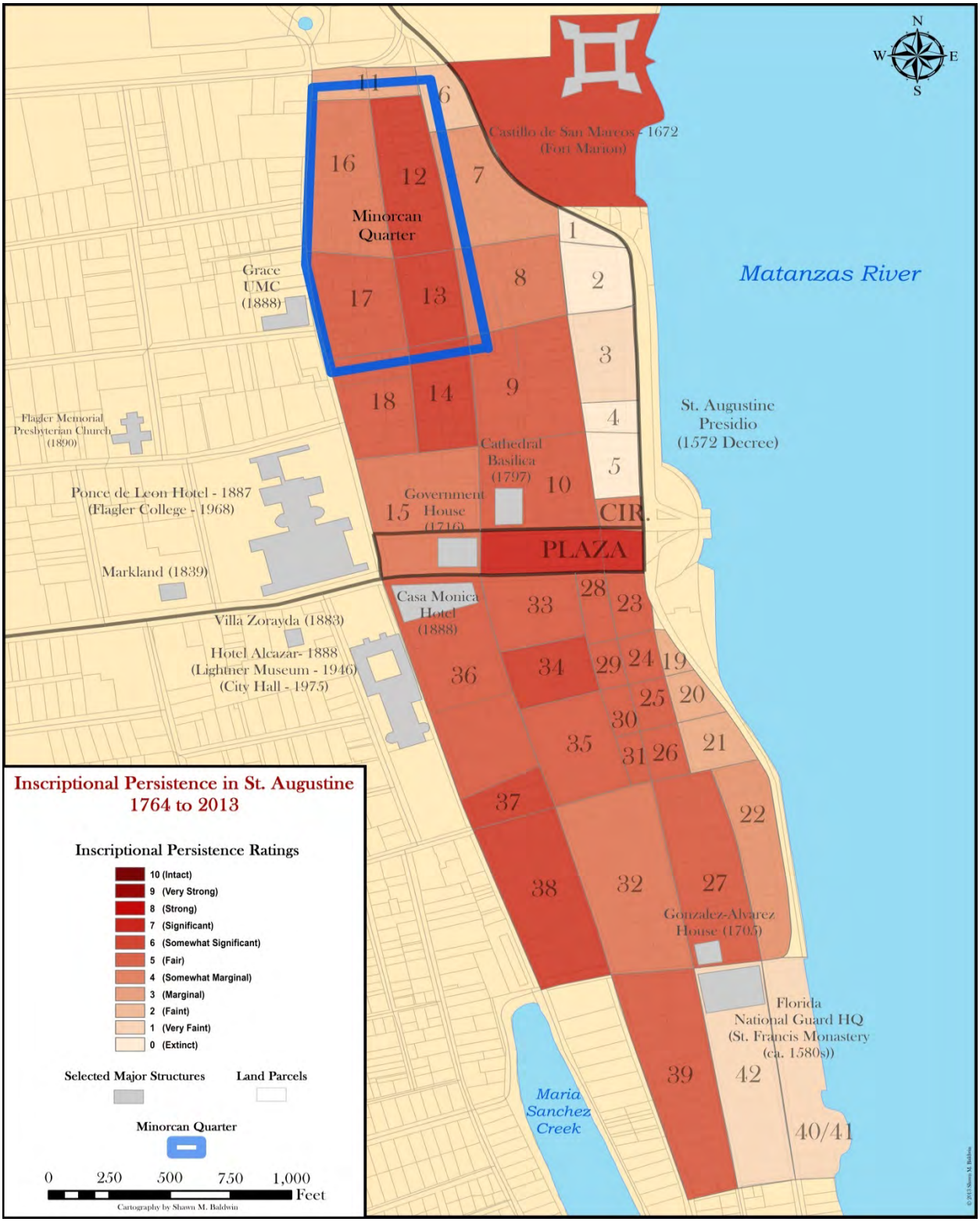
Table 7: Inscriptional Persistence Ratings in other selected areas of St. Augustine

The Abbott Tract:	5 (persistence rating of Fair)
North City Historic District:	3 (persistence rating of Marginal)
Model Land Company Tract:	6 (persistence rating of Somewhat Significant)
Lincolnville:	6 (persistence rating of Somewhat Significant)

Table 8 contains inscriptional persistence ratings determined for selected significant structures in St. Augustine. It should be stressed that the ratings of structures and the blocks they are in will not always coincide given the way in which IP ratings for blocks are determined in this study. Additionally, Map 11 communicates the results of IP calculations beyond the Minorcan Quarter within the St. Augustine presidio. The inset on this map further communicates the expansion of these IP calculations to selected adjacent areas of the presidio.

Table 8: Inscriptional Persistence Ratings for selected landmarks of St. Augustine; details in Appendix C. (Structure ratings and block ratings will not always coincide within a given block)

LANDMARK STRUCTURE	YEAR	INSCRIPTION INDEX RATING
Castillo de San Marcos	1672	8
Ponce de Leon Hotel (Flagler College)	1887 (1968)	6
San Marco Hotel	1885	0
Municipal Parking Garage	2005	10
Alcazar Hotel (Lightner Museum/St. Augustine City Hall)	1887 (1946/1975)	7
Casa Monica Hotel	1888	8
FEC Warehouse (San Sebastian Winery)	1923	3
FEC Headquarters (Flagler College Men's Dormitories)	1925	6
Gonzales-Alvarez (Oldest) House	1715	5
Government House	1716	5
Basilica of St. Augustine	1797	8
Franciscan Monastery (Florida Nat'l Guard HQ)	1580s	0
1st United Methodist Church	1887	8
Flagler Memorial Presbyterian Church	1890	9



Map 11: Inscriptional Persistence in St. Augustine presidio (1764 – 2013)

What is evident in Map 11 is something that might be considered unpredictable. Examination of the IP ratings for blocks within the presidio reveals an overall fair to somewhat significant IP rating except for the five blocks directly south of the Castillo de San Marcos (which contain low-rise hotels and shops) and the far southern extent, where the Florida National Guard Headquarters are located. The ratings are the result of 1) the influx and persistence of tourist-related commercial activity and 2) overall required maintenance activity that has occurred over the decades.

When studying areas beyond the presidio, however, new and later timeframes are encountered. In Lincolnville and the Model Land Company (established in the 1870s and 1880s, respectively, much younger than the presidio territory), the IP rating for the entire neighborhood possesses an average of significant (or 7). This is largely due to: 1) the persistence of the structures within to retain the overall look, feel, and shape of the original building (particularly relating to Flagler hotel and railroad buildings) mandated by city historic preservation codes; and 2) the location of tourism and commerce-related activities elsewhere in the city. With respect to the North City Historic District and the Abbott Tract to the north, it is this third item that causes the IP rating to fall into the marginal (or 3) to fair (or 5) category, respectively, since the area has seen considerable commercial activity since the middle of the 20th century onward.

Further subdivision into survey blocks of these and other neighborhoods elsewhere in St. Augustine may reveal different IP ratings locally, which may (or may not) confirm the average IP rating determined presently. Such study, however, is well beyond the Minorcan Quarter, the old St. Augustine presidio it is within, and this thesis.

CHAPTER 6: Discussion and Future Work

6.1 Discussion

Institutional Inscription was first defined in the context of 20th century Los Angeles County, using decadal census data between 1940 and 2010 across the county (Ethington, 2013). The situation with colonial St. Augustine of the 17th and early 18th centuries was considerably different in terms of data availability as well as spatial scale. There were four specific dates, 1764, 1788, 1800, and 1834, when enough data was available and recorded on the Drost maps for my research of institutional inscription in St. Augustine.

Even with the Drost maps, there were numerous cases where some additional interpretation on my part of the data to resolve odd occurrences (i.e., overlapping structure footprints, structures that appeared out of street address order, etc.). For example, with regard to the Perez-Sanchez House (101 Charlotte St.), the Historic American Buildings Survey (HABS) Statement of Significance summarizes in part:

> Although the correlation of the existing plan with the sketch plan on the Mariano de la Rocque Map of 1788 … is not exact, it is sufficiently close to warrant the assumption that the basic fabric is the same. That there was a house on the lot at the time of the Spanish evacuation in 1763 is reasonably certain, although nothing is known of its plan. The owner (1961) states that in the course of excavation for a well, several tabby [7] floors were encountered in the vicinity of the present structure. (Poppeliers et al, 1965, p. 2).

[7] Tabby (or '*Tapia'* as it was called by the Spanish of the time) is a type of masonry that consisted of sand, crushed or broken seashells, and then mixed with lime and water to produce a hard surface suitable for walls and floors (Adams, 2007, web).

Similarly, regarding land use, presumed usage types for structures or parcels where this information was inconclusive were based on prevailing usage patterns in the community during these times. Until the end of the Second Spanish Period, the Minorcan Quarter was predominantly a residential area with agriculture for primarily domestic use; this is the default land usage type used for inscriptional persistence analysis. As it turns out, the long-lot pattern that was established in the First Spanish Period has persisted over the centuries to the present-day. Examination of the maps contained herein reveals the continued use of the long-lot configuration, though generally at half the length since street-to-street lots are rare today (2013). These lots, particularly in the more central parts of town, are also much smaller due primarily to the larger population residing in the city (over 13,000 within the city limits) (U.S. Census Bureau 2012, http://quickfacts.census.gov/qfd/states/12/1262500.html).

The persistence of institutions introduced by each of the national and ethnic groups that have occupied St. Augustine is evident in 2013, after almost 500 years of existence. The layout of the streets (established under the auspices of the Spanish Laws of the Indies) in much of the area between the San Sebastian and Matanzas Rivers south of the Castillo still exist. The British style of architecture vis-à-vis the wooden second story over a coquina-stucco first floor (Harvey, 1997, p. 29) is still prevalent in the old presidio area of St. Augustine, particularly in the Minorcan Quarter. An example of this inscriptional persistence being carried forward exists at the Triay House (Figure 6), built during the later Second Spanish Period with the British-influenced second story.

6.2 Future Work

Along with the transsection diagram, I have also demonstrated a new graphical device, the tree-ring diagram, to elucidate institutional inscription and inscriptional persistence: although manually drawn here, both devices could be automated as GIS software extensions. In this way, GIS (through cartography) can be used to communicate institutional inscription and inscriptional persistence to a wider audience.

Given more time, a more detailed examination of the institutional cause(s) of the oscillation of parcel configuration (i.e., amalgamation and redistribution) in Blocks 12 and 16 between 1764 and 1800 would be an interesting direction of study. Extending this study with more temporal detail through the late nineteenth and twentieth century timeframe might further enrich understanding of the degree of IP in the Minorcan Quarter.

St. Augustine presents a unique case among colonies in America prior to 1650: only one other has survived, and no other has been continuously occupied. For example, when the Spanish first arrived in North America in 1513, establishing a permanent settlement was a low priority. The Pensacola settlement of 1559 was the first attempt and, like St. Augustine, was mandated to prevent French colonial intrusion. However, Pensacola was abandoned after only several months due to the seeming absence of the French and commensurate lack of support (Worth, 2009, web). Though the Pensacola settlement was reestablished in the 1750s and has remained a commercial and government center to the present day, the distinction of continuous occupation lies squarely with St. Augustine.

The first attempt by the British to colonize North America occurred in 1587 with the establishment of the Roanoke colony in what is now North Carolina. Lack of support both from London (due to conflict with Spain) and the colonial hinterland contributed to its quick failure (Smithsonian Environmental Research Center, 2009, web). The mystery in this case is that the colony not only failed, but the colonists were never seen again. Generally, in the event of a colony's failure, at least some of the colonists move to another location (as was the case of the Minorcans in 1777).

Applying the theory of institutional inscription and the concept of IP in the cases of Pensacola and Roanoke might shed more light on how the diminishing of IP contributes to settlement failures.

In 2015, St. Augustine will celebrate the 450th anniversary of its founding. For that event, an exciting future project will be the development of a digital interactive map containing the collection of maps from this portfolio, contributing to the event. Inspiration comes from a display at the St. Augustine Pirate and Treasure Museum (2012, www.thepiratemuseum.com) showing where piracy occurred in the Gulf of Mexico and Caribbean regions during the 16th to 19th century timeframe. Serving as the cartographic foundation will be the maps of St. Augustine and St. Johns County that are included in Appendix B.

CHAPTER 7: Conclusions

In this thesis, the institutional imprints of land ownership parcels at the block and sub-block level throughout successive periods of European and American settlement over a 250-year period were examined within the four-block Minorcan Quarter of St. Augustine. A rating system for the persistence of institutional inscription, Inscriptional Persistence (IP), was developed, introduced, and demonstrated. In addition, an adaptation of the ghost map (Ethington, forthcoming) and a new device, the tree-ring diagram, were presented as alternative ways to visualize inscriptional persistence within GIS occurred and were presented.

What is clear from this study is that time, difficult to visualize graphically, plays a significant role in institutional inscription and hence IP of a place. IP can be determined using data from continuous census periods, establishing consistent time frames within a longer period of interest. However, even with the lack of continuous data through time, institutional inscription can be applied and IP determined to a situation as found in St. Augustine. Through IP, other places (historic or contemporary), can be rated for the durability of institutions through time; this may help organizations or individuals prioritize further historic preservation effort. My IP rating system may also be modified and expanded to include other criteria such as the physical condition (interior or exterior) of a structure or the durability of a jurisdictional boundary. Additionally, this study suggests that the theory of institutional inscription has merit in both a general and qualified sense (as originally applied to the Los Angeles Basin) and a more localized and quantified sense (as is the case in the Minorcan Quarter of St. Augustine). I hope that spatio-temporal techniques such as ghost maps, transsection diagrams, and tree-ring diagrams will find increasing application in other places, large and small, old and not so old.

References

ACCORD Inc. (2013). "ACCORD Freedom Trail" Accessed 29 August 2013. http://www.accordfreedomtrail.org/

Adams D (2007). "Tabby: The Oyster Shell Concrete of the Lowcountry". Accessed 15 August 2013. http://www.beaufortcountylibrary.org/htdocs-sirsi/tabby.htm

Arana L R (1986). "Fort Marion in Civil War Times" In *Civil War Times in St. Augustine* (ed. J. K. Fretwell), pp. 47-63. St. Augustine Historical Society, St. Augustine, Florida.

Balchin W G V (1976) "Graphicacy", *The American Cartographer*, 3 (1) (1976):33-38.

Brewer C A (2005). *Designing Better Maps – A Guide for GIS Users*. Esri Press, Redlands, California.

Buker G E (1983). "The Americanization of St. Augustine – 1821-1865" *The Oldest City:St. Augustine – Saga of Survival* (ed. J. P. Waterbury), pp. 151-179. St. Augustine Historical Society, St. Augustine, Florida.

Bushnell A (1983). "The Noble and Loyal City – 1565-1668" *The Oldest City: St. Augustine – Saga of Survival* (ed. J. P. Waterbury), pp. 27-56. St. Augustine Historical Society, St. Augustine, Florida.

Clarke K C (1988) "On Teaching GIS", *Proceedings – AAG Middle States Division*, 21(2)(1988):13-18. Accessed 1 June 2013. http://geographyplanning.buffalostate.edu/MSG%201989/2_Clarke.pdf

Clarke K C and Cloud J (2000) "On the Origins of Analytical Cartography", *Cartography and Geographic Information Science*, 27 (3) (2000):195-204.

Cowen D J and Jones L V, eds. (2006). *"Learning to Think Spatially: GIS as a Support System in the K-12 Curriculum"*. The National Academies Press, Washington, D.C.

Davies J (2007). *"Uncle Joe knew where you lived – The story of Soviet mapping in Britain (Part I)"*. Accessed March 30, 2008. http://www.sovietmaps.com/history

Dow R N (1983). "Yesterday and the Day Before – 1913 to the present" *The Oldest City: St. Augustine – Saga of Survival* (ed. J. P. Waterbury), pp. 211-240. St. Augustine Historical Society, St. Augustine, Florida.

Drost R A (1954). *"St. Augustine Drost Tracings"*. St. Augustine Historical Society Research Library Map Collection, Drawer 2: Folders 1-6. St. Augustine, Florida.

Ethington P J (n.d.). *"Ghost Metropolis: Los Angeles Since 13,000 BP"*. Unpublished Online Manuscript. Under consideration by University of California Press. Accessed January 2013.

Graham T (1983). "The Flagler Era – 1865-1913" *The Oldest City: St. Augustine – Saga of Survival* (ed. J. P. Waterbury), pp. 181-210. St. Augustine Historical Society, St. Augustine, Florida.

Gregory I N and Ell P S (2007). *Historical GIS: Technologies, Methodologies, and Scholarship.* Cambridge University Press, New York City, New York.

Griffin J W (1983). "The Men Who Met Menendez – 8000 B.C -1565 A.D." *The Oldest City: St. Augustine – Saga of Survival* (ed. J. P. Waterbury), pp. 125-150. St. Augustine Historical Society, St. Augustine, Florida.

Griffin P C (1991). *Mullet on the Beach: The Minorcans of Florida, 1768-1788.* University of North Florida Press, Jacksonville, Florida.

Griffin P C (1983). "The Spanish Return: The People-Mix Period – 1784-1821" *The Oldest City: St. Augustine – Saga of Survival* (ed. J. P. Waterbury), pp. 125-150. St. Augustine Historical Society, St. Augustine, Florida.

Harvey K (1997). *America's First City – St. Augustine's Historic Neighborhoods,* 2nd ed. Tailored Tours Publications, Inc., Lake Buena Vista, Florida.

Hoarau C (2010) "Compromising Contextual Constraints and Cartographic Rules: Application to Sustainable Maps", *ASPRS/CaGIS 2010 Fall Specialty Conference*, (2010): 1-7. Accessed 3 June 2013. http://www.isprs.org/proceedings/XXXVIII/part4/files/Hoarau.pdf

Landers J (1992). *Fort Mose – Gracia Real de Santa Teresa de Mose: A Free Black Town in Spanish Colonial Florida.* St. Augustine Historical Society, St. Augustine, Florida.

Martin S W (1977). *Florida's Flagler*. University of Georgia Press, Athens, Georgia.

Montello D R and Sutton P C (2006). *An Introduction to Scientific Research Methods in Geography*. Sage Publications, Inc., Thousand Oaks, California

Poppeliers J C ed. Et al (1965). "Photographs, Written Historical and Descriptive Data, Reduced Copies of Measured Drawings – Perez-Sanchez House" *Historic American Buildings Survey*, HABS # FLA-128. U. S. National Park Service – Eastern Office, Philadelphia, Pennsylvania. Accessed April 21, 2013. http://lcweb2.loc.gov/pnp/habshaer/fl/fl0200/fl0225/data/fl0225data.pdf

Ranson R (1904). *Official Map of St. Augustine; Jan. 1, 1904.* University of Florida Digital Collections. George A. Smathers Libraries. Accessed 16 August 2013. http://ufdcweb1.uflib.ufl.edu/sanborn/results/?t=augustine

Reynolds C B (1892). *"The Standard Guide – St. Augustine"*. (2004 printing) Historic Print & Map Company, St. Augustine, Florida.

Schafer D L (1983). "…not so gay a Town in America as this…--1763- 1784" *The Oldest City: St. Augustine – Saga of Survival* (ed. J. P. Waterbury), pp. 91-123. St. Augustine Historical Society, St. Augustine, Florida.

Smithsonian Environmental Research Center (2009). *"The lost colony of Roanoke Island"*. Accessed 27 November 2012. http://www.serc.si.edu/education/resources/watershed/stories/roanoke.aspx

Waterbury J P (1983). "The Castillo Years – 1668-1763" *The Oldest City: St. Augustine – Saga of Survival* (ed. J. P. Waterbury), pp. 57-89. St. Augustine Historical Society, St. Augustine, Florida.

Worth J (2009). *Pensacola's 450th Anniversary Celebration.* University of West Florida. Accessed 1 December 2012. http://www.uwf.edu/jworth/spanfla_450th.htm

Wright, Jr. J L (1975). *British St. Augustine*. Historic St. Augustine Press Board, St. Augustine, Florida.

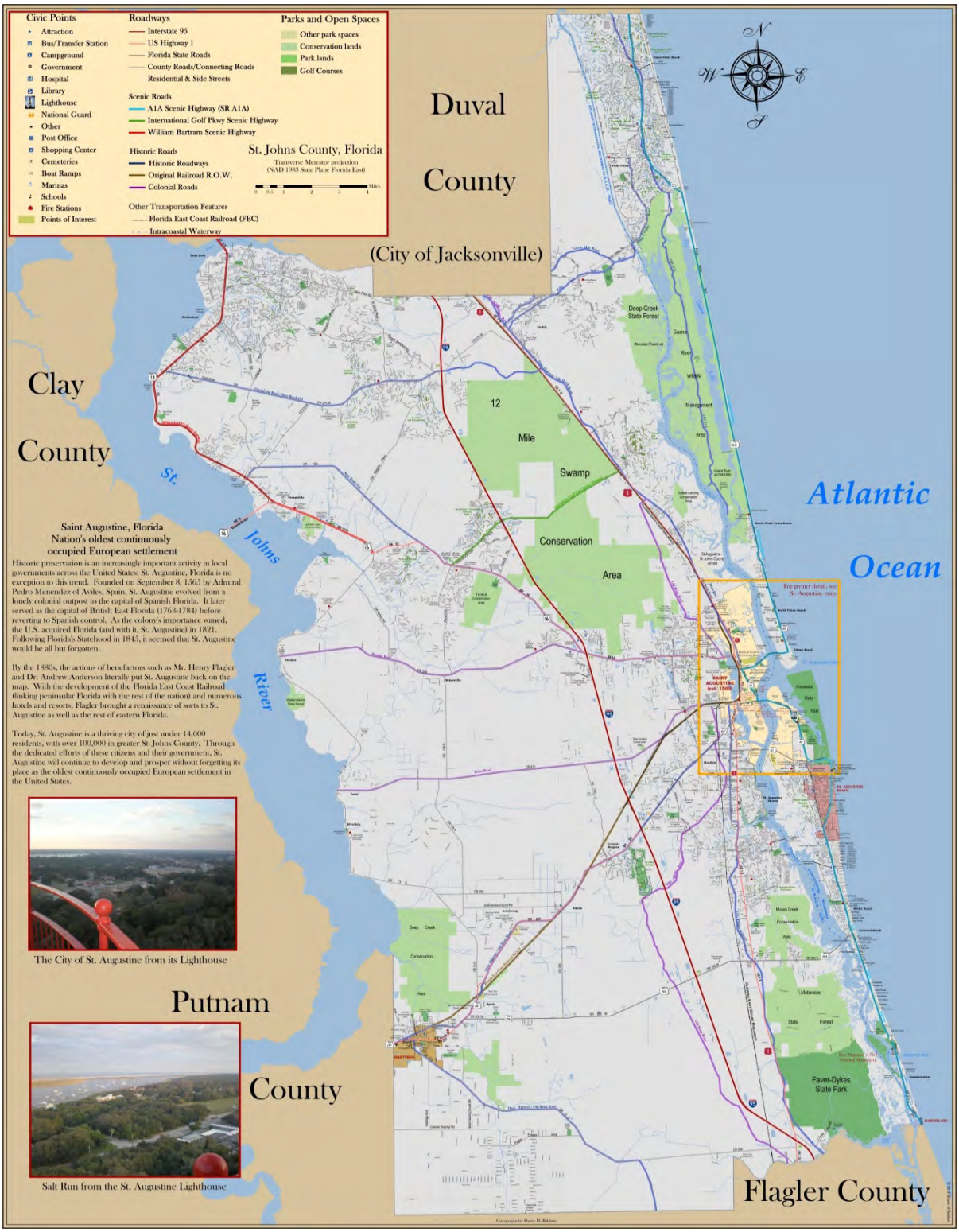
Appendix A: The Cartonomicon

The term *Cartonomicon* is sometimes used as an alternative to *Gazetteer*, a glossary of place names which include attributes such as latitude and longitude coordinates, dates of establishment, and alternative names and spellings. In a Cartonomicon, this last attribute includes native scripts and cultural meanings of the place name, among other things (Cohen, web, www.coherenceengine.com/blog/2003/09/names-territories-maps-things-when-i.html).

The cartonomicon in this thesis focuses on the cultural evolution in the Minorcan Quarter of St. Augustine, Florida and the institutional inscriptions (property boundaries, land uses, structures, etc.) manifest there. Maps 1 – 11 in the main text, together with Maps 12 – 17 in this appendix, constitute the cartonomicon. The full list of map titles appears below.

Map 1 – Central St. Augustine – 2013
Map 2 – Model Land Company Tract Historic District – 2013
Map 3 – Index of Survey Blocks in St. Augustine presidio
Map 4 – The Minorcan Quarter – 1764
Map 5 – The Minorcan Quarter – 1788
Map 6 – The Minorcan Quarter – 1800
Map 7 – The Minorcan Quarter – 1834
Map 8 – The Minorcan Quarter – 1904
Map 9 – The Minorcan Quarter – 2013
Map 10 – Inscriptional Persistence in the Minorcan Quarter cast in a ghost map
Map 11 – Inscriptional Persistence in St. Augustine presidio (1764 – 2013)
Map 12 – The City of St. Augustine (2013)
Map 13 – St. Johns County, Florida (2013)
Map 14 – Lincolnville Historic District (North)
Map 15 – Lincolnville Historic District (Central)
Map 16 – Lincolnville Historic District (South)
Map 17 – Abbott Tract Historic District

Map 12: The City of St. Augustine (2013)



Map 13: St. Johns County, Florida (2013)

Map 14: Lincolnville Historic District (North)

Map 15: Lincolnville Historic District (Central). (Note alternative street label placement)

Map 16: Lincolnville Historic District (South)

Map 17: Abbott Tract Historic District. Note parcel arrangement following long-lot orientation

Appendix B – Construction of the Cartonomicon

The majority of the map data used in the cartonomicon consists of two main categories of thematic material: contemporary (or civic) and historic. All the map data, together with derived annotation layers, containing map feature labels, have been assembled into an Esri file geodatabase (Arctur & Zeiler, 2004, p. 320).

The contemporary datasets include streets and roads, hydrology, parks and other land uses, buildings (e.g., schools, civic buildings, hospitals, etc.) and postal address data. Dedicated historic datasets include old rights-of-way, historic district polygons, and historic sites (usually those that are on private property or are overgrown in the older-growth woods of the hinterland). Historic attributes are included in some of the contemporary datasets as many buildings in St. Augustine, still extant, were built literally hundreds of years ago for quite different purposes. An example is the Hotel Alcazar, built by Henry Flagler in 1888, which now houses the Lightner Museum and the St. Augustine City Hall. Many attributes come from the National Register of Historic Places, also included in these datasets from the St. Johns County GIS Department (2012, www.co.st-johns.fl.us/GIS).

Two semiological considerations were of particular importance in the St. Augustine cartonomicon: ease of feature recognition and communication of the uniqueness of St. Augustine's history. Map symbols, points, lines, and areas, are the means by which a feature's function and identity (other than its name) is conveyed (Slocum et al 2009, p. 223). In this cartonomicon, pictograms (generally representing contemporary features) with color-coding (for

historical context) are used. For line and area features, color conveys relative importance or function with rare uses of patterned casings or outlines.

Colors for historic features as well as the background color for areas within the St. Augustine city limits and labels of significant historic features were selected based on the Approved Paint Colors List for the city (St. Augustine Planning and Building Dept., 2012, http://www.staugustinegovernment.com/the-city/documents/_PlanBldg/documents/PreapprovedColors.pdf) and matched as closely as possible using the color palette options supplied in the Esri software suite. For non-built-up environments, mimetic colors (e.g., blue indicating bodies of water or green indicating areas primarily composed of vegetation, such as parks) make those features recognizable as such more quickly than if a different color were used.

Labels (and their placement) on maps are vitally important to the intrinsic value of a map for the reader, so care should be taken when selecting the typeface to be used (Dent, 1990, p. 352). Two main typefaces were used in the cartonomicon: Arial Narrow for contemporary-themed features and Baskerville Old Face for historic and related features. A third typeface, Book Antiqua (italicized), was used for the labeling of hydrological features. Besides the typeface, orientation angles and colors of the labels also convey certain meanings to the reader (Dent, 1990, p. 367). Proofreading the map is a crucial added step to eliminate overprinted labels. In addition to making the feature names illegible, overprinted labels detract from the overall aesthetics (and credibility) of the map itself.

The Esri Maplex engine, which attempts to automate label placement, was used to display the labels on these maps. For complex maps such as those found throughout this thesis, Maplex is a valuable asset in the cartographer's toolbox due to the wide variety of label display

(or non-display) and placement parameter settings the cartographer can set ahead of time (Booth, Hasselbeck, and Hutchings, 2004, p. 61), providing greater flexibility and options than the standard label engine. In addition to the label display and placement options, conversion of placed labels to annotation classes is a significant option. Labels that have been converted in this way enable the cartographer to further manipulate labels to overcome limitations, such as lack of space or volume of labels (*ibid*, p. 36). A supplementary tactic employed during the development of this cartonomicon was to place the most numerous labels first (street and road labels) with other labels placed subsequently. Although many other label types were classified as "unplaced" by the Maplex engine, the overall result of this tactic was only local street label placement revision.

Maplex proved essential for displaying labels relative to the corresponding feature; however, considerable time was spent placing the labels in their present positions; this was particularly the case during the construction of the St. Johns County map (Map 13). While Maplex and other label display tools are capable of displaying labels, responsibility ultimately falls to the cartographer to reposition (and sometimes add "unplaced") labels for best effect. Figures B-1 and B-2 demonstrate the label quality achievable by Maplex automatically and by me, respectively. Clearly, manual placement of map labels is still important in many cases.

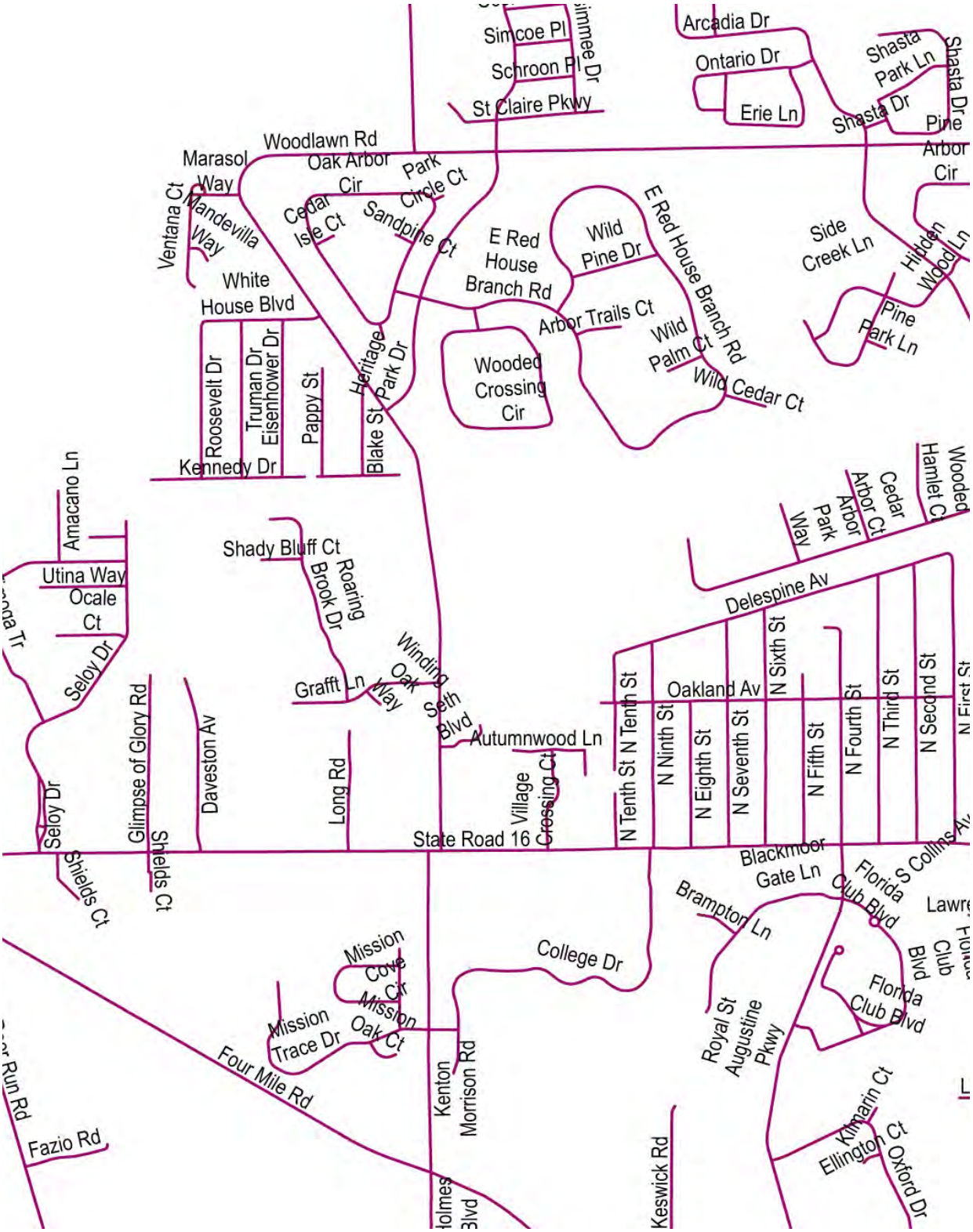


Figure B-1: Label display after processing with Maplex

Figure B-2: Label placement of Maplex-processed annotation by cartographer

Many of the maps contained in this thesis required a few hours each to complete. Some, such as the St. Augustine and St. Johns County maps, took significantly more time due to the volume of features included and the respective spatial extents involved. All were started from scratch and have the following cartographic process:

- Layout and design of the map
- Geographic data research and acquisition
- Review of data for suitability in the project
- Development of supplemental data as needed: this activity involved field data collection of specific features such as relevant historic details not included in GIS data supplied by St. Johns County GIS. Also included in this step was the Drost collection digitizing and georeferencing activities.
- Geodatabase design and creation
- Implementation of cartographic design:
    - Symbols for point, linear, and area features
    - Typefaces and fonts for feature labels (including formulating Maplex label display settings)
    - Colors of features
- Placement of feature labels (the most time-consuming task of this project)
- Export of the map document from Esri MXD format to Adobe PDF for proofing
- Quality assurance of the map to review for symbology and label spelling correctness as well as aesthetic elements. Overlapping labels, same-color

conflicts (e.g., black linework versus black labels), and label proximity relative to the feature are the chief items of interest during this review.

- Final export of the map to JPEG format for inclusion in the thesis document

Within the framework of this process, the Minorcan Quarter maps based on the Drost collection took approximately 4 hours each to compile with a couple of hours' digitizing work on the four original 1953 maps. The time needed for each of the neighborhood maps for places like Lincolnville and the Model Land Company Tract was on the order of 8-12 hours' work.

Two of the maps required substantially more time. The St. Augustine map (Map 12) took just over 50 hours to complete; the St. Johns County map (Map 13) was completed in 108 hours. The majority of the time in these cases was spent in the label placement and quality assurance stages outlined above.

References

Arctur D and Zeiler M (2004). *Designing Geodatabases: Case Studies in GIS Data Modeling.* Esri Press, Redlands, California.

Booth B, Hasselbeck T, and Hutchings J (2004). *"ArcGIS 9 – Using Maplex for ArcGIS"*.Esri, Redlands, California.

Dent B D (1990). *Cartography: Thematic Map Design,* 2nd ed. Wm. C. Brown Publishers, Dubuque, Iowa.

Slocum T A, Howard H H, Kessler F C, and McMaster R B (2009). *"Thematic Cartography and Geovisualization"* 3rd ed. Pearson-Prentice Hall, Upper Saddle River, New Jersey.

Appendix C: Selected Landmarks in St. Augustine

LANDMARK	YEAR	INSCRIPTION INDEX RATING	NOTES
Castillo de San Marcos	1672	8	No longer used for the defense of the city, it is a museum kept looking much as it did in early years (minus the paint)
Ponce de Leon Hotel	1887	5	Appearance is virtually original, but no longer serves as a hotel; currently houses Flagler College
Flagler College	1968	9	Flagler College has seen expansion to other areas of town, adjacent and further
San Marco Hotel	1885	0	Destroyed by fire in 1897
Municipal Parking Garage	2005	10	Built on former site of the San Marco Hotel
Bridge of Lions	1913	8	Refurbished in 2010
Alcazar Hotel	1888	7	Exterior virtually unchanged, building now houses the Lightner Museum and St. Augustine City Hall (no hotel)
Lightner Museum	1946	9	Applies to museum section of building
St. Augustine City Hall	1975	9	Applies to city hall section of building
Casa Monica Hotel	1888	8	Continues to serve as a hotel with shops and dining in ground floor
FEC Warehouse	1923	3	Currently houses the San Sebastian Winery (part of which is a warehouse)
FEC Headquarters	1925	2	Currently serves as dormitories for Flagler College
Gonzales-Alvarez (Oldest) House	1715	5	Currently a museum and small event venue (no longer a residence)
Huguenot Cemetery	1821	9	Victims of the Yellow Fever epidemic of 1821 are buried here
Government House	1716	5	Museum and academic extension center

LANDMARK	YEAR	INSCRIPTION INDEX RATING	NOTES
Guardhouse/Public Market	1824	7	Originally a guardhouse, market use started 1824 – continues into 2013
St. Fotios Shrine	1743	8	Greek Orthodox shrine on St. George St. (boundary of Minorcan Quarter)
Basilica of St. Augustine	1797	8	Surrounding area still used mostly for commerce, common around central plazas in the Spanish Main from 1500s
Franciscan Monastery	1580s	0	Site now occupied by FL ANG HQ
1st United Methodist Church	1887	8	Originally located where Alcazar Hotel was built; moved by Flagler to current site in 1887
Ancient City Baptist Church	1895	8	Built on land donated by Flagler (ACBC 2013, web)
Flagler Memorial Presbyterian Church	1890	9	Flagler Tomb is located here
Kirkside	1892	0	The St. Augustine residence of Henry Flagler and family
Rosario Line	1718	0	The western defensive wall of the St. Augustine presidio; only a plaque in sidewalk is reminder of the structure
Cubo Line	1702	5	The northern defensive wall of the St. Augustine presidio; reconstruction exists from 1960s