ABSTRACT

The historic preservation field has the challenge of maintaining and perpetuating the architectural and cultural history of the United States. There is an extensive number of historic resources throughout the country, which each have numerous related documents that provide the context and background on the property. In order to catalog and analyze the information in an effective manner, historic preservationists must utilize the new technologies available, including Geographic Information Systems, or GIS. Through the review of examples from various business fields and industries, as well as innovative historic preservation programs, the application of a GIS to the historic preservation field is evident. As the local level of historic preservation is the cornerstone for the field, a set of guidelines has been created to assist local historic preservation non-profit organizations and preservation planning departments to begin implementing a GIS.

INDEX WORDS: Historic Preservation, Geographic Information Systems, GIS, local government, non-profit organizations, architectural surveys
A STUDY OF THE APPLICATION OF GEOGRAPHIC INFORMATION SYSTEMS (GIS) AS AN ADVOCACY AND PLANNING TOOL FOR LOCAL HISTORIC PRESERVATION ORGANIZATIONS AND PRESERVATION PLANNING DEPARTMENTS

by

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MASTERS OF HISTORIC PRESERVATION

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A STUDY OF THE APPLICATION OF GEOGRAPHIC INFORMATION SYSTEMS (GIS) AS AN ADVOCACY AND PLANNING TOOL FOR LOCAL HISTORIC PRESERVATION ORGANIZATIONS AND PRESERVATION PLANNING DEPARTMENTS

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FOREWORD
The beginning is the half of every action. – Greek Proverb

Historic preservation is a field that seeks to understand and maintain the built environment. Built environments express the culture and ideals of the time in which they are conceived. Therefore, the study of the built environment is essential for the preservationist to accurately sustain the historic resources and provide a context to understand these resources. Although the earliest preservation actions were instigated by local historic groups seeking to save a particular building, such as the Mount Vernon Ladies’ Association, it soon became apparent that a larger scale approach was required to truly understand and perpetuate the architectural and cultural history of the United States as a whole.

Early Federal Historic Preservation Laws

The earliest federal legislative action in support of historic preservation was the Antiquities Act of 1906. The Antiquities Act basically protected “any prehistoric ruin or monument, or any object of antiquity, situated on lands owned or controlled by the Government of the United States” from any person that might damage, destroy or remove these objects.1 In addition to this protection, the Act also gave the President of the United States the right to declare national monuments and to reserve Federal lands for the protection and maintenance of historic areas. By establishing the need for the protection and maintenance of these historic areas, it became obvious that an agency should be designated to oversee these Federal lands.

On August 25, 1916, the National Park Service Organic Act created the National Park Service, a division within the Department of the Interior, for the management of federal lands, as well as natural and cultural resource conservation. At this time, the purpose of the National Park Service (NPS) was primarily to “promote and regulate the use of Federal areas known as national parks, monuments, and reservations.” The National Park Service was also to “conserve the scenery and the natural and historic objects and the wild life therein” for future generations to be able to experience these historic resources in the same condition as when they were initially designated. However, the National Park Service was focused on documenting and conserving historic resources only located on Federal lands.

In 1933, the need to document and survey historic resources nationwide was recognized by the National Park Service (NPS) through the creation of the Historic American Buildings Survey (HABS). The HABS program was conceived by Charles E. Peterson, a NPS landscape architect, to provide jobs for architects, draftsmen and photographers during the Great Depression. The HABS mission statement established the following regarding the work that was to be undertaken:

…the survey shall cover structures of all types from the smallest utilitarian structures to the largest and most monumental. Buildings of every description are to be included so that a complete picture of the culture of the times as reflected in the buildings of the period may be put on record.

Although this was one of the earliest Federal actions regarding the importance of historic resources throughout the United States, there was still not a stated legislative policy regarding the Federal government’s commitment to the ideals of historic preservation at this time.

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2 Ibid., 7.
3 Ibid.
The Historic Sites, Buildings, and Antiquities Act of 1935 formalized a national policy regarding historic preservation. Section I of the Act states:

It is hereby declared that it is a national policy to preserve for public use historic sites, buildings, and objects of national significance for the inspiration and benefit of the people of the United States.5

This Act gave the Secretary of the Interior, through the National Park Service, the following powers and duties:

(a) Secure, collate, and preserve drawings, plans, photographs, and other data of historic and archaeologic sites, buildings, and objects.

(b) Make a survey of historic and archaeologic sites, buildings, and objects for the purpose of determining which possess exceptional value as commemorating or illustrating the history of the United States.

(c) Make necessary investigations and research in the United States relating to particular site, buildings, or objects to obtain true and accurate historical and archaeological facts and information concerning the same.6

This language provided the foundation for the Historic American Building Survey and in later amendments, the Historic American Engineering Record (HAER) and the Historic American Landscapes Survey. Through this type of comprehensive survey, historians and preservationists now have access to the archived records of American architecture and engineering, compiled over the last seventy years. With the adoption of this Act, the federal government defined the importance of documenting the historic resources throughout the United States but still did not offer protection from demolition or adverse alterations, which could affect the historic significance of the properties.

5Federal Historic Preservation Laws, 12.
The National Historic Preservation Act of 1966

Although the Federal Property and Administrative Services Act of 1949 and the Archaeological and Historic Preservation Act of 1960 further expanded the Federal government’s participation in historic preservation, the National Historic Preservation Act of 1966 (NHPA) truly defined the national preservation policy. As stated in the preamble, “the historical and cultural foundations of the Nation should be preserved as a living part of our community life and development in order to give a sense of orientation to the American people.”

To this end, the NHPA formally created partnerships to assist in the documentation and preservation of architectural and cultural resources. These preservation partners now include Federal agencies, Tribal Preservation Offices, State Historic Preservation Offices, Certified Local Governments and private organizations, including the National Trust for Historic Preservation.

The NHPA extended federal recognition beyond nationally significant properties to those that were important on the state and local level by developing preservation partnerships. There was now a national framework for the federal government to assess the historic significance of resources by utilizing these partnerships. The Act also requires these partners to comment on properties that are being proposed for the National Register of Historic Places, which was also created as part of the NHPA.

The Act authorizes the Department of the Interior to establish, maintain and expand a National Register of Historic Places. Properties listed on the National Register have been nominated and accepted as having historic, architectural, archeological, engineering or cultural significance, at the national, state or local level. In order to place properties on the National Register, either individually or as a district, historic resources must be researched and studied in relation to their level of significance and integrity. The State Historic Preservation Officers

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7 Federal Historic Preservation Laws, 34.
8 Ibid., 34-49.
(SHPO) and Federal Preservation Officers (FPO) nominate properties for inclusion on the National Register. However, private individuals and organizations, local governments and American Indians tribes often initiate the process and prepare the necessary documentation for the National Register listing. Additionally, these organizations frequently take the responsibility for creating or funding architectural surveys since many historic resources are particularly relevant for understanding and defining the community, as well as providing the context for the creation of local historic districts.

As the historic preservation movement grew, local municipalities became more involved with the process of recording and regulating historic resources. The 1980 amendments to the National Historic Preservation Act provided for the creation of Certified Local Governments (CLG). The State Historic Preservation Officer and the National Park Service must certify qualifying municipalities that administer historic preservation programs, which meet prescribed standards. This certification allows the local government to apply for special grants-in-aid and technical assistance from the State Historic Preservation Office to assist them in carrying out preservation activities at the local level. Additionally, the National Historic Preservation Act of 1966 “establishes the legal and administrative context within which local historic preservation commissions relate to, and participate in, the national historic preservation program.”

As a Certified Local Government, the municipality must “maintain a system for the survey and inventory of historic properties.” Since the earliest conception of the Federal policies on historic preservation, the need to document historic resources has been emphasized. Each subsequent addition to the Federal legislation regarding historic preservation has only further stated that buildings, structures, objects and sites of cultural and architectural significance must

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11 Federal Historic Preservation Laws, 44.
be recorded, and the data organized and managed to provide access for the education and edification of the American public.

This is one of the greatest challenges for historic preservationists - cataloguing the historic resources into a functional database. Preservationists draw from multiple pieces of data in order to provide the context for historic resources, including historic maps, photographs, deed records, and previous survey forms. Information can be provided both through hard copy or digital means. Many local and statewide surveys were conducted in the late 1960s, after the adoption of the NHPA, and must be continually updated as conditions change and new properties become historic and/or eligible for the National Register of Historic Places. However, most of these surveys were paper-based, and with the advent of the computer age, historic preservationists are seeking ways to digitize the information into a more useable form for analyzing and researching the data.

**Geographic Information Systems and Historic Preservation**

The development of Geographic Information Systems (GIS) in the mid-1960s has revolutionized the way geographical data is handled. In the simplest terms, a GIS is composed of a database, geographic reference (such as a map or aerial photograph) and an analysis software component. As noted in *Past Time, Past Place: GIS for History*, a “GIS is particularly useful when the position of historic artifacts, buildings, roads, or other features intrinsic to understanding their historical significance.”\(^{12}\) As architectural and cultural survey data needs to be geographically displayed to fully comprehend, and analyze, the historic context of the resources, GIS and historic preservation are a natural pairing.

The use of GIS in the historic preservation field has increased over the last five to ten years as the technology becomes more readily available to governmental entities and non-profit

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organizations. The National Park Service began utilizing GIS in the mid-1990s to locate and map historical features within battlefield parks. The Cultural Resources GIS Facility, a technical assistance office within the Park Service, uses Global Positioning System technology and GIS to map the parks’ historic resources.\textsuperscript{13}

In addition to the work being conducted in national battlefield parks, the National Park Service is also developing the Mapping and Preservation Inventory Tool, or MAPIT. MAPIT is “a National Park Service adaptation of the popular Geographic Information Systems (GIS) software package ArcView.”\textsuperscript{14} The program has been designed to organize historic resource inventories, with the ultimate goal of creating a “one stop shopping tool to view information on individual historic properties such as site plans, Historic American Buildings Survey/Historic American Engineering Record (HABS/HAER) drawings, photographs, narrative text, or any other type of digital information.”\textsuperscript{15} Although MAPIT has the potential to become a valuable asset to the preservation community as a whole, the program is still under development at this time. Figure 1 (below) shows a sample screen of the MAPIT application software.

\textsuperscript{13} Ibid., 52.
\textsuperscript{15} Ibid.
Figure 1: Screen of MAPIT Software application. (National Park Service website)

Multiple examples exist to display how GIS technology has been integrated into the historic preservation field by state and local governments, as well as private organizations. Through the review of these programs, one can identify key issues and challenges, specific to the historic preservation field that will affect the development of a successful GIS. Once these issues have been identified, guidelines can be created that are necessary for the implementation of a local GIS program that is both attainable and effective. As most grass-roots preservation work is based on the local level, these guidelines will be directed towards local groups, but the concepts will be universal for any historic preservation program.

It has been noted that historic preservation is no longer just the simple preservation of a building; it now includes “tourism, economic development, open space protection, heritage education, rehabilitation of historic buildings, community conservation, affordable housing, neo-traditional planning, sustainable development, downtown revitalization, cultural celebration,
archaeology, design and craftsmanship."16 Although it appears that historic preservationists have a daunting task of incorporating each of these aspects into cultural and architectural resource management, the use of GIS can provide valuable assistance for organizing such complex data. But the work must begin at the ground level of resource management, in the local historic preservation program.

Chapter 1

The Role and Structure of the Local Historic Preservation Program

All historic preservation is local. – Tip O’Neill paraphrase

On the local level, there are two basic historic preservation programs, governmental and non-profit. A local government historic preservation program may include regional, county or municipal forms of government, while non-profit corporations include county, community or neighborhood organizations. Thomas B. “Tip” O’Neill, former United States Speaker of the House, is often quoted as saying “All politics are local” and it has been an easy transition for historic preservationists to paraphrase that quote as “All historic preservation is local.” Since local historic preservation is frequently tied to the political climate of the community, and most, if not all, regulatory actions for preservation are based in the local level of government, that paraphrase becomes particularly apropos. As noted above, the National Historic Preservation Act established the Certified Local Government Program in 1980. Certified Local Governments, or CLGs, now create the backbone for the national historic preservation program by providing the context and the framework for historic resources nationwide.

Local Governments and Historic Preservation

The 1980 amendments to the National Historic Preservation Act also established the criteria for governments to qualify for CLG status. There are only minimal regulatory and administrative requirements for local governments so that there is flexibility in the local preservation process. As de Teel Patterson Tiller, deputy associate director of Historic Preservation, Recreation and Partnerships for the U.S. National Park Service stated, “the best
historic preservation is not only local but also that it will, of necessity, be different from state to
state and from community to community." Each state provides enabling legislation, usually
through a Local Government Code, to establish the minimum requirements for certification of
local governments in accordance with the National Historic Preservation Act. Requirements for
certification are listed in the Act for cities, towns and counties, as follows:

(A) enforces appropriate State or local legislation for the designation and protection of
historic properties;

(B) has established an adequate and qualified historic preservation review commission
by State or local legislation;

(C) maintains a system for the survey and inventory of historic properties that furthers
the purposes of section (b) of this section;

(D) provides for adequate public participation in the local historic preservation
program, including the process of recommending properties for nomination to the
National Register;

(E) satisfactorily performs the responsibilities delegated to it under this Act.

State Historic Preservation Officers, with National Park Service approval, are able to expand
upon these minimal federal requirements and may incorporate additional requirements for CLG
status. These may include the composition of commission members, the commission’s ability to
require delay in demolition of designated historic properties, continuing education for
commission members and/or staff, as well as any additional criteria that may be specific to the
perpetuation of the historic preservation program in the state.

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17 Tiller, de Teel Patterson, “Still Local After All These Years,” *Forum Journal, The Journal of
18 *Federal Historic Preservation Laws*, 44.
19 U.S. Department of the Interior. National Park Service and the National Conference of State
Historic Preservation Officers. *Preserving Your Community’s Heritage through the Certified
In order for a local government to become a CLG, an application must be filed with the applicable State Historic Preservation Officer (SHPO) for recommendation to the Secretary of the Interior. Generally, the chief elected official for the governmental entity must request certification and information must be provided to prove that the CLG requirements are currently being met. For municipalities, the first requirement is usually the establishment of a historic preservation ordinance that provides for the designation of local historic districts and properties.

Historic preservation ordinances are the basis for all local government preservation programs. These ordinances address how historic districts may be created, the structure of the commission that oversees projects in historic districts, the review process for the commission, and the set of criteria for the approval of projects within the district that are often referred to as Certificates of Appropriateness. Other issues such as “demolition by neglect”, the term frequently used by preservationists when referencing properties that have been the victim of delayed maintenance to the point of possible loss of the viability of the structure, may also be covered under a historic preservation ordinance. In order to have these types of ordinances provide regulatory authority to the preservation commission, a municipality generally has to adopt a zoning overlay, or preservation, ordinance under state enabling legislation.

Zoning, when applied correctly, is a “powerful tool in protecting historic properties.” 20 Webster’s Dictionary defines zoning as: “to partition (a city, borough, or township) by ordinance into sections reserved for different purposes (as residence, business, or manufacturing.)” 21 In 1916, New York City adopted the first comprehensive zoning ordinance in the United States. The Department of Commerce drafted the Standard State Zoning Enabling Act in 1922. This Act led the way for states to begin adopting their own enabling legislation for zoning ordinances, which were soon embraced by many of the larger cities across the United States. 22

22 Morris, 2.
A zoning ordinance allows a local government to regulate land use by creating different districts or zones, with specific set of development criteria tied to each zone. These development criteria may include general information such as permitted land use, signage requirements, setbacks of buildings from the city right-of-way or adjacent properties, and number of stories that can be built; more specific information may also be covered under zoning such as permitted building materials, scale, massing, and even architectural style. At the time a zoning ordinance is adopted, the local government also creates a map that graphically displays the different zoning districts throughout the community. The zoning districts reflect current development patterns, as well as providing allowances for future growth.

Land uses, building setbacks, and other features covered under zoning that do not meet the new standards are referred to as non-conforming. Some cities require an amortization period to bring the properties into compliance with the new zoning, such as replacing non-conforming fences or signage. Most require that new construction must adhere to the revised standards and existing properties are “grand-fathered”. In many instances, historic properties do not conform to the new standards and the zoning should reflect allowances for these areas to maintain the integrity of the resources.

The terms historic zoning, or historic district overlay zoning, are used if a historic district is established through a local zoning ordinance. Communities may utilize other cities’ ordinances as a basis for its own, in addition to researching the multiple resource materials that are available regarding the creation of historic preservation ordinances. However, a community must always remember that individuals may not be deprived of their constitutional rights when the government exercises its authority through adopted ordinances. Therefore, any zoning or historic preservation ordinance must meet the following:

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23 Ibid., 4.
1. An ordinance must promote a valid public purpose. That is, it must advance the public health, safety, or general welfare.

2. An ordinance must honor a citizen’s constitutional right to “due process” under the law. In other words, fair hearings and notice to property owners must be provided and rational procedures must be followed in the administration of an ordinance.

3. An ordinance must not be so restrictive as to deprive a property owner of all reasonable economic use of his or her property. If correctly executed and applied, “the preservation ordinances provide a constitutional way for local governments to protect the historic character of their community.”

The creation of an “overlay” district means that the underlying zoning, referencing land use, setbacks or density controls, remains in place while more specific development criteria is placed over certain areas. These development criteria often relate to design or architectural style as dictated by the zone. Although this type of overlay zoning has been used primarily for historic districts, more cities are utilizing this type of zoning, and related design standards, as tools for areas of new development that are particularly prominent within the community. New construction, or alterations to existing buildings, must adhere to these design standards and be reviewed by a design review board or historic preservation commission.

As mentioned previously, another requirement for becoming a Certified Local Government is the establishment of “an adequate and qualified historic preservation review commission.” The earliest historic preservation review board was instituted in Charleston, South Carolina in 1931. In an area of the city referred to as the Old and Historic Charleston District, the review board was given the authority to approve applications for building permits and certificates.

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25 Cassity, 11.
of occupancy; however, their review was limited to “exterior architectural features which are subject to public view from a public street or way.”\textsuperscript{26} The five members of the Board of Architectural Review were nominated from organizations “representing realtors, architects, engineers, city planners, artists and appointed by the mayor,” a common make-up of historic district review boards to this day.\textsuperscript{27} Several other well-known historic cities also created a historic district review process prior to the National Historic Preservation Act, such as New Orleans in 1937 and San Antonio in 1939.

Design guidelines/standards were often included in these early historic preservation programs, as they are in current historic preservation ordinances. Adherence to these design guidelines and standards is defined through the historic preservation ordinance in one of four ways: mandatory, advisory, incentive-related or as a combined approach.\textsuperscript{28} The review board or historic district commission must have a set of design criteria for their review of projects proposed within the local district. Most design guidelines are based on the \textit{Secretary of the Interior's Standards for Historic Preservation Projects} and/or the \textit{Standards for Rehabilitation}. The \textit{Secretary of the Interior’s Standards for Historic Preservation Projects} was initially written in 1976, with the \textit{Standards for Rehabilitation} revised and expanded in 1983. In 1992, the \textit{Secretary of Interior’s Standards for the Treatment of Historic Properties}, which replaces the previous \textit{Standards for Historic Preservation Projects}, were developed and later codified in 1995.\textsuperscript{29} There are also multiple resources from the National Park Service, American Planning Association and the National Trust for Historic Preservation to assist a community through the development of a historic preservation ordinance and associated design guidelines. Each

\textsuperscript{27} Ibid., 1.
\textsuperscript{28} Cassity, 12.
community has a unique character and development pattern particular unto itself. Therefore, before the establishment of any local historic district ordinance, review board or set of design guidelines, the community should have conducted a historic resources survey of the area to determine the boundaries for the districts, identify and document current conditions, and establish a context, as well as a set of goals, for the historic preservation program.

Surveys are the cornerstone for determining the historic development of a community and identifying information specific to the historic resources that remain. Identifying character-defining elements such as architectural period, architectural styles, building relationships, land use, street features, as well as unique aspects of the community, are the basis for creating design guidelines that reflect the different personalities of the historic areas within the city. In addition to providing the necessary information for the development of the design guidelines, “maintain(ing) a system for the survey and inventory of historic properties” is another requirement for a community to become a Certified Local Government.

Historic properties are defined under the National Historic Preservation Act as “any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion in the National Register.” Properties that “possess historic significance and integrity” are eligible for listing in the National Register of Historic Places. However, the general rule of thumb for preservationists is that a resource must have reached the age of fifty years to be considered historic. The data gathered during community surveys may be utilized for the local government information as well as nominations for individual resources and districts to be listed on the National Register of Historic Places. However, it should be clear that local historic designation and National Register listing are two very different processes. A National Register listing is honorific only and does not include any additional regulations for the property owner,

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31 National Register Bulletin – How to Complete to the National Register Registration Form, 1.
while local designation often includes design review by the historic district commission as well as other zoning restrictions. One of the unusual aspects of the United States National Register of Historic Places is that it is the only historic registry in the world that recognizes the concept of local significance, and in fact, the majority of listings on the register are for local significance.32

The fact that the National Register of Historic Places has a predominant listing of properties that are locally significant displays the importance of the local preservation program to the overall national historic preservation policy. In order to start the process of establishing a local preservation program, a community must begin by cataloging its most significant historic resources. However, a comprehensive survey of historically and culturally significant resources, including not only the built environment but archaeological sites and landscapes as well, provides a much greater context for understanding the complete history and development of the area.

To begin a historic resource survey, one must first establish a methodology for the project. One of the initial decisions regarding the survey project is determining who will conduct the survey. If volunteers are utilized, an intensive training program will need to be incorporated into the project to ensure accurate results. If a consultant is used, funding sources will need to be located and criteria for evaluating credentials will need to be established. As mentioned before, each community is unique and surveys will vary in scope and complexity depending upon the scale of area and resources available. Therefore, each historic resource survey will need to be adapted to fit the needs of the local area.

There are three major components for a historic resource survey: archival research, field survey work, and compiling and recording the data.33 Archival research may be accomplished through a variety of means including local libraries, historical societies, old maps, family

32 Tiller, 10.
histories, etc. Preliminary research may help to establish focus areas for the field survey work but archival research will be necessary through the entirety of the historic resource survey project.

Field survey work is generally the most labor-intensive portion of a historic resource survey project. Before fieldwork begins, the community must decide the information to be gathered for each resource. At the minimum, each survey record should include the following information:

- Clear photograph of the building;
- Architectural description noting important features;
- Approximate date of construction and historical importance; that is what important events occurred there or historical characters lived or visited there, its role in the history of the community, what important cultural practices or themes it embodies;
- Structural condition, including how much of the building is authentic and what has been altered and/or added; and,
- Relationship of the building to its setting, including compatibility of use and contribution to the historic character and appearance of the area.  

Additionally, criteria must be set in order to evaluate the contribution of the resource to the historic character and appearance of the area. More comprehensive survey data may include recording distinctive features, such as historic paving patterns or hitching posts, significant landscapes, and fencing.

Once the community has decided upon the information to be gathered for each resource, a form must be generated to record the data. Many State Historic Preservation Offices have survey forms available, which are compatible to their statewide historic resource inventory, and will facilitate the sharing of data once the survey is complete. If the survey data will also be used to generate an application for inclusion on the National Register of Historic Places, the

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34 Cox, 6.
information required for submittal should also be included on the survey forms. The final form should be easy to use but must also provide the necessary data required for all resources within the survey area. For example, the survey form shown below is an on-line form that is provided as a sample for a class at the University of Wisconsin – Madison.35

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| Figure 2: | Example of a Historic Resource Survey Form from the University of Wisconsin – Madison. |

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The final phase of the survey, compiling and recording data, is also a challenging process for the survey team. The method for storing and recording the data gathered during the archival research and field survey will determine how effective and accessible the survey results will be to the community. It is imperative that survey results be accurately recorded and displayed since a historic resource survey often provides the basis for a community-based, historic preservation advocacy program. Preservation commission members and staff also utilize the survey data

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35 "Historic Resource Field Survey Form", (on-line form) University of Wisconsin – Madison website, as reference material for Art History 449, taught by Prof. Anna Adrzejewski, Fall 2001; accessed 7 July 2003; available from www.wisc.edu/arth/ah449/SurveyFrom.doc; Internet.
during the design review process as a basic tool to make decisions regarding projects proposed within historic districts.

Historic resources surveys will need to be continually updated as construction projects occur within the local districts and, over time, to include structures that have become historic. Additionally, survey results often are displayed graphically on maps to focus attention on information such as specific periods of significance or a particular architect or builder. Although traditionally, survey results have been maintained in hard copy format, preservationists are now seeking ways to utilize new technologies to provide a more usable system. As discussed, a comprehensive survey of local historic resources is fundamental to creating an effective local preservation program. The survey serves as the beginning for historic district ordinances, design guidelines and ultimately, a community preservation plan.

Although a preservation plan is not a requirement of becoming a Certified Local Government, it is an essential part of creating a successful local preservation program. The preservation plan often may spin-off from the summary developed after a comprehensive historic resource survey. The preservation plan may also begin as an element within a municipal comprehensive plan process. For communities with a significant number of historic resources, the preservation portion of the comprehensive plan may affect other elements such as community character, housing and neighborhoods, land use, and economic development.

The preservation plan will assess the current conditions of the historic areas and provide a roadmap for the preservation goals of the community. There are ten essential elements for a preservation plan outlined in the American Planning Association’s Planning Advisory Service report, *Preparing a Historic Preservation Plan*:

- Statement of Goals
- Definition of Historic Character
- Summary of Past Preservation Effort: Preservation Context
The development of a preservation plan should be a community-wide effort, encompassing all ethnic groups and economic levels, so that it fully reflects the preservation concerns and aspirations of the entire population. The plan should provide clear-cut goals, strategies and objectives so that implementation into the local governments’ short and long term planning procedures is easily facilitated. The preservation plan also provides the local government with a full understanding of its historic resources and allows for educated decision-making in public policy.

In addition to the preservation plan and historic resource survey providing the framework for a local preservation plan, they also provide the CLG staff and preservation commission the information needed for recommendations on federal actions. A requirement of becoming a CLG is to allow “for adequate public participation in the local historic preservation program, including the process of recommending properties for nomination to the National Register.” A CLG is notified of all applications made to the National Register of Historic Places and gives an opinion on the eligibility of the property for listing. In addition, “CLGs with qualified professional staff have received authority from the SHPO to act in its place in reviewing federally-funded local projects that affect historic properties.”

Another benefit of becoming a Certified Local Government is the ability to receive federal grant funds. Once the government has become certified, it is then eligible to apply for the

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36 *Preserving Your Communities Heritage*, 15.
grants-in-aid program offered through a minimum of 10% local share of the state’s Historic Preservation Fund, which is allocated annually. Grants amounts vary but generally range from $1000 to $15,000 per community. Each State Historic Preservation Office is mandated by federal law to create a statewide preservation plan. CLG grant projects are then reviewed in accordance with the stated goals and objectives of these plans. For example, the state of Texas utilized the following areas for eligible projects under the FY2004 CLG Grant cycle:

A. Development of a preservation vision for community or county
B. Development or revision of a historic preservation plan for community or county
C. Completion or revision of the survey and inventory of historic resources
D. Nomination of properties to the National Register of Historic Places
E. Educational activities, programs, and publications.

In addition to these stated focus areas, grant funds are also available for in-state, preservation education opportunities for commission members and the staff.

The grants-in-aid program varies from state to state but generally requires a matching share from the CLG. In the state of Texas, the CLG is required to match 40% of the necessary funds with the state CLG program providing 60% for the overall project. However, the city can include “in-kind” services, such as donated commission member time, as part of their match but the match will increase to a 50/50 ratio. The CLGs are usually given eighteen to twenty-four months to accomplish the objectives of the grant-funded project. In addition to the grant funding available, the CLG also receives valuable training and technical assistance from the State Historic Preservation Office, National Park Service and other federal agencies.

As of 2001, there were almost 1,300 Certified Local Governments throughout the nation, with a population of 58 million citizens. Even more encouraging is the number of cities that currently have a preservation commission. Per the National Alliance of Preservation

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37 Tiller, 9.
Commissions (NAPC), over 2,000 cities across the United States are participating in a design review process for their historic districts. However, even with numbers such as these, there are still thousands of communities that do not have governmental participation in the preservation of historic resources. For these communities, a local historic preservation non-profit organization often fills the niche left vacant by their political process.

Local Historic Preservation Non-profit Organizations

The role of the non-profit organization within a community is multi-faceted and yet, unique. Non-profits have been referred to as a “precious national resource”, “central to the quality of life in America” and “uniquely American in (their) diversity and strength.”38 To fully comprehend how a non-profit organization can positively affect the quality of life on a local level, one must first understand what defines a “non-profit” and why the non-profit sector evolved. Only then can the possibilities available to these organizations be fully realized.

Non-profit organizations are a vital part of the effort for historic preservation within a community. Oftentimes, these organizations are the only representation a community has to effect change on a local level. These non-profit organizations are generally created from a previous historical society or an event-specific group, formed to save a particular property. A group may then decide to take a more active and organized role by becoming a local non-profit organization.

Since “non-profit organizations are basically creatures of state law”, most of the guidelines for establishing a non-profit organization can be found in the legal statutes of an individual state.39 Depending upon the type of organizational structure a group chooses, different laws will apply. For example, if an organization decides to become a non-profit corporation, it

would then be subject to a state’s non-profit corporation statute. Many states have adopted, either
wholly or in part, the American Bar Association’s Model Nonprofit Corporation Act. Several
other states have Separate Nonprofit Corporation Acts.\(^{40}\) The specific requirements of these acts
will be discussed further in the section on incorporation. Often, the main reason an organization
may choose to become a non-profit organization is for the tax benefits. However “(b)efore an
organization can be tax-exempt, it must be a non-profit corporation.”\(^{41}\)

The three basic operating structures upon which a non-profit can be organized are as an
association, a trust or a corporation. Associations, which are the least formal unincorporated
structure, may also be operationally the most difficult. An association is formed when a group
creates and adopts a constitution, similar to the articles and bylaws of incorporation. However,
all members have full rights and responsibilities, which may create conflict both in making
decisions and in the general functioning of the organization. Personal liability, which means “one
or more of the managers of a nonprofit organization may be found personally liable for something
done or not done while acting on behalf of the organization”, may become a serious issue.\(^{42}\)
Legal precedent or laws concerning unincorporated organizations are “vague and uncertain.”\(^{43}\)
Many event-specific historic preservation groups may begin as associations.

Trusts are another operating structure for an organization that wishes to remain
unincorporated. A trust is generally thought to be “best suited to the simple holding of assets for
charitable purposes.”\(^{44}\) To create a charitable trust, “the execution of a trust agreement or a
declaration of trust” must be enacted.\(^{45}\) The purpose of the trust, declared in the trust agreement,

\(^{40}\) Hadden, Elaine M. and Blaire A. French. *Nonprofit Organizations: Rights and Liabilities for

\(^{41}\) Hopkins, 9.

\(^{42}\) Ibid., 10.

\(^{43}\) Hadden/French, 12.

\(^{44}\) Ibid., 12.

\(^{45}\) Hopkins, 13.
should also be in “accordance with the wishes of the grantor or person establishing the fund.”

Usually a charitable trust may be established under at least one of several purposes:

(1) Relief of poverty;
(2) Advancement of education;
(3) Advancement of religion;
(4) Promotion of health;
(5) Governmental or municipal purposes; and,
(6) Other purposes beneficial to the community.

Historic preservation trusts could be considered under the “advancement of education” but would most likely be classified as “other purposes beneficial to the community.” A specific application for historic preservation under a charitable trust would be for “the trustee (to) be directed to apply the property placed in trust (for example through grants to various groups) for the historic preservation purposes specified in the trust instrument.”

There must be at least one trustee, or director, of the trust although there may be multiple trustees. The donor of the trust may also be the sole trustee. Trustees are subject to personal liability and do not have the protection usually supplied by an incorporation. Often in historic preservation charitable trusts, “the trustee is a charitable nonprofit corporation that the grantor has directed should be established to administer the trust.”

There may also be several additional problems when choosing to structure an organization as a trust including: less flexible state laws, more “stringent fiduciary standards and practices” than other non-profit corporations and “annual filing requirement(s) on trusts for the trust agreement or declaration of a trust.”

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47 Hadden/French, 19.
48 Goodman, 3.
49 Ibid., 3.
50 Hopkins, 13.
Most commonly the organizational structure adopted by non-profit historic preservation groups is that of incorporation. An incorporated non-profit organization is formed by preparing and filing articles of incorporation, with its operating rules embodied in bylaws. Often, the requirements for incorporation are "established by state law and will usually include:

- The name of the organization
- A general statement of its purposes
- The name(s) and address(es) of its initial director(s)
- The name and address of its registered agent
- The name(s) and address(es) of its incorporator(s)
- Language referencing the applicable federal tax law requirements"\(^{51}\)

The bylaws "will usually include provisions with respect to:

- Its purposes (it is a good idea to restate them in bylaws)
- The election and duties of its directors
- The election and duties of its officers
- The role of its members (if any)
- Meetings of members and directors, including dates, notice, quorum, and voting
- Role of executive and other committees"\(^{52}\)

These requirements for the articles and bylaws are usually referenced in a state’s Nonprofit Corporation Act, either based on the Model Nonprofit Act or as a Separate Nonprofit Corporation Act. Some states apply a uniform code of law to both profit and non-profit corporations. The main "distinction between profit and nonprofit corporations lies not in whether they may earn profits but in who may receive those profits. In a non-profit corporation, no distribution of profits or income may go to members, directors, or officers of the corporation."\(^{53}\)

\(^{51}\) Ibid., 12.
\(^{52}\) Ibid., 13.
\(^{53}\) Hadden/French, 9.
There are several advantages in becoming a non-profit corporation rather than an unincorporated organization. The first is limitations on personal liability, by one or more of the following methods: indemnification, insurance, immunity and incorporation. The second is that state law usually provides for a set of guidelines in creating a nonprofit corporation, such as the previously mentioned Acts. The third advantage is that most people understand the “corporate form” and are more willing to contribute to a known entity than to a legal framework with which they are unfamiliar. There is not necessarily an advantage to being a corporation in order to qualify for tax-exempt status although there are a few exceptions under federal tax laws.

As historic preservation nonprofit organizations are considered to be established for charitable and educational purposes, they are usually eligible for tax-exempt status under the Internal Revenue Service’s Sections 501(c)(3) or 501(c)(4). A common misconception is that if an organization is labeled as a nonprofit, it is automatically tax-exempt. Nonprofit organizations are established through state law; “tax-exempt organizations are basically subjects of federal tax law.” Therefore, tax-exemption should be considered “a privilege, not a right.”

A historic preservation non-profit corporation seeking to qualify for tax-exempt status must submit an application to the Internal Revenue Service, using Form 1023 for 501(c)(3) and Form 1024 for 501(c)(4) status. The Internal Revenue Service’s Publication No. 557 (Rev. Oct. 88) distinguishes the different sections under which an organization may apply for tax exemption status. Historic preservation organizations qualify for either Section 501(c)(3) or Section 501(c)(4). These are defined as follows by the Internal Revenue Code:

Section 501(c)(3): Corporations, and any community chest, fund, or foundation, organized and operated exclusively for religious, charitable, scientific, testing for public safety, literary or educational purposes ....no part of the net earnings of which inures to

54 Hopkins, 12.
55 Ibid., 9.
the benefit of any private shareholder or individual, no substantial part of the activities of which is carrying on propaganda, or otherwise attempting to influence legislation, (except as otherwise provided in subsection (h)), and which does not participate in, or intervene in (including the publishing or distributing of statements), any political campaign on behalf of any candidate for public office.

Section 501(c)(4): Civic leagues or organizations not organized for profit but operated exclusively for the promotion of social welfare...and the net earnings of which are devoted exclusively to charitable, educational, or recreational purposes.57

Annual returns documenting a nonprofit’s activities are still required by the Internal Revenue Service even though they may be tax-exempt. Section 501(c)(3) and 501(c)(4) organizations must submit a Form 990 to the IRS; other forms apply to various tax-exempt organizations.58

The most important distinctions between the two section classifications are charitable contributions and lobbying activities. If possible, a nonprofit organization should seek classification as a “public charity” versus a “private foundation” under Section 501(c)(3). An organization must prove that their activities are defined as “charity” in the legal sense; otherwise, they will automatically be classified as a “private foundation.” Private foundations also “are subject to greater restrictions and some taxes not applicable to public charities.”59 Nearly all of the standard activities of a historic preservation nonprofit will fall under the legal definition of charitable. Under the Treasury Regulations Section 1.501 (c)(3) - 1(d)(2), the term “charitable includes lessening the burdens of government and promoting social welfare through efforts ‘to combat community deterioration’.”60 However, especially with organizations that are involved with acquisition and sale of historic properties, the primary purpose of the nonprofit corporation must be proven to be charitable.

57 Goodman, 8.
58 Hopkins, 77.
59 Overton, 78
60 Goodman, 9.
Section 501(c)(3) organizations may receive charitable contributions, which will then be tax-deductible for the donor. Most people are motivated to donate money, property or easements because of the tax benefits involved; therefore, Section 501(c)(3) status is often preferred over Section 501(c)(4) status. However, due to restrictions imposed by the Internal Revenue Service Code, Section 501(c)(3) organizations may only participate minimally in legislative activities.

Section 501(c)(4) organizations are often set up as “sister organizations” to Section 501(c)(3) nonprofit corporations because of the legislative restrictions imposed. Section 501(c)(4) organizations are able to participate in legislative activities but the contributions they receive would not be tax-deductible for the donors. Therefore, Section 501(c)(3) nonprofit corporations may help form these “sister organizations” to parallel the mission of the original organization but focus on the legislative process. In deciding the focus of the nonprofit organization, the appropriate tax-exempt status must be chosen carefully and the mission of the organization should be reviewed.

The pursuit of a mission is one of the greatest strengths of a non-profit organization. It is the missions of these organizations that were the impetus to create the non-profit or “third” sector of the economy. For many years, Americans supported the concept of the federal government “as the source of the remedial actions and policies required to keep our society economically and socially healthy.”61 Beginning with Franklin D. Roosevelt’s New Deal Program, the American society believed that the federal government would provide a “national safety net”, i.e. Social Security, welfare, unemployment insurance, as well as other beneficial programs to aid citizens in all levels of society. However, with the national involvement in Vietnam, under the Johnson administration, the public belief in a “beneficent role of government” began to decline. Although

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there was a brief resurgence of public optimism towards the government during Ronald Reagan’s first term in office, the decline has been steady since the mid-1980s.62

It was in this social climate that the non-profit sector began to fully emerge. The growth of this sector was also fostered by the changing international economic environment. In the last few decades, technological breakthroughs have increased the rate of change, socially and economically, worldwide. Most institutions, including private and public, have been severely strained in an attempt to accommodate these changes.63 The public’s perception of the government was that it lacked the ability to respond adequately to the needs of the society. “Well-financed lobbies”, representing special-interest groups, are also seen as a deterrent to initiating any necessary changes to government programs. “Many observers believe that genuine reform will not be attainable until campaign financing reform is achieved and the power of special interests diminishes.”64

Frances Hesselbein, president of the Peter Drucker Foundation, warns against solely blaming the government for the lack of programs. Hesselbein said, “Beating up on government is the least productive thing we can do...We still have to build a cohesive society. As government relinquishes leadership, new leadership must bring people together and create alliances.”65 Scott Peck “seeing an ‘illness abroad in the land’, finds its source is a collective absence of ‘civility’, which he defines as ‘consciously motivated organizational behavior’ that values the common good above narrow self-interest.”66 Others, including many historic preservationists, believe that the destruction of traditional communities is the primary cause of the society’s decline. In Spirit

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62 Ibid., 6.
63 Ibid., 5.
64 Ibid., 7.
65 Ibid., 8.
66 Eadie, 9.
at Work by J.A. Conger, he felt that “(t)he civic community that once nourished our needs for contribution has fallen prey to cynicism and apathy and to lives that are too busy.”

In the last three decades, the non-profit or “charitable” sector has been steadily growing in response to the lack of adequate social and cultural programs provided by the government. One reason for this may be that non-profit organizations not only fill in the gaps left by inadequate programs but they also provide “an outlet for individuals’ sense of altruism and civic responsibility.” Non-profit organizations “allow people to take an active role in shaping their communities, rather than being passive participants in a society dominated by massive impersonal institutions.” Peter Drucker wrote:

“America’s third sector institutions are rapidly becoming creators of new bonds of community...Increasingly, they create a sphere of...meaningful citizenship...Now that the size and complexity of government make direct participation all but impossible, it is the human change institution of the third sector that is offering to volunteers a sphere of personal achievement in which the individual exercises influence, discharges responsibility, and makes decisions...This may be the most important contribution of the third sector so far.”

James Gardner believes that the most important task of leadership is to “help in restoring the face-to-face community in the family and extended family, in schools, congregations, workplaces, neighborhoods. That is where shared values are generated and if they decay, that is where they decay.”

Non-profit organizations are successful not only because they provide an outlet for community-minded citizens; it is the structure of the non-profit itself, which allows the

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68 Firstenberg, 8.
69 Ibid., 11.
70 Ibid.
71 Eadie, 10.
organization to be effective. There are many reasons attributed to the success of the third sector. The first is the organization’s mission, often very focused on a particular issue, which allows the non-profit to concentrate on attaining a goal. Frequently the board, staff and volunteers believe passionately in the organization’s mission and this “idealistic mission is the driving force of such entities.”72 The second most noted reason is flexibility. A non-profit is not constrained by policies forced on government programs or the need to pursue a profit, as in the private sector. This freedom also allows the non-profit organization to “experiment with creative solutions to complex issues.”73

The non-profit structure provides an ideal environment for historic preservation programs within a community. As historic preservation covers a multitude of “charitable purposes”, non-profit organizations focused on maintaining the cultural and architectural heritage of a community should be part of every city. Most organizations start off as small groups, but once the non-profit has established its presence in the community and has begun to grow, it can become an effective advocate for its mission.

The National Trust for Historic Preservation, in its Information Series edition No. 14 on Legal Considerations in Establishing a Historic Preservation Organization stated that “the overall purpose of a historic preservation organization is to engage in activities to preserve historic sites, districts, buildings and objects.” The edition also listed several ways in which this goal may be accomplished, “including:

- Acquisition and restoration of historic structures
- Development and dissemination of a plan to preserve historic sites and districts
- Operation and maintenance of historic places for the benefit of the public
- Research and publication of education materials on the history and architecture of historic districts and sites

72 Ibid., 12.
73 Ibid., 2.
• Initiation of or participation in litigation to protect the public’s interest in preservation of historic buildings
• Supporting legislation that will further the cause of historic preservation
• Making gifts or contributions to groups that engage in preservation activities\textsuperscript{74}

Using this framework, the various responsibilities of a historic preservation nonprofit can be addressed.

The “acquisition and restoration of historic structures” carries perhaps the most significant amount of legal responsibilities for a historic preservation nonprofit corporation. Some of these include the acquisition and ownership of a historic structure, the possible resale of the property, the maintenance of funds to acquire and restore properties, and the receipt of donated easements or properties. In fact, a nonprofit historic preservation corporation may choose not to be a recipient of properties or easements, especially if it is a smaller organization with limited staff, because of the legal responsibilities entailed.

Often when these properties are purchased by a nonprofit organization, significant restoration or rehabilitation work is needed. The organization would then be responsible for either reselling the property as it was purchased, pursuing the restoration work and then re-selling, or restoring the property to be used as a house museum or property to be retained by the organization. If the property is sold, the proceeds from the sale are usually returned to a revolving fund. A revolving fund is “used to buy or option a historic property. The sales proceeds are reinvested in another project, thus leveraging the initial funding. A revolving fund can be created for acquisition or rehabilitation projects, or set up on a low-interest loan basis.” \textsuperscript{75}

One of the difficulties that arise when a nonprofit corporation becomes involved with larger volumes of property acquisition and re-sale is in the retaining of their tax-exempt status. In

\textsuperscript{74} Goodman, 1.
order to continue to qualify for tax-exempt status, organizations “that undertake this type of rehabilitation must demonstrate that their primary purpose is not the carrying on of an ‘unrelated trade or business’. The Internal Revenue Service has specifically ruled in regard to this:

“... that a tax-exempt organization does not jeopardize its exemption if it conducts extensive educational activities in connection with the preservation work and limits its involvement in real estate acquisition, development, and sale to those instances where:

(1) Buildings, sites, and districts are of cultural, historic, or architectural merit, or necessary to the implementation of a preservation plan for a historic district, or community; and

(2) Acquisition, development, and sale of the property by the preservation organization accomplishes preservation purposes and the continued preservation of the property after its sale is guaranteed by means of restrictive covenants (Rev. Rul. 86-49, 1986-1 C.B. 243).”

Nonprofit historic preservation organizations may also be the recipients of easements or development rights for individual properties. Easements are defined as “a legal agreement between a property owner (the grantor) and the holder of the easement (the grantee), which governs the current and future owners’ treatment of the property.” Laws do vary by state, although many have enacted the Uniform Conservation Easement Act. At this time, “all states have passed some form of easement legislation or otherwise authorized easements. Forty-seven states and the District of Columbia, have passed generic legislation authorizing state agencies and certain qualified nonprofits to accept easements. Three states and Puerto Rico have authorized easement acquisitions by specified state agencies only.”

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76 Goodman, 9.
77 Ibid., 10.
79 Ibid., 4.
A historic preservation nonprofit corporation should be aware of the benefits available to the donors of easements. The property owners are often able to receive tax benefits by donating an easement. State and local laws will vary regarding tax benefits to the owner but federal tax provisions have been well established. “Congress authorized the deduction of easement donations from income, estate, and gift tax liability under Section 1.170A-14 of the Internal Revenue Code, for which the Internal Revenue Service issued regulations in 1986 in Section 1.170A-14 of the Treasury Regulations.”80 Easements are usually given in perpetuity, which is required for “conservation purposes” under the Internal Revenue Code.

Historic preservation organizations may receive the following types of easements: scenic or open-space, facade or exterior and, less frequently, interior easements. Scenic or open-space easements “protect open spaces, historic and scenic views, the surroundings of culturally significant structures, archaeological sites, and ecologically significant land.”81 The term ‘development right’ may apply to this type of easements because of the previously mentioned “bundle of rights.” The right to develop the property without restriction, other than standard zoning measures, has been transferred to a party other than the owner. The change in value often translates into a change in tax assessment for property tax purposes.

Exterior or facade easements are a means to preserve the exterior appearance of a building when a property is outside of a local historic district or a local preservation ordinance does not exist. They are primarily used to control any changes to the facade or outer surfaces of a building. Facade easements also “usually include aspects of the scenic easement, to control the development rights of the lot on which the building stands and the air rights, which are development rights for constructing additional stories above the building.”82

80 Ibid., 3.
81 Ibid.
82 Ibid.
Interior easements are used to preserve some or all interior spaces within a building. These are not used as frequently as the previously mentioned easements for several reasons. One is that many people are not aware that this is an option, or that it is even legal. The second is that many people do not wish to have restrictions placed on their actual living space. The third is the difficulty involved with the needed access to the residence for review of the easement, which often is a requirement for easement acceptance.\textsuperscript{83} However, as all local historic district review only examines the exterior changes to the historic resource, an easement is the only means available for securing the preservation of interior spaces.

There are several advantages to creating an easement program: tax benefits for the donors; protection of buildings, both exterior and interior; and preserving the character of a particular area through both facade and scenic easements. Easements may also be very specific to the particular property, with special provisions for access to the property, maintenance and conservation, or use of the property. There are legal responsibilities as well. “Every easement should require the grantor to allow the grantee access for periodic inspections to see that the easement provisions are being observed.”\textsuperscript{84} The nonprofit recipient of the easements must also accept full responsibility for the enforcement of those agreements. However, an easement program can be a very useful tool for historic preservation purposes.

The “development and dissemination of a plan to preserve historic sites and districts” mainly focuses on working with a local government in establishing a historic preservation program for the community if it does not currently exist. If a local governmental preservation program is in effect, the non-profit should focus their own strategic planning process to meet the identified preservation goals in the city. Often, the local historic preservation non-profit is listed as a partner, with specific tasks, as part of the implementation portion of a preservation plan.

\textsuperscript{83} Ibid.
\textsuperscript{84} Ibid.
As technology develops further, non-profit organizations must look to new and innovative ways to plan for the preservation of their communities. Working with state and federal organizations, information can be compiled to create a network of resources for individual communities. The organization should have a representative at any planning commission or historic preservation commission meetings since they are open to the public. Legally, the main restriction would be in the tax-exempt classification of the nonprofit corporation. As mentioned, a 501(c)(3) organization is limited in the amount of legislative involvement it may have and a charitable organization may not participate at all in a political campaign. A more in-depth discussion of these restrictions will be covered in the section on legislative activities.

The “operation and maintenance of historic places for the benefit of the public” furnishes a chance for the non-profit historic preservation organization to “practice what they preach.” House museums are usually open to the public and provide a great opportunity for the organization to educate visitors on the history of the area, as well as the importance of historic preservation within the community. Additionally, many local preservation organizations locate their headquarters in historic structures, which can promote the concept of adaptive reuse of buildings for modern companies. The care and maintenance of these facilities may also be used as an educational tool to demonstrate the correct methods for preserving historic resources or addressing concerns common to historic property owners.

“Research and publication of education materials on the history and architecture of historic districts or sites” is also a valuable tool for a preservation non-profit organization to advocate local preservation work. Oftentimes, the local historic preservation organization is the only group that can provide this type of information to the general public. Materials relating to the history and architecture of the community that are produced by the local non-profit organization may also aid in the preservation planning process, including providing a context for the development of additional districts. Historic resource surveys may also be part of the research required for additional information on historic areas. Many historic preservation nonprofits will
engage in activities relating to this area by “researching the history and architecture of a state, district or historic structure...publishing periodicals on historic preservation; and sponsoring academic research and studies.”85

A nonprofit’s right to “initiat(e) or participat(e) in litigation to protect the public’s interest in preservation of historic buildings” has become a vital part in the preservation effort. The most important decision in litigation issues is the choice of legal counsel. Historic preservation is a very specialized field with specific laws and cases relating to its background. A well-informed attorney, with an interest in historic preservation, can prove to be an invaluable tool for the nonprofit organization.

Initiating litigation for a nonprofit may be broken down into two categories: outreach litigation and impact litigation. Outreach litigation is “designed to ensure that the nonprofit organization can continue to reach out to the public and preserve and enhance its viability as an organization.”86 This form of litigation is usually “content neutral” and would include such responsibilities as “communication of messages, recruitment of members, mobilization of support, and solicitation of donations.”87

Impact litigation is not “content neutral”. This form of litigation refers to “the impact that a nonprofit organization hopes to achieve through litigation.”88 Impact litigation “involves litigation that the organization pursues to directly implement its nonprofit cause.”89 In historic preservation organizations, initiating or participating in litigation may include opposing the destruction of a historic building under federal or state environmental protection laws or pursuing non-compliance with an easement agreement.90

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85 Goodman, 9.
87 Ibid., 79.
88 Ibid., 80.
89 Ibid.
90 Goodman, 11.
While initiating litigation, especially in impact litigation, is voluntary on the part of the nonprofit, defensive litigation is not. “In defensive litigation, the nonprofit organization has been sued.”\textsuperscript{91} This may come from a variety sources, including past employees. Even if a nonprofit chooses not to initiate litigation to pursue its purposes, defensive litigation may occur; therefore, a strong legal counsel should be retained as part of a nonprofit’s legal structure.

When a nonprofit is called upon to “support...legislation that will further the cause of historic preservation”, it must take into account its tax-exempt status. As historic preservation nonprofit corporations are generally also tax-exempt as a charitable organization, the Internal Revenue Service Code places heavy restrictions on the group’s participation in political activities. The amount of allowable participation varies depending upon the status of the organization as either a 501(c)(3) or 501(c)(4) tax-exempt organization.

501(c)(3) organizations are only completely excluded from participating in political campaigns. A charitable organization may participate in lobbying activities to a very limited extent. Section 501(c)(3) provisions state that a corporation will not qualify under that section of the Internal Revenue Service Code if it devotes a “substantial” part of its activities to “lobbying, propaganda, or attempting to influence legislation”. The most important word in that statement is “substantial” and there are two tests for determining substantiality that are usually applied by the IRS.

The first standard is known as the “insubstantial part test.” It requires that “no substantial part of a charity’s activities...be carrying on propaganda or otherwise attempting to influence legislation.”\textsuperscript{92} The problem with this standard is that it is extremely vague and may be misinterpreted by an organization. The definition of substantial is subjective and an organization risks the loss of their tax-exempt status if their interpretation is different from that of the Internal Revenue Service.

\textsuperscript{91} Bachmann, 82.
\textsuperscript{92} Young, Kay Y. “Section IV: Restrictions on Lobbying and Political Activity”. Legal Guidebook, 33.
Revenue Service. The second is the “expenditure test”. In this test, a certain percentage of charitable organizations exempt purpose expenditures may be used for lobbying purposes. To qualify for use of the expenditure test, a public charity must submit IRS form 5768; if they elect not to file for the expenditure test, the organization will be subject to the insubstantial part test.93

The second portion of the Section 501(c)(3) provisions discusses the actual activities that are affected by the substantiality tests: “lobbying, propaganda, or attempting to influence legislation.” The IRS guidelines state that lobbying is any attempt to influence legislation, including direct lobbying and grass roots lobbying. Direct lobbying is “any attempt to influence legislation through communication with any member or employee of a legislative body or with any government official or employee who participates in the formulation of legislation.”94 Grassroots lobbying is defined as “any attempt to influence legislation by an effort to affect the opinions of the general public or a segment of the public.”95 A historic preservation nonprofit must look carefully at its activities and be aware of the legal definitions as stated by the Internal Revenue Service.

The term “legislation” may also need further clarification. Legislation includes:

“the introduction, enactment, amendment, repeal or defeat of acts, bills, resolutions by congress, any state legislature, any local council, county commission or similar governing body. It also includes any initiative, referendum, constitutional amendment, or similar procedure.”96

However, it does not include a governmental agency’s administrative actions to implement legislation. The National Trust for Historic Preservation Information Series No. 14 Legal Considerations for Establishing a Historic Preservation Organization noted this example:

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93 Ibid.
94 Ibid., 31.
95 Ibid., 32.
96 Ibid.
“Thus, in the area of zoning, for instance, a historic preservation organization could seek enforcement of zoning regulations by applying for or opposing exceptions or variances, when necessary to carry out preservation activities. However, if the organization advocates changing the zoning law itself, it enters into the sphere of restricted legislative activities and stand to be denied Section 501(c)(3) status is such activities are substantial.”

As noted previously, the regulations imposed by the Section 501(c)(3) provisions substantiate the need for a “sister organization” that is under Section 501(c)(4) status if affecting legislative activities becomes a vitally important issue for a community.

Historic preservation nonprofit corporations are also involved in “making gifts or contributions to groups that engage in preservation activities.” Fund raising, in order to provide these contributions, is subject to a variety of laws that are in place on federal, state and local levels. Charitable organizations, at this point, are not affected by federal regulations even though it does apply to other tax-exempt organizations. However, it is possible that “this type of law may be extended to charities if they persist in securing payments from individuals that are not gifts...under circumstances where the payers think the payments are gifts and try to deduct them as charitable contributions.”

State and local level laws regarding fund raising are becoming more prevalent and restrictive. Most states have some form of “charitable solicitation act”, including the state of Georgia. Georgia’s Charitable Solicitation Act requires charitable organizations to “register each year with the Secretary of State, if the organization requests funds from the public (unless an exemption applies).” Exemptions are only given to “religious organizations; organizations with less than $25,000 in gross revenue; nonprofit educational organizations; and certain fraternal

97 Goodman, 11.
98 Hopkins, 112.
organizations. As each state and local law regarding fund raising varies, close examination of applicable laws should be undertaken by the nonprofit organization.

While each of these purposes is a valuable part of a historic preservation non-profit’s mission, some require more detailed management techniques due to the complexity of their activity. Both the local government historic preservation program and the local historic preservation non-profit organization have specific duties that are better served by working in conjunction with one another. A successful local historic preservation program has active partnerships throughout the public and private sector that are dedicated to the pursuit of preserving and maintaining the cultural and architectural heritage of the community. However, the wealth of information that is generated, and by multiple sources, makes data-sharing challenging at best.

Both local governments and non-profits are beginning to look outside of their standard procedures to new and innovative ways of pursuing their goals. One of the most difficult issues facing a local preservation program is assessing the community’s inventory of historic properties and planning for future growth. As mentioned previously, Geographic Information Systems (GIS) and related software, long-used by federal and state governments, are now more accessible than ever to local organizations and municipalities. Although the most common utilization of a GIS is for survey and database management, the applications of these programs, in the historic preservation field, are seemingly endless.

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99 Fokes, 29.
Chapter 2

A Brief History of Cartography and the Development of Geographic Information Systems

A picture is worth a thousand words – credited to Fred R. Barnard

A Brief History of Cartography

For tens of thousands of years, maps have been used to guide, explain, describe and direct human beings to interact within their environment. It may have been as simple as a caveman using a stick to draw a line in the dirt, but mankind has long understood that representing our three-dimensional world in a two-dimensional format allows for greater comprehension between people. By creating a picture or a map of the environment, both the built and natural, we are able to describe and analyze and ultimately comprehend, the world in which we live. Geographer J.B. Harley once wrote,

“There has probably always been a mapping impulse in the human consciousness and the mapping experience, involving cognitive mapping of space, undoubtedly existed long before the physical artifacts we now call maps.”

A map is defined by Webster’s Dictionary as being, “a representation, usually on a flat surface, of the whole or a part of an area.” Primitive representations of a man-made environment, dated between 6100 and 6300 BC, were found in Catal Hoyuk, a prehistoric site in Anatolia. A nine-foot long wall-painting depicts approximately eighty structures, with a volcano in the

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However, the earliest known map-like images, which date to approximately 2300 BC, have been found on Babylonian clay tablets. The ancient Greeks and Romans are credited with truly advancing the development of cartography, or the science and art of making maps.  

Philosophers of Pythagoras’ school first proposed the concept of a spherical earth instead of a flat disc, a theory popularized by the writings of Plato. Claudius Ptolemaeus (Ptolemy, approximately AD 85-165), a Greek geographer, wrote elaborate instructions on producing maps in his work, *Geographia*. However, no ancient examples of Roman maps are known to exist. 

After the fall of the Roman Empire, the ecclesiastical influenced “T-O” maps dominated medieval cartography for 700 years.

**Figure 3:** Ptolemy’s map of the World, approximately A.D. 150.
Medieval European world maps, or mappaemundi, are illustrative of religious views of the time. The maps were designed with Jerusalem in the center of the map, and oriented so that east is at the top. The three continents, which are populated by the sons of Noah, are then arranged as follows: Europe in the lower left, Africa in the lower right, Asia above. A fourth continent, terra incognita, is included in maps referred to as Beatus maps. These maps were drawn to accompany the Commentary on the Apocalypse of Saint John, by the abbot Beatus of Liebana. Since the apostles were to preach the gospel to the “four corners of the earth”, this fourth continent is required by the maps’ evangelistic context.

Bodies of water in a T-form separated the unique layout of the continents, with an O-shaped ocean surrounding them; therefore, the descriptive name of “T-O” maps is often used.

Figure 4: Hereford Mappa Mundi, c. 1300, Hereford Cathedral, England.

Although the Medieval European maps were developed based on religious beliefs, Arabic and Viking maps of the same time period were focused primarily in their individual geographic

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105 Wood.

areas and were more realistic depictions of the regions. In the wake of the Crusades, Ptolemy’s original texts on the creation of maps were rediscovered and translated into Latin. The use of this translation led to the development of a more modern-looking style of cartography during the fourteenth century. As the maps from Europe, the Middle East and the North Atlantic were all laboriously drawn by hand; the distribution of these documents was limited to only the rich and powerful. However, during the Renaissance period, the invention of the printing press allowed for more widespread circulation of more accurate maps as well as geographic knowledge.

Major advances in cartography were achieved during the Renaissance period. The “Age of Exploration” in the fifteenth and sixteenth centuries provided previously unknown information regarding the geography of the world. Following the voyages by Christopher Columbus and others, the first global maps began to appear. In the mid-sixteenth century, Geradus Mercator of Flanders developed a cylindrical projection that is still widely used for navigation charts and world maps. As man’s understanding of his environment increased, maps became less focused on a Biblical interpretation of the world and more centered on commercial usage.

With the development of modern scientific methods, the seventeenth, eighteenth, and nineteenth century maps were increasingly more factual and accurate representations of the world. In fact, many countries, including Great Britain and France, undertook nationwide mapping programs during this time. The majority of maps also become increasingly “Eurocentric”. Denis Woods, in The Power of Maps, describes this phenomenon:

“The borders, markings, illustrations and notation on these maps graphically express the European states’ political, commercial and scientific interests; colonial possessions were prominently displayed. These maps build on the Ptolemaic tradition and establish a new set of conventions. North is at the top, zero degrees longitude runs through Greenwich,

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107 Aber.
England, and the maps are centered on Western Europe, North America or the North Atlantic. The resulting configuration has become so familiar that few people notice just how arbitrary it is.\textsuperscript{108} As described previously in relation to medieval maps, the cartographer’s point of reference, especially with respect to societal influence, may greatly affect how a map is drawn and interpreted.

The twentieth century brought about increasingly accurate methods of obtaining geographic information. The advent of World War II was a stimulus for mapping much of the world. Widespread use of aerial photography following the war allowed a more comprehensive view of the globe, especially for inaccessible areas.\textsuperscript{109} It has been noted that military purposes have been the “driving force in the development of modern mapping technology based on satellite imagery.”\textsuperscript{110} The other major contribution of the twentieth century is the development of computer systems. Up until the 1970s, maps were still hand-drafted, using pen and ink. As the world we live in becomes more complex, and technology more advanced, new means of creating maps have necessarily evolved.

\textbf{Development of Geographic Information Systems}

One of the most effective technologies in cartography, Geographic Information Systems, or GIS, has developed in the last forty years. The Canada Geographic Information Systems (CGIS) program was begun in 1963, under the direction of Roger Tomlinson. In the mid-1960s, Howard Fisher established the Harvard Laboratory for Computer Graphics and Spatial Analysis.

\textsuperscript{108} Woods.
\textsuperscript{109} Aber.
\textsuperscript{110} Stephens, David. “Making Sense of Maps” [article on-line] \textit{History Matters: A project of the American Social History Project, Center for Media and Learning (City University of New York Graduate Center, and the Center for History and New Media (George Mason University); accessed 20 January 2003; available from http://historymatters.gmu.edu.mse/maps/where.html]. Internet.
Fisher had begun work on SYMAP (Synagraphic Mapping System) a “pioneering automated computer mapping application” while at Northwestern Technology Institute, University of Chicago and completed it in 1966 at Harvard Lab.\footnote{“Mapping GIS Milestones: 1960-1970” [document on-line] (GIS Development website, accessed 13 February 2003); available from \url{http://www.gisdevelopment.net/history/1960-1970.htm}; Internet.} Many key individuals in the GIS industry also studied at the Harvard Lab, including David Sinton (Intergraph) and Jack Dangermond (ESRI).

Jack Dangermond and his wife, Laura, founded Environmental Systems Research Institute, or ESRI as it is more commonly known, in 1969 as a privately held consulting firm. ESRI, a current leader in the GIS industry, began research and development in cartographic data structure, which included specialized GIS software tools and creative applications. Through the 1970s and 80s, GIS programs continued to evolve into a technology that would be available to a greater assortment of users. Four students from the Renselaer Polytechnic Institute, the oldest engineering school in the United States, founded the company, MapInfo, in 1986. By the early 1990s, MapInfo had pioneered the concept of using GIS for making business decisions and created the business mapping market.\footnote{“Mapping GIS Milestones: 1980-1990” [document on-line] (GIS Development website, accessed 13 February 2003); available from \url{http://www.gisdevelopment.net/history/1980-1990.htm}; Internet.} Additionally, the development of Global Positioning Systems, or GPS, by the Department of Defense in the 1960s and 70s had a significant affect on GIS technology. GPS is described as a “satellite navigation and satellite positioning system, providing safe and efficient movement, measurement and tracking of people, vehicles, and other objects anywhere in the world.”\footnote{Ibid.} GPS units are now a common feature in modern vehicles and boats, as well as a common georeferencing tool for GIS applications.
The impact of GIS on the world of map-making has been described by T.L. Nyerges in “Understanding the Scope of GIS: Its relationship to environmental modeling”, as follows:

“GIS represents a major shift in the cartography paradigm. In traditional (paper) cartography, the map was both the database and the display of geographic information. For GIS, the database, analysis and display are physically and conceptually separate aspects of handling geographic data. Geographic information systems comprise computer hardware, software, digital data, people, organizations, and institutions for collecting, storing, analyzing and displaying georeferenced information about the Earth.”\(^{114}\)

GIS allows for an amazing array of information, which is only limited by the availability of the data. However, as previously mentioned, the cartographer’s point of reference can significantly affect the interpretation of the data and although maps are supposed to be objective representations of raw data, these maps often become subjective. As noted in Ed Madej’s *Cartographic Design using ArcView GIS*, in the opening chapter,

“You can make maps rapidly with the software, which means that you can also produce a lot of bad maps quickly.”\(^ {115}\)

Therefore, the mapmaker must have a satisfactory understanding of GIS technology, and the common pitfalls of producing maps, before attempting to illustrate data effectively.

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What are Geographic Information Systems?

There are multiple ways to define Geographic Information Systems but a simplistic view is that they may be considered as a “higher order map.”\textsuperscript{116} Essentially, GIS “are a special type of information system, concerned with the representation and manipulation of a model of geographic reality.”\textsuperscript{117} Another definition is that “GIS databases are simply those, which use three dimensional space as an organizing principle.”\textsuperscript{118} But a more comprehensive definition is as follows:

“A geographic information system (GIS) consists of computer software, hardware, and peripherals that transform geographically referenced spatial data into information on the locations, spatial interactions, and geographic relationships of the fixed and dynamic entities that occupy space in the natural and built environments.”\textsuperscript{119}

Many have attempted to define what creates a GIS but there is not a standard answer. There are, however, specific features of GIS that separates them from other mapping or database/information systems.

As noted above, the structural portion of the GIS consists of hardware, software, and data/databases. Generally, the hardware requirements of a GIS are standard operating equipment for most computer users, including computers, input devices, storage systems and computer configuration/networks. Computers for GIS can be personal computers for smaller scale programs; large-scale GIS programs will require supercomputers, or X-terminals, and will


generally necessitate a network environment. Additionally, the GIS user may require a scanner for hard copy data and a digitizer board for vectorisation of given map objects or collected features. This process is referred to as geocoding. A printer or plotter will also be necessary to produce hard copy maps. However, the operating system, or software program, that the GIS user decides to utilize, generally dictates the hardware requirements.

There are various software programs that can perform the functions of a GIS. ARC/INFO by ESRI is one of the most frequently employed programs within the industry. The ESRI software has recently undergone a significant revision and is now available as ArcGIS 8.3. Other well-known programs are Modular GIS Environment, available through Intergraph, and Geo/SQL by Generation 5 Tech, Inc. Both ESRI and Intergraph have developed business partners that have created specialized applications for diverse industries and special interest groups. Desktop mapping programs were developed to provide individual users with the ability to create map presentations. Although they have similar features to a GIS, their ability to support spatial analyses is limited. Prominent sources for desktop mapping programs are MapInfo, developed by MapInfo, Corp; Atlas GIS by Strategic Mapping, Inc.; and MapGrafix by ComGrafix, Inc.

Types of Data Source in GIS

The data and database portion of the GIS is derived from many different sources. GIS data sources are generally classified into two main categories: spatial data and attribute data. Spatial data is defined as “information about the locations and shapes of objects found on the earth’s surface.”\(^{120}\) The most common types of spatial data are raster and vector, although spatial data may also be found in tabular form. Raster references spatial data using a grid of cells (or

\(^{120}\) Getting to Know ArcView GIS: the geographic information system (GIS) for everyone. (Redlands, CA -Environmental Research Institute, Inc., 1999), G-10.
pixels) and assigns different numerical values to each cell. Raster data is most suitable for representing features without discrete boundaries, such as elevation or vegetative cover. However, if discrete boundaries are necessary, vector-based data is more appropriate.

Vector data is based on a coordinate representation of map features. Points, lines and polygons are all vector data. Points are represented by one (1) set of $x,y$ coordinates in GIS, and basically record “anything that can be designated by dots on maps.”\textsuperscript{121} Depending on the scale of the map, these points can include power poles, individual buildings or even cities. Lines, or arcs, are created by two (2) sets of $x,y$ coordinates that are linked between points, or sites, in the real world. This type of vector data can represent roads, railroad tracks, streams, or delivery routes. Polygons, or areas, are represented by three (3) or more $x,y$ coordinates, which are also linked. Land parcels, lakes, or specified zoning districts are all polygons. Social and economic data primarily use vector representation.\textsuperscript{122}

\begin{figure}[h]
\centering
\includegraphics[width=0.5\textwidth]{vector_raster.png}
\caption{Vector data is represented on the left and the same feature is shown in raster on the right.\textsuperscript{123}}
\end{figure}

\begin{itemize}
\item \textsuperscript{121} Castle, 8.
\item \textsuperscript{122} Knowles, xv.
\end{itemize}
Once a feature has been designated as a point, line, polygon or pixel cell, it must be georeferenced to provide its location on a map. Georeferencing is “to assign coordinates from a known reference system, such as latitude/longitude, UTM, or State Plane, to the page coordinates of an image or a planar map.”¹²⁴ As noted in Past Time, Past Place: GIS for History, ‘(l)ocation is what gives GIS its unique powers to integrate and analyze data.”¹²⁵ However, without the attribute data, the spatial data is merely a two-dimensional representation of features on a map that does not allow for more involved spatial analysis.

Attribute data is information about geographic features in a GIS that may include descriptions, measurements and/or classifications of the features. This type of information is usually stored in a database table with attributes as column headers and records as rows. A value, which can be numerical or text, is assigned to the contents of an attribute for each record. Each record is a unique identifier for a particular feature and contains all the attributes that are available from the data sources. For example, attributes of a historic building might include name, date of construction, and architect or builder.

Once these features have been geographically referenced, the information can be combined into layers for a specific location. Although layering can be done for simple visual comparison, it is also “the basis for methods of spatial analysis such as overlay, in which the GIS integrates and analyzes two or more layers of geographic information.”¹²⁶ The integration of these layers may reveal trends or patterns that might not be readily apparent if viewed separately or in purely written form. Additionally, “due to its graphic orientation, there is not only (virtually) an unlimited number and diversity of sites that could be candidates for entry into a GIS database, but also information about the location of sites and their spatial relationship can be

¹²⁴ Ibid., 186.
¹²⁵ Ibid., xv.
¹²⁶ Ibid.
Such layering techniques can provide a graphic representation of information that may not be available from any other source. However, the challenge for all GIS projects is to obtain the necessary data to produce the anticipated results.

**Collection of Data Sources**

There are generally two means to obtain data for a GIS project: primary source data, which usually requires field survey, research studies or remote sensing, and secondary source data from existing maps, tables and other databases. Acquiring the data for GIS has been one of the greatest deterrents in the integration of this technology into standard business practice. As noted by Stan Aranoff in *Geographic Information Systems: A Management Perspective*, “GIS is expensive to implement, primarily due to the conversion of existing data to digital form which may be well over the cost of the hardware and software. Initial cost of building a database is commonly five to ten times the cost of the hardware and software.”

Similar concerns are also shared by Anne Kelly Knowles, editor of *Past Time, Past Place: GIS for History*, as stated in the following:

“Although GIS can be used quickly to make simple maps, students and scholars thinking of using it as a foundation for historical research should be prepared to invest considerable time in designing their systems, acquiring data and converting material from manuscript and print sources, including paper maps, into digital form.”

However, as more GIS projects collect and convert data into digitized formats, the quantity, and quality, of data available will vastly improve. Although specialized fields may have to focus on

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127 Castle, 9.
129 Knowles, xvii.
the digitization of original materials, there are also readily available sources of information currently existing.

One of the best sources of digital information is the United States government. Census information must be collected every ten years and street centerline files are critical to taking the census. To map out street centerlines, the dual independent map encoding (DIME) file was developed in the 1960s. DIME files were replaced in the 1980s by TIGER, or topologically integrated geographic encoding and referencing. TIGER files improved on DIME in two major ways; the first is by coverage area. DIME files were only provided for urbanized areas, TIGER files are intended to encompass the entire United States.

The second major difference is the method in which the street centerlines were mapped. For example, in DIME files, “a block face could only be indicated by two $x, y$ coordinates, which means that the streets looked very blocky and jagged. In the TIGER file, many points can be used to show the shape of a street, so the TIGER file is a “better cartographic product.” TIGER files, organized by counties, can be obtained directly from the federal government. However, it has been noted by more than one source that although TIGER files improve upon its predecessor, DIME, the data is not extremely accurate when viewed on a community-scale.

Figure 6: Map created utilizing 1998 TIGER/Line® data and 1990 Decennial Census data. (U.S. Census Bureau website)

130 Castle, 265.
As stated previously, the DIME and TIGER files were created to aid in collection of U.S. Census data. The data obtained from the census may also provide valuable demographic information, which can be used for analysis and planning in many industries. For example, the census can provide information on age, education, ethnicity, and income of the residents within a particular census tract. Additionally, the United States government will have digitized flood elevation maps from the Federal Emergency Management Agency (FEMA); location of wetlands and sensitive environmental areas from the Army Corps of Engineers and the Environmental Protection Agency (EPA); health statistics from the National Institutes of Health (NIH) as well as information from many other federal agencies. Often these federal agencies work with state, county and local governments to collect and disseminate information.

State, county and local governments, as well as regional planning agencies, can provide a wealth of information for GIS projects. State agencies, such as the Texas General Land Office, routinely document the ever-changing coastline environment through aerial photographs. State universities frequently conduct environmental, planning or demographic studies as part of students’ coursework and the data compiled and analyzed in a GIS. State Departments of Transportation may have locations of roadway systems and other infrastructure improvements as a GIS. Some states even have a GIS division, which is responsible for mapping the entire land area, although often with information received by smaller county or regional GIS programs.

County and municipal governments, along with regional planning agencies, can provide GIS users with information on parcel maps, which is perhaps one of the best types of information for GIS projects. However, it is also one of the most difficult to attain. This type of data is often developed as needed and the agencies do not consider these files a product that can be sold to others.\footnote{Ibid., 266.} Local planning studies, zoning categories, special districts, infrastructure
improvements, etc. are also valuable tools to assist with any sort of land development GIS program. However, as with parcel maps, this information is not always readily attainable in digital format. In many cases, the governmental entity may not have a fully developed GIS program or the policy regarding dissemination of information may not allow for GIS data to be released outside of the agency itself.

The release of government data has been a controversial topic for some time; in fact, within the GIS industry, numerous articles and even trade conferences have addressed this subject. The main debate centers between the government’s need to recover their costs in developing the data versus the public’s right to freedom of information. To date, the trend has been towards governments selling data in both the United States and Canada.132

Private organizations may also be willing to sell or share data. Many non-profit organizations have a specialized field of interest and may have received grants in order to research a particular subject. Generally, the information is intended to be shared with others to further the mission of the organization. For profit organizations, as well as consulting firms, may have already converted “high demand” data for distribution or have the capabilities to provide the data conversion to clients.

For example, Sanborn Map Company, one of the greatest sources of historical data in graphic form, will digitize their historical insurance maps as well as provide current maps of existing built environment, aerial photography, and GIS services, for a fee. The city of New Orleans recently converted historic Sanborn Maps into GIS format. The Journal of GIS in Archaeology describes the project and includes examples of the digitized Sanborn maps within the article, entitled, “Historic Sanborn Maps in the Digital Age: City of New Orleans.” Figure 7 below illustrates the digitized building footprints from the historic Sanborn maps.

132 Ibid.
As with all acquisition of data, several variables have to be considered in constructing a GIS database. Both internal and external data must meet certain criteria for inclusion in a high-quality database. In *Profiting from a Geographic Information System*, the following is noted regarding assessing current data available:

“The eight requirements for a high quality GIS database are listed below and must be achieved through the available or acquired source materials. Source materials must be:

1. Accurate (free from mistakes and errors; whatever is displayed is correct),

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2. Complete (all necessary elements are displayed),
3. Timely (the data are current, up-to-date),
4. Reliable (users can depend on the information),
5. Credible (different sources agree),
6. Valid (the impact of changes is predictable),
7. Convenient (the required information is easy to use), and
8. Readable (files are clean, legible, and easy to read).

The criteria for selection and use of the multiple, varied source materials are as follows:
1. Appropriate scale,
2. Content accuracy (correctness),
3. Latest date of revision (currency),
4. Positional accuracy (relative and absolute),
5. Coverage,
6. Legibility, and
7. Suitability.

If critical data are unavailable or unsuitable for use in their present form, they must be physically inventoried. It is simply a cost of GIS database conversion. To do otherwise would be a waste of money.134

Although the acquisition of data sources appears to be the most challenging aspect of a GIS project, the amount of data available is increasing every day. As GIS becomes an integral tool in multiple industries, the quality and diversity of information will expand exponentially.

134 Castle, 285.
Current GIS applications

Jack Dangermond, President of ESRI, is frequently quoted as saying, “the application of GIS is limited only by the imagination of those who use it.”135 GIS is now used in multiple business fields as well as community-based organizations. There are similar application techniques that are utilized throughout these diverse groups that have been customized for that particular field. Generally, any field that relies on location-specific information should be able to utilize a GIS to improve their efficiency and base of knowledge.

One of the most obvious location-based fields to utilize GIS is real estate. As the familiar quote says, “What are the three most important factors in a real estate decision? Location, location, location!” Purchasing property requires an extensive amount of knowledge regarding the surrounding land use, demographics of the area, property valuation, and other socioeconomic factors. Institutional investors, such as banks and insurance companies, are also increasing their control in the real estate industry. These investors demand that the purchase of real estate be analyzed, “with relatively sophisticated computer models, supported by extensive and credible databases.”136 A GIS can also be employed to review property valuation in the surrounding area to determine if the market value of the property is adequate. In many cases, the local tax appraisal office or government provides this information. Therefore, the use of a well-designed GIS in the acquisition of real property is an evident match. However, the acquisition and lease of property is only one aspect of the real estate field with which a GIS can assist.

Property inventory and asset management are extremely important functions of any corporation involved with real estate holdings. A GIS can be used to assess the company’s real estate to determine if properties have excessive rents or carrying costs, and if the people or assets

136 Castle, 86.
should be relocated. A GIS can also be employed to analyze the use of the real estate holding and
determine if reallocating office and warehouse space would result in greater efficiency as well as
determining if there are surplus properties which should be sold. A GIS can also track
maintenance and improvements of buildings for companies with large-scale land holdings. If a
corporation is involved with property management, the GIS may also be used to attract tenants to
specific properties by providing the local market demographics in relation to that particular
business.  

Businesses can also utilize the analytic capabilities of a GIS. For companies that are
involved in marketing, a GIS can be used to develop sales and support territories. By creating
contiguous and condensed regions, the companies can improve the effectiveness of their sales
force. In addition, analysis of the demographics of the area can also produce sales territories that
are equitable and efficient.  This type of spatial analysis can also be deployed in retail
businesses as well.

Retail companies are generally nationwide organizations that have created sophisticated
models to determine the placement of their facilities. These corporations look at regional
preferences for such items as fast foods, consumer products and services that have been obtained
through market research, which have been entered into a GIS database. One example is the
Arby’s fast food franchise, which utilizes GIS to determine the best location for new
restaurants.  Meineke Discount Mufflers also uses a GIS program from MapInfo Corporation
to interpret information about customers from their database, and other market research, to
determine the placement of their stores as well. Paul Baratta, director of real estate and

137 Ibid., 93.
138 Ibid., 261.
139 Ibid., 94.
international development for Meineke, stated the following about their GIS system, in the New York Times article, “Turning a Map into a Layer Cake of Information,”

“We can place a store on the map, draw a radius around it, then ask the system how many vehicles are in the area. There might be 75,000 cars in a given neighborhood, but another layer of data might show that 65,000 of those are Lexus brands. How many people are going to put mufflers on a car that they’re trading in every two years? It looks at the information in a different way.” 140

Sears, Roebuck and Company is another national corporation that utilizes a GIS to decide on the placement of new stores. Sears uses their customer database to look for areas with large ratio of homeowners, versus rental property, since property owners are more likely to purchase home improvement items that are sold in their stores. 141

Sears uses GIS for other company functions as well. One of the GIS capabilities is to create distribution routes for home delivery. The GIS analyzes information such as “how large the merchandise is and how heavy, how much the trucks can carry, where the customers live, how long it takes to get from one house to the next, and how long it takes to unload and install each appliance. Plus, the truck has to arrive within the promised four-hour delivery time.” 142 The company has found that utilizing a GIS to determine distribution routes has increased efficiency since the information is produced more accurately and there is a significant reduction in time from the manual system that had been employed previously. This same type of spatial analysis is also being used by the Sears, Roebuck and Company to determine routes of forklifts within the

141 Ibid.
142 Mitchell, 20.
warehouses, which also increases the overall effectiveness of the delivery and distribution of consumer items. 143

Determining the most effective, and time-efficient, route is also extremely important for emergency management operations. In 911 operations, emergency personnel are usually dealing with people under stress who are not able to accurately give location information. Utilizing caller-ID, and GIS-linked databases, the 911 operator can quickly determine the location of the caller and relay the information to response crews. The location of fire hydrants, storm drains, power poles, and other pertinent information for response crews can also be displayed on the GIS system.144 In large-scale emergencies such as wildfires, hurricanes or other flooding incidents, GIS can be utilized to determine the boundaries of the disaster through the use of GPS units. A GIS could also provide sophisticated spatial analysis of how the boundaries of the disaster area could expand based on information such as wind speed, elevation of land, rate of precipitation, or other environmental factors, which could affect the specific event.

GIS is not only useful in the response to emergency events but also in the other three phases of the disaster management cycle: preparation, mitigation, and recovery.145 One of the most challenging scenarios for disaster preparation and mitigation is the cycle of wildfires and mudslides that occur in the western states. Drought conditions produce an increased risk for wildfires. If wildfires do occur, there is usually a significant loss of vegetation in the area, which then leads to susceptibility for mudslides if there is a substantial amount of rain. Obviously, emergency operations managers need to have a vehicle to assess the conditions, which lead up to the disaster event. In cases such as wildfire and mudslides, environmental factors such as slope of the hill, vegetative cover, amount of precipitation and hillshade (based on quality and quantity

143 Ibid, 26-27.
144 Ibid, 5.
of sunlight) are necessary data that the GIS model would require during analysis to project future danger zones.\textsuperscript{146}

Other environmental disasters, such as hurricanes, would take into account evacuation times and accessible routes. The one advantage to hurricanes, versus other natural disasters, is that there is an alert period prior to the event actually occurring. However, until weather models become more accurate, there is still an element of uncertainty for the precise location of landfall. A GIS can assess conditions to help direct officials in the information disseminated to the public. For example, if a roadway has become inaccessible due to flooding or an accident, or the vehicle load has exceeded roadway capacity, the GIS can determine the best alternate route for evacuation. After the disaster event, the GIS can also be used to determine the level of destruction throughout the area, placement of emergency personnel and areas where utilities have been compromised.

Utility companies, as well as local government infrastructure, can utilize a GIS to determine where to shut off utilities in disaster areas or if line damage has occurred. Many power and natural gas companies have already instituted GIS programs that track the location of main distribution lines, as well as individual meters. The GIS allows the utilities to map out areas for expansion, and to assist developers in identifying the infrastructure available to vacant land. In many cases, the GIS can also monitor utility flow, including electrical distribution and water and sewage flow during flood events, to improve the capability of the system during surges.\textsuperscript{147}

Local governments can also benefit from GIS in a multitude of other ways. One of the most common uses of a GIS within a local government is to manage growth. Most local planning departments are utilizing a GIS to assess land use and zoning issues in long-term growth plans. Trying to assess the needs of the community, twenty years in the future, requires that all variables

\textsuperscript{146} Ibid, 9.
\textsuperscript{147} Mitchell, 61.
possibly attained should be included in the analysis to provide the most accurate representation of future scenarios. GIS can also assess the suitability of land for development through the review of environmental factors such as slope or a location in a floodplain or wetland. In these cases, sensitive environmental areas may be designated as conservation areas or zoned for very limited land uses.

As growth occurs in communities, the local government has to reassess the infrastructure available. This may include water and sewer systems, as mentioned previously, but also quality of life issues as well. One example is the distribution of schools in a community. As the land develops, the demand for schools also increases. Shifting populations may also require a review of available classrooms or attendance boundaries for particular schools. There is a complex set of factors that must be considered when re-districting schools, including ensuring that the schools will not be overcrowded nor underused, students’ travel time to school, and avoiding splitting neighborhoods into multiple school districts. Other quality of life issues include tracking recycling pick-ups and drop-off centers, green space and park improvements, as well as public health issues such as water and air pollution.

Environmental groups, as well as advocacy groups, may also find a need for a GIS. For example, Essential Information, an advocacy group founded by Ralph Nader, utilizes GIS to track financial institutions’ loan activities in major cities. Utilizing the data in the GIS, the group then determines whether residents in poor neighborhoods are given fair access to mortgages. John Brown, director of the GIS project at Essential Information, noted, “(p)eople who have a hard time relating to statistics can instantly grasp the impact of a map.”

Other non-profits that have utilized GIS in a similar way include community development corporations (CDCs). CDCs usually work in low-to-moderate income areas to

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148 Ibid., 51.
149 Greenman. "Turning a Map into a Layer Cake of Information"
redevelop neighborhoods that have fallen into decline. Utilizing a GIS, the CDC can assess which blocks have multiple vacant lots, tax delinquent properties and/or absentee landlords. These factors are all reviewed in determining the blocks that have the greatest potential for redevelopment.\textsuperscript{150} And as described above, presentation maps can graphically illustrate the need for reinvestment to loan officers and potential developers, as well as reviewers of grant applications.

There are numerous other fields that have begun integrating the use of GIS into industry standards. As stated above almost any field that relies on location-specific information should be able to utilize a GIS to improve their efficiency and base of knowledge. Within the last several years, more specialized location-specific fields such as landscape architects, archaeologists and historians have begun utilizing GIS to manage large amounts of data that relates to specific sites. With such closely related fields taking advantage of the benefits that a GIS program has available, it is a natural progression for the field of historic preservation to begin integrating the technology into daily practice as well.

\textsuperscript{150} Mitchell, 15.
Chapter 3

The Use of GIS in the Historic Preservation Field

The future belongs to those who see possibilities before they become obvious
Author Unknown

In the Spring 2001 edition of the National Trust for Historic Preservation’s Forum Journal, an article entitled, “Applying GIS Technology to Preservation Planning” was included as part of the publication focused on local government and historic preservation. The inclusion of this article indicates the growing awareness of this type of technology within the preservation field. Deidre McCarthy, author of the article and a member of the National Park Service’s Cultural Resources GIS Facility staff, stated the following:

“Clearly GIS, and related technologies like GPS, open many new possibilities for preservationists and preservation planners, particularly at the local level.”151

As early as the mid-1990s, historic preservation professionals began calling for improved methods for managing the large amounts of data involved in historic resource inventories. In the National Park Service document, From Paper File to Digital Database, the author notes that:

“Lack of inventory automation, through computerized databases or Geographic Information Systems (GIS) in a majority of states renders these inventories ineffective for

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land use planning and regulatory compliance, resulting in increased costs for government agencies and informed land development decisions.”

Although the paper primarily focuses on managing inventories located in the State Historic Preservation Offices, the same holds true for local organizations. As more communities complete historic surveys, the sheer volume of paper-based information becomes not only a storage problem but a retrieval problem as well.

In a paper-based historic resource survey, the supporting documents, photographs and actual survey forms are usually kept in individual folders in file cabinets or in several large binders. To retrieve the information, one generally has to pull the individual files, sort through the loose papers, and then utilize a separate map to locate the property. The process can be time-consuming and does not easily provide a geographic reference for multiple properties. In addition, historical maps, which may give vital information to development patterns or locations of significant historical events, can not be referenced in physical relation to the modern maps for reasons such as differing scales and the inability to overlay documents.

As part of the article, “From Paper File to Digital Database,” the proposed goal was to automate the existing SHPO historic resource inventories more quickly than they were currently converting. To achieve this goal, the document proposes to increase the Historic Preservation Fund by $5 million a year, for a period of five years, so that “by the year 2003, all 5 million historic properties and all 500,00 survey data will be within a computer database and in a GIS.” Unfortunately, the goal of the article has not been achieved to date. However, the National Park Service has established the National Historic Preservation Information Network (NHPIN), which is a “web resource designed to provide information and assistance regarding Geographic


153 Ibid.
Information Systems (GIS) and Global Positioning Systems (GPS), as they relate to historic preservation and cultural resource management.”  

NHPIN maintains information regarding the current status of state, federal and tribal inventories. Currently, per NHPIN’s listed state inventories, only 0.5% - 1% of each state’s archaeological and historic properties surveys have been entered into a database and/or digitized.  

“From Paper File to Digital Database,” goes further in stating the consequences of not taking action to automate the SHPO inventories, 

“As paper inventories continue to grow, their search and retrieval times will soon be unacceptable to most regulatory environmental review processes such as NEPA, historic preservation review processes such as Section 106, and their state and local counterparts. As these processes begin to employ GIS and computer databases to make decisions that impact historic resources the inventory will cease to inform these processes. The result will be the inadvertent loss of historic resources, increased expenditures on surveys, fewer nominations to the National Register, and inability to respond to disasters, and a loss of investment in the inventory” 

Although these comments are directed to statewide inventories, the same conditions hold true for local historic preservation programs. Local inventories can become quite extensive in communities that have a large number of historic resources, especially if spread over a wide geographic area. Additionally, if a municipality or county is a Certified Local Government, they also will be called upon to address issues regarding historic preservation review as well as commenting on, and nominating, properties to the National Register of Historic Places. Geographic Information Systems offers historic preservationists an essential tool in managing the

156 Ibid.
basic components of the field. In order to extrapolate the possibilities further for local programs, one must review current applications utilized in preservation related fields.

**GIS in Historical Research and Cultural Resource Management**

The use of GIS in historical research and cultural resource management has now become prevalent enough for Environmental Systems Research Institute (ESRI) to have published a book entitled, *Past Time, Past Place: GIS for History*. The publication outlines historical studies that have utilized GIS to piece together information from the past in ways that had not been previously analyzed. For example, in the chapter entitled “*Teaching the Salem Witch Trials*”, the author, Benjamin C. Ray, describes integrating information from various historical sources including legal documents, maps, as well as personal data regarding the people involved with the trials such as dates of birth, family histories and economic status. As Ray states,

“What makes the archive coherent and useful is its simultaneously geographical and historical organization – the linking of every document, every image, and every piece of demographic and genealogical information to every person involved, with their location in place and in time.”  

During the study of the Salem Witch Trials, the author’s students analyzed the source data in new ways. One was by mapping out the geographic relationships between the accusers, the defenders and the accused witches. Another was to review information regarding the village households in relation to tax rate, church membership, and support of the controversial Reverend Parris. Parris was the fourth minister of the local church within a single year, and three of the witch accusations came from his household. One of the more interesting maps created from the historical data was the location of the accusations over the course of time. In June 1692, the initial accusations were focused in Salem and Ipswich, a neighboring village to Salem. After June, no other witch

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157 Knowles, 21.
accusations occurred in Salem, but they did continue in outlying communities through September of that year. Ray stated at the end of the chapter that,

“Using GIS enabled me to incorporate and analyze a larger body of data, and to explore geographical patterns at a variety of temporal and spatial scales. While GIS has not changed my basic historical methods, I now routinely use spreadsheets and relational databases because they permit far more accurate and richer maps. Because all the data can be so easily shared, this approach enables – and indeed virtually demands – collaboration in both teaching and research.”

Obviously, by incorporating a GIS to analyze historical data in new ways, researchers can more readily view relationships between seemingly unrelated pieces of information. In this way, a part of history that may have been misinterpreted previously can be reviewed and the true story revealed. Although this project was dependent upon only written documentation and not fieldwork, the incorporation of both historical documents and archaeological information in a GIS can also assist researchers in piecing together the physical history of a site.

In the past decade, archaeologists have started using GIS and GPS to “map sites with new precision and to predict where undiscovered sites of archaeological interest might be.” Archaeological sites are frequently located in areas that are not well mapped and the use of GPS units can geographically locate the dig position in relation to the surrounding landscape. Additionally, the overlay capability of GIS allows the archaeologist to produce layers of information at different depths, which allows them to see a site in three to four dimensions. An archaeologist may also want to map out a village site in relation to topography and note the development pattern of an ancient settlement as part of the natural environment.

In Past Time, Past Place: GIS for History, the chapter entitled “Telling Civil War Battlefield Stories with GIS” explains the use of GIS and GPS in mapping battlefield parks across

158 Ibid., 32.
159 Ibid., 131.
the nation. The author, David Lowe, focuses one of the first NPS survey projects at Fredericksburg-Spotsylvania National Military Park in Virginia. The survey, which was conducted in 1994 – 1995, mapped out fortifications created by Civil War soldiers within the park. The surveyors compared historic maps with modern maps to determine coordinating points such as road intersections or buildings that could be identified in both sets of maps. Using these features as a starting point, the surveyors then visited the sites and “captured” the spatial coordinates with GPS units. After scanning and georeferencing the historic maps, and adding modern data layers for new roads and topological information, the team of six members then completed the survey of thirty-five miles of trenches in just twenty-five days.160

In addition to identifying the military fortifications, the project was also able to look at past and present land use, as well as buildings, in the town of Petersburg and the surrounding areas. The team selected ten structures from the digitized historic maps and entered the spatial coordinates into the GPS to locate the actual sites. Out of the ten sites, two antebellum houses were still standing and three modern houses were constructed in the middle of very old trees. By talking to the local residents, the surveyors were able to determine that the modern houses had replaced historic buildings. The remaining sites had been destroyed and replaced by factory buildings and convenience stores. Lowe states, “this exercise convinced us that the overlay coordinates could serve the basis for a systematic survey of historic structures in the Petersburg area. When finished, surveyors could report the number of antebellum structures still standing and how many were gone, valuable information for people who promote preservation”161

The National Park Service website explains the breadth of the Cultural Resources Geographic Information Service’s (CRGIS) project “Mapping America’s Battlefields.” Outlined on the website are the various GIS and GPS projects, as well as reports and papers generated by the mapping project. The synopsis for the GIS project “Civil War Battlefields in the Shenandoah

160 Ibid, 53.
161 Ibid, 57-58.
Valley of Virginia, Summer 1993” described the reasons the CRGIS created the database for the fifteen Civil War battlefields in the Shenandoah Valley of Virginia:

1. to assess the integrity of the battlefields based on current (1993) land use or land cover;
2. to provide digital data to Federal, State and local agencies for incorporation into their respective GIS databases;
3. to create a long term, ongoing inventory of Civil War battlefields as part of the American Battlefield Protection Program;
4. to use the databases for further analysis and enhancement such as Global Positioning Systems (GPS) survey, viewshed analysis, development scenario modeling and preservation priority analysis.162

The CRGIS battlefield project is supplying valuable historical information, not only on the federal and state level, but also locally. As stated above, one of the goals of the survey is “to provide digital data to…local agencies for incorporation into their respective GIS databases.”

Local officials can utilize the historical and archaeological data provided by the Federal government and consolidate into the local planning process.

Another historical research case study in Past Time, Past Place, is in the chapter entitled, “Immigration, Ethnicity and Race in Metropolitan New York, 1900 – 2000.” As mentioned, one of the data sources for GIS work is the United States Census, which provides valuable demographic information for the tract being researched. The GIS project reviewed the changing human geography of New York City for the 20th century; as noted by the author, Andrew Beveridge, “many neighborhoods have been repeatedly reconstituted, changing language,

religion, complexion, and economic status.” Although the census tracts had changed from 1910 to 2000, the GIS was able extrapolate the information so that the researchers could review population changes for specific areas.

The earliest effort to understand the changing population was presented by Walter Laidlaw, a New York City Urban Planner. Laidlaw suggested that “the city be divided into units according to population.” Eight U.S. Cities were divided into tracts during the 1910 Census; New York City was one of them. The 1990 Census was the first to have the entire nation divided into tracts. By reviewing the census information over time, social scientists, planners and public officials can utilize the data to understand changing settlement patterns, land use, segregation, and other socioeconomic issues.

To assist cities across the nation with creating similar data and maps, a new project has been started at the Minnesota Population Center at the University of Minnesota. Directed by John Adams, the National Historical Geographic Information System (NHGIS) “will digitize all available tract data and boundaries for 1910-2000 and all available county-level data and boundaries for 1790 – 2000.” The information will be made available to the public via the Internet, thereby making this type of research project possible for almost any location within the United States.

The volume of GIS projects that are currently in progress in historical research and cultural resource management is burgeoning. GIS can be utilized as an investigative tool, to understand the historical significance of particular historic artifacts, to produce maps of research data, or simply to compile and organize location-based information from various sources. Through researching and understanding historical data, we must review the lessons of the past and utilize these to preserve our historic resources and plan for better communities of tomorrow.

163 Ibid., 65.
164 Ibid., 66.
165 Ibid., 67.
GIS in Local Governments and Preservation Planning

The main application for a GIS in local government is maintaining information about the community. The wealth of information that can be contained in a GIS ranges from mapping out the city’s infrastructure; including roadways, water and sewer systems; emergency services operations, such as police and fire; to perhaps the most important to preservation planning, zoning and building department information. The data compiled in building departments and planning/zoning departments is invaluable to a local government preservation program. Although departmental structure varies from city to city, the municipal historic preservation office is often a part of the planning department. If well-integrated into the city’s planning initiatives, preservation planning can affect all aspects of managing growth and encouraging economic development.

As mentioned previously, the comprehensive historic resources survey provides the foundation for the local government historic preservation program. Although historic preservation ordinances, districts and commissions can be established by surveying only the areas subject to the local regulations, an area-wide historic resource survey is essential for a well-developed preservation plan. A comprehensive historic resource survey also aids a local government in the responsibilities of becoming a Certified Local Government. As one of the requirements of becoming a CLG is to maintain a system for the survey and inventory of historic properties, a local government must find a way to initiate and manage the retrieval and storage of the data generated by the historic resource survey. It is in this capacity that a GIS system can best serve the local government’s preservation program.

A GIS is capable of storing large quantities of data and referencing that information to a site-specific identifier. For many communities, the unique identifier can be an address combination, the parcel number assigned by the local appraisal office, or any identification number that is specific to only that structure or parcel of land. For communities with a dense
urban core, or multiple resources on a single parcel or lot, the selection of the unique identifier can become challenging. However, once established, the unique identifier becomes the link between all the data sources so that the attribute data is assigned to the correct feature.

Sharing data between multiple entities is also an important characteristic of a GIS. With a common GIS program, multiple groups may have access to data that normally would not be easily accessible. In some communities, GIS Consortium groups have been created to facilitate the sharing of information. Members of the consortium may include the local government, utility companies, the economic development office, the chamber of commerce, the tourism board, local colleges or universities, the local historic preservation non-profit group, the tax appraiser’s office, etc. Any organization that has GIS capabilities and information that would be valuable to the other consortium members is an asset to the group. The more diverse the make-up of the data sharing group, the greater the analytic capabilities of the consortium as a whole. The group is also able to create naming conventions, standardize the data input, and avoid projects that duplicate work already completed by another organization. As data gathering is one of the more challenging aspects of a GIS project, partnering with other local entities is strongly suggested.

The creation of an effective GIS program, and integration of the historic resource survey into that system, provides the basis for expanded analytical capabilities for local historic preservation work. Utilizing existing parcel data and information derived from the historic resource survey, city planners can determine boundaries for the creation of new historic and conservation districts. The GIS can also assist the planning staff in developing historic preservation plans for sites, neighborhoods and historic districts. Although the use of GIS in the preservation field is not currently standard practice, there are several examples of local governments creating GIS projects in conjunction with the management of historic resources.

The City of Newton, Massachusetts also has a well-developed GIS program that includes historic resources as part of the inventory. Although established as a town on December 15, 1691, Newton was not incorporated as a city until June 2, 1873. The city of Newton is located in
Middlesex County, about 7 miles from downtown Boston and 31 miles from Worcester.\textsuperscript{166} Through the use of a CLG grant, the city of Newton was able to record over five thousand local, state and federal designated historic sites. By integrating all departments, as well as historic resource material, in a GIS, the city is able to coordinate land use planning with other local and state agencies.\textsuperscript{167} The city was so successful in the implementation of its GIS program that in the year 2000, the City of Newton was awarded the “Best Municipal GIS in New England”.\textsuperscript{168}

A city that successfully utilized GIS, historic preservation, and the comprehensive planning process is Athens-Clarke County, Georgia. In the ESRI publication, \textit{GIS for Landscape Architects}, Athens is described as “one of those fortunate small towns that has maintained the historic character of downtown.”\textsuperscript{169} However, as Athens is only 70 miles east of the center of the constantly expanding metropolis of Atlanta, the city/county government is experiencing the pressure of encroaching development.

In August 1998, the city of Athens contracted with Fregonese Calthorpe Associates (FCA) to prepare a new comprehensive plan utilizing a GIS format. An ad hoc committee composed of “homebuilders, bankers, environmental advocates, advocates for historic preservation, and University of Georgia representatives” met monthly to review the consulting firm’s work to date.\textsuperscript{170} There was also an extensive public involvement process including questionnaires distributed by local newspapers, as well as community information meetings. FGA then produced preliminary land use plans based on the information obtained from the public comments as well as the committee. In addition, by working with the GIS/Graphics Division of the Athens-Clarke County Planning Department, the consultants were able to map the existing

\textsuperscript{166} City of Newton Massachusetts website “Demographics”, accessed 29 June 2003, available from \url{http://www.ci.newton.ma.us/demographics.htm}; Internet.
\textsuperscript{167} Preserving Your Communities Heritage, 4.
\textsuperscript{169} Hanna, Karen C. \textit{GIS for Landscape Architects} (Redlands, CA: Environmental Systems Research Institute Press, 1999), 47.
\textsuperscript{170} Ibid, 48.
land use patterns, growth patterns and demographics. The use of GIS also enabled the consultants to create full-color maps that were easily read for the community to review during the planning process. By utilizing the input from the diverse interest groups, the completed land use and growth concept plans reflect the overall vision of the citizens, while maintaining the community character that defines the historic core of the city.

The July 2000 edition of *CRM* included an article entitled “Taking America’s Past into the Future: Prescott, Arizona, Plans for the Future of Historic Preservation”. The city of Prescott was established in 1864 as the capital of the newly created Arizona Territory. Although the capital changed to Phoenix in 1889, Prescott had a population of over 2000 and was well-established. The author, Nancy Burgess, the city’s historic preservation specialist, describes Prescott as a city that “retains hundreds of historic buildings and dozens of historic neighborhoods with an early-20th century character and small-town charm that bring visitors and new residents from throughout the United States and many other countries.”171

The City of Prescott became a CLG in 1980 and received a grant from the program to revise the city’s preservation ordinance. A subsequent grant from the federal Historic Preservation fund allowed the city to hire a consultant to prepare a historic preservation master plan. The Historic Preservation Master Plan was adopted in 1997 and included numerous customized maps created by the city’s GIS division. National Register and historic preservation overlay districts are included in the overall GIS for the city. By utilizing a single tool button, staff members can display all information regarding a particular parcel of land including site address, inclusion in one of the historic districts, zoning, and property owner. Timothy Smother, Prescott’s GIS coordinator, also intends to expand the data currently provided for historic properties and stated in the article:

“In the future, digital imagery will be linked to existing historic preservation overlay
district and National Register historic district parcels to both document current status,
parcel by parcel, as well as engineer a “virtual” walk of Prescott’s historic properties.
This may include three-dimensional “maps” along with historic and contemporary
photographs.”

Additional plans for addressing historic preservation concerns by using GIS also include review
of districts for possible re-zoning as well as an overlay district to restrict building heights.
Although the previous examples of historic preservation related GIS projects have dealt with
smaller scale cities, the application of GIS to a survey project, such as one proposed for the City
of Los Angeles, shows the ability of the system to deal with large-scale historic resource
inventories.

At the National Alliance of Preservation Commission’s Forum 2002 conference in San
Antonio, Texas, a session entitled, Current Issues in Historical and Architectural Survey included
a discussion of the Los Angeles Historic Resource Survey. The Getty Conservation Institute
commissioned Kathryn Welch Howe to conduct an assessment of the City’s Historic Resource
Survey. In the Summary Report, Howe notes that less than 15% of Los Angeles had been
surveyed although there had been a cultural heritage ordinance in place since 1962. She also
states that a “historic resource survey should be considered the first step in a large, dynamic
process, not an end in itself.”

Several existing strengths were also identified as part of the study including the
Department of City Planning’s parcel-based Geographic Information System. The GIS was
recognized as having the potential to be “an important tool to integrate survey information with
other property-related information, thus facilitating one-stop review of all pertinent information

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172 Ibid., 16.
173 Howe, Kathryn Welch. Los Angeles Historic Resource Survey Assessment Project: Summary
on a property.\textsuperscript{174} The Department of City Planning’s GIS currently includes a map identifying locally designated “Historic-Cultural Monuments” and Historic Preservation Overlay Zones (HPOZ) that may be accessed from the Internet.\textsuperscript{175} As a result of the analysis project, one of the priorities for the City of Los Angeles suggested the extension of the GIS program as follows:

“Currently, the Los Angeles City Council has directed the Department of City Planning to maintain an official database of locally designated historic property (Historical-Cultural Monuments and HPOZs) on the city’s GIS. There is a tremendous value in a citywide database that includes survey information and the different types of resource classification associated with the individual property. For environmental review purposes as well as public information, consideration should be given to aligning the survey process with the GIS parcel mapping system so that survey information is included for every parcel for which a survey was conducted. A link to, or preferably integration with, CHRIS (California Historic Resource Information System) would produce maximum effective use and exchange of important data.”\textsuperscript{176}

As this report shows, the utilization of GIS in historic resource survey, especially for large cities, for integration into the planning process is essential. Linking survey records into an existing database provides for a comprehensive assessment of the location specific data and provides city planners with the necessary factors to make informed decisions. Additionally, in states such as California, the planners need a system to assess all environmental factors which could negatively impact historic resources.

As noted in Chapter 2, a GIS is useful in emergency events such as wildfires, earthquakes and hurricanes. However, when historic structures are threatened as part of the event, the necessity of a GIS is evident. A GIS can be used in the preparation, mitigation, response, and

\textsuperscript{174} Ibid., 7.
\textsuperscript{175} Ibid., 11.
\textsuperscript{176} Ibid., 20.
recovery phases of a disaster management cycle. In the preparation and mitigation stages, identifying the historic areas is a prerequisite to each of the remaining steps. By utilizing additional layers of information such as elevation levels, drainage systems, and flood zones for flooding or hurricane prone areas, or in cases such as earthquakes, wildfires and mudslides, environmental factors such as slope of the hill, vegetative cover, and amount of precipitation, a preservation planner can identify areas that are more prone to natural disasters. An educational campaign could be launched to inform historic property owners of the potential threat and how to prepare. The National Trust for Historic Preservation has information booklets that deal with disaster preparation and relief including, *Controlling Disaster: Earthquake-Hazard Reduction for Historic Buildings* and *Hurricane Readiness Guide for Owners and Managers of Historic Resources*. The citizens are then informed of the potential impact of the natural disaster and can mitigate the effects as much as possible.

As discussed, during the response phase of a disaster, a GIS can be utilized to determine the boundaries of the disaster through the use of GPS units. A GIS could also provide sophisticated spatial analysis of how the boundaries of the disaster area could expand based on information regarding the type of disaster and related environmental factors, which could affect the specific event. Emergency personnel can then be notified if a significant historic resource is threatened. Although the primary focus of emergency personnel is, and should be, to protect human lives, the importance of certain historic resources to a community may focus additional efforts to save the property from destruction.

During the recovery phase, the GIS can be used to determine the boundaries of the destruction, the level of destruction and the historic resources that have been affected by the emergency event. This analysis capability becomes extremely beneficial when FEMA responds to the event. Since FEMA is a federal agency, all funds expended will come under Section 106 review. Section 106, under the National Historic Preservation Act, states the following:
“The head of any Federal agency having direct or indirect jurisdiction over a proposed Federal or federally assisted undertaking in any State and the head of any Federal department or independent agency having authority to license any undertaking shall, prior to the approval of the expenditure of any Federal funds on the undertaking or prior to the issuance of any license, as the case may be, take into account the effect of the undertaking of any district, site, building, structure, or object that is included in or eligible for inclusion in the National Register.”

Therefore, if a comprehensive resource survey has not completed, the jurisdiction and the FEMA personnel will have a difficult time assessing which properties were historically significant. If the properties have been identified prior to the disaster event, the utilization of manpower will be more efficient and focused on debris removal versus identification. FEMA has also instituted in program called Project Impact: Building Disaster-Resistant Communities. In June 1999, ESRI became a business partner for Project Impact and as part of the agreement, the company is “providing multihazard maps and information to U.S. residents, business owners, schools, community groups, and local governments via the Internet.” Communities that were involved in this program utilized GIS in “identifying potential hazards, planning mitigation programs, and assisting in disaster preparedness activities.” Unfortunately, Project Impact is no longer offered by FEMA although other disaster planning programs are available. Usually FEMA will enter into a programmatic agreement with the SHPO to assist in the identification and damage assessment of historic properties in conjunction with the local government. Utilizing a GIS with an updated historic resource survey, response personnel can quickly determine which properties

179 Ibid.
within the damage area are either listed or eligible for the National Register and conserve valuable time and energy in rebuilding the community.

In addition, to providing valuable information for federal undertakings in Section 106 review, whether during a disaster event or not, a GIS-based comprehensive historic resource survey may also assist the local government with recommending properties for nomination to the National Register. Although the jurisdiction may be involved in the process of creating the nomination, the state review requires that a CLG comment on any proposed inclusion to the National Register. Through accessing the resource database, and reviewing the historic context of the proposed structure or district, the municipality can make an informed decision and response for eligible properties.

There are widespread applications for the use of GIS in relation to preservation planning and local government entities. However, local governments are rarely capable of providing all of the resources necessary for an effective local preservation program. Local governments should seek preservation partners on all levels – state and federal government offices, statewide non-profit organizations and perhaps, most importantly, the local historic preservation non-profit.

**GIS in Local Historic Preservation Non-profit Organizations**

Local historic preservation non-profit organizations often provide the framework for community-based preservation efforts. The non-profit organization is an advocate for historic preservation and provides services and assistance that the governmental entities are unable to supply. Each non-profit organization will be unique and its mission should reflect of the preservation goals and ideals of the community in which it is based. However, as with local governments, non-profit organizations need to broaden their scope to reflect the changing needs of the community. By exploring the possibilities of new technologies, the non-profit can become a more efficient preservation advocate as well as provide the necessary resources for a successful local historic preservation program.
While there are numerous examples of local governments involved with GIS projects, there are very few local non-profit organizations that are currently utilizing this technology. The lack of local non-profit GIS programs may be contributed to various factors. One factor may be limited knowledge of how a GIS application could contribute to the overall mission of the organization. Even though GIS has been used in archaeology, landscape architecture and planning for the last decade, the utilization of this technology to assist with historic preservation programs is relatively restricted. With the exceptions of the National Park Service CRGIS Division, as well as ESRI’s, publications and websites, there is not a centralized location for information regarding historic preservation GIS applications, especially for the non-profit sector.

In addition to the lack of knowledge regarding GIS applications, there is also a general lack of funds available for historic preservation non-profit organizations, regardless of its size. Many non-profits depend on grant funds and donations to provide operating costs and support outreach programs. However, there are grant funds available for training and software purchase from various GIS software suppliers, including ESRI. In many cases, these grants do not require any matching funds from the organization and are available to non-profits that are setting up a GIS program that meets the established criteria. For example, ESRI’s conservation grant program includes historic resource database and survey work as a qualified project for funding.180

The third factor that may contribute is the lack of other resources, including personnel and computer hardware. With limited financial capabilities, the local organizations may not have enough staff to support the development of a GIS program. However, this lack of personnel can be overcome by the use of graduate level interns in either planning or historic preservation programs. As mentioned, another limiting factor is the hardware component of the GIS program. This can include the server, digitizer, and scanner, as well as network development. However, if

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an effective project plan is outlined, there may be technology grants available to supply the hardware needs of the organization. Existing programs have not adequately modeled the value of a GIS to a local historic preservation non-profit organization. However, by reviewing similar projects in either the governmental or business sector, the benefits of integrating a GIS into a local non-profit’s organizational structure can be easily identified.

As discussed in Chapter 1, non-profit organizations frequently engage in the acquisition and restoration of historic structures. As acquisition of property is location-based, the same GIS application that is available for the real estate industry can be employed by a historic preservation organization. Depending on the type of information available through the GIS database, the non-profit can search for properties that meet the criteria established for acquisition of property. For example, a non-profit organization may have determined a target area within a community to focus its outreach or advocacy platform. These could include areas that are not protected by local historic district regulations or simply areas that have a large number of deteriorated or poorly maintained historic properties. Tax-foreclosed properties and structures determined to be substandard by the municipality may also be a focus of the non-profit organization. The search for acquiring properties could be further refined by reviewing factors such as date of construction, level of historic significance and condition of the property.

Since revolving funds are often used by non-profits for acquiring historic properties, the organization’s Board of Directors will often act as the “investors”. Often business leaders in the community, the board members will need to make informed decisions regarding the acquisition of property by the organization. As the entire concept of a revolving fund is to rehabilitate and stabilize properties for resale to individuals, the Board will want to find properties that do not overburden the fund and also bring a rate of return that will kept the revolving fund solvent. Surrounding land use, demographics of the area, property valuation, and other socioeconomic factors should all be taken into account by the Board when making decisions. In order to assist
the Board during this process, the non-profit staff may use the GIS to generate maps of the target areas with the applicable information graphically displayed.

Once a property has been purchased, the GIS may be used to assess the restoration/rehabilitation of the properties as well. If multiple projects are under construction, the GIS may be used to note the locations of the sites, the funds expended, manpower allotted to each site, and percentage completed on the job. Maps may also be generated as part of the organization’s advocacy effort to show the number of deteriorated properties that have been placed back on the tax role, as well as the funds invested back into the community as part of the overall historic preservation mission.

A GIS may also be used to track easements or deed restrictions placed on properties that have been re-sold by the non-profit organization. As noted above, a GIS can assist with any location-based application. The non-profit will be able to add an attribute to the database that flags the property as having an easement or deed restriction held by the organization. Queries could be run to determine current market value of the easements and the most recent inspection dates of the property. If a non-profit has an extensive easement program or revolving fund, management of these legal responsibilities in a concise manner can be an invaluable asset.

In addition to acquiring properties, the non-profit may also create partnerships with local real estate firms to assist in marketing historic properties to further the cause of historic preservation within the community. Realtors could notify the non-profit organization of current historic properties for sale, and by utilizing the GIS, an information page could be generated that includes a location map, a history of the building, current photographs, and if available, historic photographs. This type of report could be standardized so that it could be easily produced. Additional information could include deed restriction on the property, local zoning information, location within a historic district, and listing on the National Register of Historic Places.

The development and dissemination of a plan to preserve historic sites and districts should be accomplished in tandem with the local government. If the community has an active
historic preservation program through the city or county, the non-profit organization will be a vital partner with the governmental entity in accomplishing the goals of the preservation plan. However, in communities that do not have political support for a local preservation program, the non-profit organization must take a much larger role in the protection of historic resources.

In any type of community planning, a comprehensive assessment of the area is necessary. This may relate to land use, location of schools, public infrastructure, parcel data, businesses located in the area, as well as market values. Public entities such as the local government, tax appraisers’ office, and the public school district may have this information digitized into a GIS database that may be shared. However, information relating to the architectural and cultural significance of the area is not a common focus of these groups. Therefore, if a comprehensive historic resource survey has not been completed, this is the first step for the non-profit organization to effect change in their community.

One example of a local non-profit organization taking on the task of completing a comprehensive resource survey is Preservation Dallas. In the Discover Dallas project, Preservation Dallas is utilizing volunteers to survey properties within the metropolitan area. The goal of the project is to “document all properties with the Dallas city limits up to the early 1960s.” The collection of data will then be catalogued and stored in a GIS-compatible database so that users may search properties by “location, architect, style, date of construction, building material, designation and neighborhood.”

As mentioned throughout this document, compiling and recording survey results is challenging for any group. Historic resource survey data is particularly cumbersome because of the multitude of hard copy data that relates to specific properties. The process for determining a

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preservation plan for the non-profit will be very similar to that of the local government. However, the theme of the plan will focus on activities that are specific to the non-profit’s mission.

Often the planning process for the non-profit will focus on advocacy efforts with the local government as well as an education program for the community on the benefits of historic preservation. A GIS can be useful for creating maps to present to government officials that display the historic areas of the city that would benefit from local historic district protection. Utilizing GIS maps from other communities, a non-profit could demonstrate the increase in property values within a local historic district after the designation. As most politicians are in favor of economic development within their community, the graphic representation of how preservation had encouraged revitalization of historic areas is a strong method of persuasion. As stated in *Boundaries of Home: Mapping for Local Empowerment*:

A map becomes more than a series of lines; it becomes an agenda for action, a turf to defend, a series of memories that remind of action and pleasure and history.\(^{183}\)

The organization could also utilize a GIS to display the number of historic resources that had been lost to demolition over a period of time. Unfortunately, most preservation initiatives only develop when the community realizes it has lost a significant historic building or understands the comprehensive loss of its architectural and cultural history.

In addition to political advocacy efforts, maps generated by a GIS may also be valuable educational tools for the public. As noted in Chapter 2, “a picture is worth a thousand words.” It is difficult for people to fully comprehend written documents or to understand statistics but by creating maps, the history of a community comes alive. For example, the 1900 Storm of Galveston, Texas is still the deadliest natural disaster in United States history. Over 6000 people died in the hurricane that swept across the island. There were also approximately four thousand

structures that were destroyed, which removed about two-thirds of the developed part of the island. The remains created a thirty-foot high, three-mile long mountain of refuse and debris.\textsuperscript{184} The statistics on paper are astounding, but the historic map that displays the areas of loss graphically illustrates the destruction the city received. (See Figure 8) The city did rebuild, and houses that survived the 1900 Storm are now honored by a commemorative plaque program instituted by the Galveston Historical Foundation and the 1900 Storm Committee.\textsuperscript{185} If the historic map was digitized and incorporated into a GIS, the identification of the surviving structures would be more easily accomplished and the story of the 1900 Storm could be interpreted into the modern environment.

\textbf{Figure 8:} City of Galveston's businessmen created this map to document the destruction from the 1900 Storm. (Map Courtesy Rosenberg Library, Galveston, Texas)\textsuperscript{186}

Another way that GIS can empower a non-profit’s advocacy effort is by creating maps of “things to come”. In other words, a map can display the current conditions within a community

\textsuperscript{184} Bixel, Patricia Bellis and Elizabeth Hayes Turner. Galveston and the 1900 Storm. (Austin, Texas: University of Texas Press, 2000), 43.

\textsuperscript{185} The 1900 Storm: Galveston, Texas, online article, accessed 30 June 2003, available from \url{http://www.1900storm.com/welcome.lasso}; Internet.

\textsuperscript{186} Bixel, 42.
and then the effect of a proposed project. In *The Power of Maps*, Denis Wood describes the following example:

“I am one of a group of Raleigh citizens who have banded together to oppose a road the City of Raleigh wants to build across the grounds of a hospital listed on the National Register of Historic Places. In the process – of our living here and now – we compare a map of the proposed route for the road – that is a map of a potential future – with a map of the historic site – that is, with a map displaying a determination made in the past about the extent of the historic site. Past and future – neither accessible to my senses on the ground (the road does not yet exist, there is nothing to see, the boundaries of the historic district are not yet inscribed in the dirt, there is not even a marker) – come together in my present through the grace of the map.”187

Maps such as these can be presented to the planning or traffic commissions of the city government to explain the non-profit’s position on contentious issues.

In addition to participating in advocacy and educational issues relating to community planning, GIS may also be used to create specialized plans that focus on a specific resource, a block-face, or even a neighborhood. These directed planning efforts produce highly visible results even on a small scale, which often radiate out into the surrounding areas. The GIS can be utilized to target areas that could benefit the most from these types of specialized plans by identifying areas that have a strong chance for success. Factors such as a high percentage of owner-occupied buildings or buildings that have maintained a high degree of historic integrity may be used as part of the GIS analysis process. Additionally, by graphically representing the project on a map, the non-profit can present the plan to the citizens and property owners so that there is a “buy-in” from the community. In addition to outreach projects focused on residents of

187 Woods.
the community, the non-profit is also generally the only advocate for historic preservation to visitors to its locale.

A historic preservation non-profit may utilize a GIS for a number of applications for the operation and maintenance of historic places for the benefit of the public. Although the significance of the resource generally determines where a house museum is located, the organization may want to utilize a GIS to analyze the surrounding demographics to determine if the site is readily accessible to public, zoned for museum operation, and the stability of the neighborhood in relation to property values, crime statistics, etc. Through the use of a visitor survey, a GIS may also be used to track the number of visitors to particular locations, where they live, and how long they are visiting the community. This type of information is invaluable to the heritage tourism industry and the community’s tourism organization. The use of a regional or national GIS database may also assist in marketing the historic place to visitors by determining areas for mass-mailing brochures or by concentrating limited advertising funds.

If an organization utilizes multiple historic buildings for the various retail functions, such as museum shops, visitor’s centers or architectural salvage yards, a GIS can assist with property inventory. A GIS can track the number of items located at specific sites, indicate low inventories, and determine the percentage of sales by each retail location. This information may then be used to ascertain whether the non-profit should continue to operate certain properties, reallocate retail inventory between stores or if additional warehouse space is needed.

A GIS may be particularly useful in the maintenance of historic places owned by a non-profit organization, especially if they are spread out over a large geographic area. Historic properties require significant maintenance and care to preserve the features that are unique to the site. In communities where there are extreme environmental conditions, such as coastal communities or desert climates, a well-designed maintenance program is imperative.

One example of this type of GIS program is Fairmount Park in Philadelphia. Although the park is owned and maintained by the City of Philadelphia, the principles that apply to this
A grant application to the William Penn Foundation in 1998 initiated the project to “create the first comprehensive building resource survey inventory for Fairmount Park.” The park is noted to have the largest collection of historic resources in the Commonwealth of Pennsylvania. The final version of the Cultural Resource Inventory database took five months of full-time effort to complete. At the 2000 American Planning Association conference, the Fairmount Park project was presented by Theresa Stuhlman and Amy Freitag, with the Fairmount Park Commission, and Peter Godfrey of Camp, Dresser and McKee. During the conference session, the presenters outlined the reasons for a GIS-based Cultural Resource Inventory. These included:

- Fire – Six properties lost or severely damaged since 1980
- Lack of mapping/address coordination with 911 dispatch
- Lack of Inventory to identify and assess fire detection systems
- Lack of existing database
- Lack of existing mapping
- Need for proactive vs. reactive management
- “Spatial” nature of the problem

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With this project, Freitag and Godfrey note that the Park is “now in possession of a powerful tool for creating an inventory of all its buildings with both database, as well as GIS, applications for decision support regarding historic preservation, capital planning, maintenance prioritization, and a variety of other pro-active planning efforts. The time saved aggregating data is now replaced by time spent on making informed policy decisions.”\(^{189}\)

The research and publication of education materials on the history and architecture of historic districts and sites is also an important function of a local historic preservation non-profit organization. In this case, the use of the GIS is tied to the comprehensive historic resource survey of the community, which has an extensive amount of associated archival research. As noted in *Past Time, Past Place*, “For some historical projects, producing maps is less important than compiling and organizing information from diverse sources according to geographical location.”\(^{190}\) This is one of the truly valuable aspects of a GIS to preservationists, the geographic referencing of multiple sources of data.

Historic resource data is derived from many different mediums including historic maps, old photographs, insurance records, deeds, and narratives. Utilizing a location-based system provides an effective framework for compiling and indexing information. If the non-profit is researching a particular area of the community, analyzing data from the various resources may indicate trends or development patterns that had not been previously identified. By studying unusual architectural features that may be particular to a certain area, the preservationist may be able to determine “sub-groups” of architectural style that are distinctive to that community. This type of information can be useful in historical research as well as creating visitor tours of the community that focus on properties that display features that are unique to the area.

A local historic preservation non-profit may decide to produce walking or driving tours to educate citizens and visitors about the important historic resources throughout the community.

\(^{189}\) Ibid.

\(^{190}\) Knowles, xvii.
Utilizing the same GIS spatial analyses functions as the Sears, Roebuck and Company did to create distribution routes, the local non-profit can highlight the historic resources, determine the best route to reach all of the destinations and the time required for the tour. If the database has historical information on each of the sites, the data can be extrapolated and used to create the script for the tour. Historic photographs and current photographs may also be referenced as part of the information stored in the GIS. It is also entirely possible to believe that in the not too distant future, driving tours such as these may be incorporated into the GPS units installed in vehicles to provide an interactive map that displays the location of the vehicle in relation to the tour.

Although the initiation of, or participation in, litigation to protect the public’s interest in preservation of historic buildings is usually not a main component of the local non-profit organization’s daily activities, there may be a time that the group decides to step forward and pursue legal action. Whenever legal action becomes necessary, a well-prepared case is the key to success. By utilizing a GIS database, the non-profit may be able to utilize maps to analyze the particular situation or provide documentation on the history of the property. Maps created by a GIS may also be useful when a non-profit is called upon to support legislation that will further the cause of historic preservation. As stated previously, “(p)eople who have a hard time relating to statistics can instantly grasp the impact of a map.”  

191 Politicians have multiple issues that they must make decisions upon during each legislative session. By providing clear graphic representations of the facts, specific to their community, in support of preservation-friendly legislation, a non-profit can promote the cause of historic preservation on the local, state and national level.

Local historic preservation organizations also make gifts or contributions to groups that engage in preservation activities, which may also include outreach programs. GIS can be useful

191 Greenman, 2.
to non-profit organizations that have outreach programs to the public that are funded through grants or federal monies. For example, the Galveston Historical Foundation’s Paint Partnership Program was initially funded by a Community Development Block Grant (CDBG). The Paint Partnership Program provides free paint and supplies to low-to-moderate income families with historic properties.\(^{192}\) As part of the grant cycle process, the grant administrator periodically reviews the work that has been completed to date, the money already expended, and where the activities have occurred. By inputting the data relating to the Paint Partnership Program into an established GIS database, maps may be produced to show the data requested. The maps may also show which areas of the city have produced the most applicants and where the organization needs to increase awareness of the outreach program. Additionally, during the next grant application cycle, maps depicting the impact of the program throughout the community may assist in the awarding of successive grants.

In cases where the non-profit is making donations or gifts to other preservation entities, a GIS can help monitor the expenditure of funds to multiple recipients. On the local level, these organizations may include neighborhood groups, special interest groups that provide homeowner assistance programs or redevelopment initiatives. The GIS can track specific projects these groups have completed and determine whether the donations or gifts should be considered for successive years. By giving the local non-profit a tool to analyze all aspects of their mission, the GIS allows to organization to have become a more effective and encompassing force in advocating and enriching the historic preservation of its community.

In a paraphrase from ESRI’s president, Jack Dangermond, the application of GIS in the historic preservation field is limited only by the imagination of those who use it. However, in order to have a successful GIS program, preservationists on the local level must think outside of

standard practices and embrace new methods to advance the historic preservation cause in their community. By reviewing similar projects in other locations, as well as looking to other business fields for inspiration, the local preservation program has the ability to organize and analyze historical data as never before. Although each GIS program will be unique to the community, there are common procedures that will assist any local organization in integrating a GIS to achieve the historic preservation goals and objectives it has set.
Chapter 4

Conclusion and Recommendations

To know the road ahead, ask those coming back. – Chinese Proverb

Even though GIS has become integrated into the standard practices of fields such as archaeology, landscape architecture and urban planning, the historic preservation field has not fully embraced this relatively new technology. Only within the last five to ten years has there been an organized effort, through the National Park Service’s Cultural Resource Geographic Information Systems Division, to bring GIS technology to the forefront of cultural resource management and historic preservation. However, both the historic preservation field and the GIS industry are beginning to promote the obvious link between the two. At the July 2003 ESRI User conference in San Diego, California, there will be two sessions discussing GIS applications in the historic preservation field; one simply focused on “Historic Preservation” and another entitled “GIS Data Models for Archaeology and Historic Preservation”.193 In October of 2003, the National Trust for Historic Preservation conference in Denver, Colorado will also feature a session that focuses on the relationship between GIS technology and historic preservation.194 As the lack of knowledge, and the related “fear of the unknown”, are deterrents for local historic preservationists to begin utilizing GIS technology as part of the standard preservation tools, it becomes obvious that there needs to be a greater education program developed on many levels. For local preservation professionals and activists, the inclusion of GIS information session at

preservation conferences is a beginning but there needs to be more advanced GIS sessions that include practical information for implementing a local program. The 2003 American Planning Association conference provided these types of focused sessions and could be used as a model for future preservation conferences. The conference sessions, and the associated case studies, could then be compiled into an informational book that would be available to local preservation programs as a working guide.

However, this is only the beginning. Historic preservation educators should ensure that GIS technology, and the associated preservation applications, are included as part of the regular curriculum. Although this is a new technology for the historic preservation field, the business and governmental entities with which preservationists interact on a daily basis have already integrated GIS into standard practice. As Deidre McCarthy stated in “Applying GIS Technology to Preservation Planning, “sharing GIS and cultural resource data across local, state, and national boundaries will soon become commonplace, enabling researchers and planners to interpret cultural resource data in ways never possible before.” If preservation professionals are not prepared with the right tools and knowledge, they will not be part of the local, state or federal decision-making processes and the historic resources will suffer the consequences. Additionally, if we are content with current levels of resources and knowledge, the field of preservation will not make progress in and of itself. Students, in the coming years, will be ill-prepared to face the challenges that come with new technology and capabilities if GIS is not incorporated into curriculums.

Another apparent constraint in integrating GIS into the local historic preservation program is funding, which is especially true of the non-profit organizations. As mentioned previously, non-profit organizations often rely on outside funding sources and donations to provide operating costs and outreach programs. However, if a non-profit organization is a 501 (c)(3), they are often eligible for grant programs through the major GIS software suppliers. ESRI and Intergraph both have grants program for non-profits that can be used as a starting point for
organizations that wish to incorporate a GIS. Although these grants primarily apply to the software portion only, Internet links are provided to companies that provide grants for hardware if it is also needed. As the hardware portion of the GIS, including servers and upgrades to existing computer systems, can be extensive for smaller organizations, this may provide the means for a non-profit to fully fund a local GIS program. In addition, ESRI grants also apply to on-line training and publications so that the non-profit organization can educate staff members prior to any major time or funding commitments.

There are also grant programs available for local governments that are planning for a GIS in their municipality. Since a local government GIS will be most effective if it links all departments to the same system, the creation of a GIS can be very expensive for any size community. In addition, most local governments are also authorized to purchase GIS software utilizing state government contracts, which provides the software at a significantly reduced rate. A local government may also be able to sell the information it has assembled to recoup the costs incurred during the program set-up.

The third factor that appears to affect the integration of GIS into the local historic preservation program is the lack of data sources. This is true for both local government and non-profit organizations. Although the National Park Service’s National Historic Preservation Network will eventually provide a centralized repository for GIS information, both the state and federal governments are relying on local programs to supply historic resource data for properties within their community. Fortunately, most states now have a specialized GIS agency “that exists to warehouse and provide the various data layers used and maintained throughout the agencies and jurisdictions within the state.”195 If the baseline information for the community is available, local GIS programs can usually download data sets free of charge. These data sets will also

195 McCarthy, 46.
include statements telling the user “what the data set contains, who made it, and when they made it.”

In addition to seeking governmental data resources, the local historic preservation GIS program developers also need to create data-sharing partnerships. The most obvious partnership is between the two groups discussed: the local government and the local historic preservation non-profit. Each entity has its own role within the community, and these roles will dictate the types of GIS projects that will be the priority for each. If the local government is a CLG, it will be necessary for the historic preservation office to provide a comprehensive historic resource survey as part of the program requirements. Although the use of GIS is not part of the CLG program requirements, the technology will provide the necessary framework for compiling and indexing the data. The non-profit may then assist the local government in attaining the historic resource survey or conduct independent historical research that is derived from the historic resource data. Regardless of how the GIS technology is applied, the sharing of information between multiple sources will increase the capacity of the system since a GIS is only as good as the information the users have to contribute.

Throughout this document, there have been multiple examples and GIS applications described that display how the technology can assist local organizations with developing an effective local historic preservation program. As mentioned previously, historic preservation is no longer just the simple preservation of a building; it now includes “tourism, economic development, open space protection, heritage education, rehabilitation of historic buildings, community conservation, affordable housing, neo-traditional planning, sustainable development, downtown revitalization, cultural celebration, archaeology, design and craftsmanship.” The examples presented explain how the goals of local preservation can be achieved through the use

196 Ibid., 46–47.
of Geographic Information Systems both in the local government and local historic preservation non-profit.

However, there have been challenges presented as well. In particular, the local historic preservation non-profit has the greatest opportunity to utilize the analytic capabilities of a GIS through innovative research, but the greatest challenge in funding and momentum. Such innovative research could include utilizing GIS to predict the location of areas with architectural significance as potential historic districts. The local non-profit could also research the architectural features of mid-twentieth century buildings and describe new architectural styles that may be unique to that community. A non-profit organization would not be restrained by the typical “book-keeping” responsibilities upon which a local government GIS program tends to focus its attention and could seek out new ways of applying the technology to historic preservation.

Nevertheless, once committed to a GIS program, the CLG, or local preservation planning department, is often safeguarded by continuing budget allotments and political pressure. In the future, the State Historic Preservation Offices may find it necessary to direct the CLG’s to provide each municipality’s inventory in a GIS database form that conforms to state standards. Considering the commitment the National Park Service has made to the National Historic Preservation Information Network, this requirement may not be far away. But there are no such requirements placed on a local non-profit. If the Board or staff leadership changes, the commitment to a GIS program may not continue to be a priority. In addition, as with all non-profit organizations, funding sources are not guaranteed and without the required financial backing the project may be placed on the back burner.

For example, the Galveston Historical Foundation began a GIS/survey program in January 2000. A graduate level intern was hired for a full year to focus on starting the GIS and a comprehensive survey of the island. By applying for grants from ESRI, the organization was able to attain software and training to set up the program. The intern, with the technology staff
member, completed construction of a Microsoft Access database with the intention of GIS conversion. However, in mid-project, the senior level staff member that initiated the GIS program decided to leave the organization. Without the knowledge and driving commitment of this individual, it was difficult to sustain the momentum of the GIS survey project. At the end of the intern’s year, the project was not funded again. Although the organization maintains a presence at the local GIS consortium meetings, the project has not moved significantly forward since that time.

The three main factors noted above are lack of knowledge, lack of funding, and lack of data. Although these are obstacles in the integration of GIS into a local historic preservation program, they can be overcome. The implementation of a GIS program is attainable at the local level by educating and preparing organizations for the challenges that may be faced during development. By adhering to a set of guidelines focused on the integrating GIS into the historic preservation field, the local organization can minimize the impediments to an effective project.

**Guidelines for Incorporating a GIS into a Local Historic Preservation Program**

1. Plan, plan, plan
2. Establish realistic goals
3. Assess the organization’s technology
4. Educate the organization’s staff
5. Locate and evaluate data sources
6. Set up partnerships
7. Pursue funding sources
8. Create an implementation plan
9. Don’t underestimate the time or the manpower required
1. Plan, plan, plan

At the outset of any large-scale project, an organization must carefully plan and analyze the anticipated end product. The local historic preservation organization must determine how the data will be used and by whom. Since the composition and presentation of the data may change depending if it will be available publicly, or only utilized by members of the organization, the end user may affect the overall scope of the GIS project. The local historic preservation organization also needs to determine the information currently available and what must be obtained.

If a comprehensive historic resource survey does not exist, the local preservation organizations must decide the methodology for how the information will be obtained and what factors will be included as part of the survey form. If a historic resource survey does exist, the organization must determine if it needs to be updated. The organization must also decide if GPS will be included as part of the project to accurately provide site coordinates. There may also be gaps in coverage for the survey that will need to be addressed as part of the project.

If a database does not exist for the current survey information, the local organization must establish database development as a priority. In order to utilize a GIS, a database for storing the survey and historical resource data must be created. Although there are multiple programs available, the database must be capable of exporting information into a GIS. The type of information that the local historic preservation organization includes as part of the historic resource survey will determine the design of the database. As with most databases, the most important design aspect for integrating into a GIS is consistency of attribute data. In order to create queries for specific features or attributes, there must be uniform categories and naming conventions. If the local historic preservation organization does not have a staff member capable of creating this basic building block of the GIS project, an outside consultant or intern will need to be incorporated as part of the process.

Once the end product has been established, the local historic preservation organization should review the GIS software available. There are multiple corporations that supply GIS
software including ESRI, Intergraph and MapInfo. The pros and cons of each software package should be assessed before deciding upon a product. It is strongly recommended that the local organizations contact their state GIS agency and SHPO to determine which software is currently utilized in order to facilitate information sharing. Many states have also adopted standards and guidelines for GIS projects that will guide the local organization in determining various aspects of the program. In addition, the local historic preservation organization should search for similar projects nationwide and discuss the software utilized with the program manager. As the utilization of the GIS is dependent on the ease of use, the choice of software program is one of the most important decisions the local historic preservation organization will face.

There are also various resources available during the planning phase of a historic preservation GIS project. These sources range from the National Park Service CRGIS Division, to State agencies, software companies, as well as various articles available through publications and the Internet. Although information specific to historic preservation is not always available, general data relating to the planning process of a GIS program will assist the local organization in determining the additional steps required. Utilizing applications that are similar to historic preservation, such as archaeology, landscape architecture and urban planning will provide an easier translation to a historic preservation based GIS application.

2. Establish realistic goals

Once a local preservation organization begins to understand the breadth of GIS applications to historic preservation, it is easy to get caught up in the excitement and thereby set unrealistic goals. The applications and tools that a GIS can provide are extensive, which is why it is necessary to clearly establish the end product of the GIS program. A local historic preservation organization needs to accurately assess its resources so that the scope of work included as part of the GIS project does not overwhelm the staff or the funding.

It may also be necessary to break the project down into manageable parts that span several years. The organization should assess the portions of the project that are critical for local
historic preservation goals and focus on attaining the data or converting into a GIS format. Once the critical information has been completed, the organization may move on to a prioritized list of projects for implementation into the GIS.

3. **Assess the organization’s technology**

The local historic preservation organization must assess the technology currently available once it has decided upon a software program. Operating systems, networks, and servers may need to be upgraded or purchased so that the software program can be used. Each of the GIS software manufacturers will have the system requirements necessary for the applicable programs. Local government organizations should discuss the requirements of the system with the IT department to determine if upgrades are necessary or if the costs associated with the upgrades can be absorbed by that department’s budget or shared with other GIS users.

The purchase or replacement of computer-related technology can significantly increase the expense of creating a GIS project. If a local historic preservation non-profit is a 501 (c)(3), there are grant programs available that can provide the necessary hardware to implement a GIS. The Internet links are often provided on the software manufacturer’s website to assist the organization.

Finally, the local historic preservation organization needs to determine how the information gathered through fieldwork and archival research will be entered into the GIS. This may include the purchase of scanners to digitize hard copy information such as historic photographs, deeds, letters, and insurance records. If historic maps need to be scanned and geo-referenced, particularly if over-sized, the organization may want to consider utilizing a GIS consultant for that portion of the project. However, if there are funds available, as well as trained staff members, the purchase of a digitizer may also be necessary.

4. **Educate the organization’s staff**

A staff trained in GIS technology is an asset to any historic preservation organization, but unfortunately that is not currently the norm. If university-based historic preservation programs
begin incorporating GIS into their curriculums, this will assist organizations in utilizing an essential tool for the preservation of historic resources. However, until this becomes a reality, local historic preservation organizations that wish to create a GIS program must utilize the educational opportunities currently available.

Fortunately, the use of GIS in most major industries has created a plethora of educational training programs to learn GIS technology. In fact, many of the GIS and GPS manufacturers have created training programs for their products. For example, ESRI has a “virtual campus” on its website to teach individuals how to utilize its software. Local colleges and universities also have GIS laboratories set up to teach the various software applications. Other educational sources include the National Center of Preservation Technology and Training, the Cultural Resource GIS Facility (CRGIS) and state GIS agencies.

A well-trained staff is essential to the success of a local historic preservation GIS project. Therefore, the organization must either incorporate the training into the overall cost of the project or seek grant sources for the training. The software manufacturers will often provide funds to non-profit organizations that are setting up GIS programs, in conjunction with the receipt of their software. The local historic preservation non-profit, especially if located in a large city, may also be able to attract volunteers that are skilled in GIS technology who are seeking an altruistic outlet. However, since the development of a GIS program is a long-term investment of time, the non-profit should not depend heavily on the use of volunteers.

5. Locate and evaluate data sources

Locating and evaluating data sources is one of the most complex aspects of the GIS project. The conversion of source material into spatial and attribute data will take the most time in the creation of a historic preservation GIS. However, the GIS is only as effective as the data that creates it. Therefore, the local historic preservation organization should assess available data, the quality of the data, and the information that still must be obtained.
There are various sources for GIS data including federal, state, county and local governments. The United States Census can provide valuable demographic information that specifically relates to the local community. The Federal Emergency Management Agency (FEMA) can provide flood elevation maps, which may affect infill properties in historic districts. State GIS agencies may also be able to provide data such as aerial photographs or parcel data. If the data is incompatible, or the quality or source questionable, it should not be incorporated into the database. Although it may extend the scope of the project, it is more efficient to reproduce data than utilize an unreliable data source.

6. **Set up partnerships**

The local historic preservation organization must seek out GIS partners to create an effective program. Many communities and regions have set up consortium groups to facilitate the sharing of GIS data. Often the consortiums allow the members to discuss issues regarding database management and conversion of data, as well as to create standardized conventions for data to be shared with the group members. These consortium members may include governmental organizations, utility companies, colleges or universities, economic development groups, special interest groups, or any other industry that utilizes GIS data as part of its business practice. The more diverse the groups, the greater the opportunity to provide a broad reaching GIS network.

The local historic preservation organization must also seek out preservation related GIS partners. This can include federal, state and other local organizations that have developed GIS programs and may be able to provide valuable knowledge or data to a developing local preservation GIS project. Until there is a comprehensive repository for historic preservation-related GIS projects, local organizations may have to search out similar programs through trade conference sessions, software manufacturers, and through Internet research.
7. **Pursue funding sources**

Once the local historic preservation organization has created a plan of action, evaluated the technological resources and inventoried the data sources, it is time to seek funding. By completing the preliminary investigative work and planning process, a local historic preservation program has all the tools necessary to convince the decision-makers that the project should be funded. These decision-makers may include a City Council, City Manager, Board of Directors or a GIS steering committee. By presenting a well-developed plan of action, the staff of the local historic preservation organization can make a case for the implementation of a GIS project.

However, if funding for a GIS project still presents an obstacle, there are several grants available for development and implementation of the program. Community Development Block Grants (CDBG) are available to both non-profits and local governments to create a GIS program that benefits areas that have been determined as low-to-moderate income. CLG sub-grants are available to local governments that have met the requirements to become a Certified Local Government, and may be utilized for GIS survey projects. Software manufacturers also have grant programs that can provide the software, training and publications to support the development of a local GIS program. Since a GIS can be an expensive project, the local historic preservation organization should pursue all avenues for funding so that implementation does not tax a developing program.

8. **Create an implementation plan**

After the local historic preservation program has completed all of the preliminary work, an implementation plan must be developed to ensure completion of the GIS project. The implementation plan should include a time line for finishing various phases of the project, as well as the staff members assigned to each component. If outside resources are necessary for completion of a particular phase, those resources should be included as part of the implementation plan. In order to ensure the project is on schedule, the local preservation program should review the implementation on a routine basis, depending upon the project time frame. If
the GIS project will span several years, the groups may want to review the implementation on an annual basis; if the GIS project is slated for completion in less than a year, the review should be adjusted accordingly.

The implementation plan is the work schedule for the project and should keep the various staff members on track for the independent development phases. Short-term goals should be reviewed by all members to ensure that the project is not falling behind as well as to identify potential problem areas. By utilizing the implementation plan throughout the project, the local historic preservation program can efficiently utilize funding, time and manpower.

9. Don’t underestimate the time or the manpower required

This is perhaps the most important guideline of all. If a local historic preservation organization has resource or personnel constraints, it should not consider taking on a GIS project at the time. The development of a GIS program requires a commitment by the organization to changing the way that it conducts business. Although the benefits of implementing a GIS are clear, the time and manpower required to create an effective program should not be underestimated.

The local historic preservation organization should thoroughly research the above stated issues and determine if it can adequately provide the resources to see the project through to completion. This is particularly true if the local organization is pursuing grant funding. Most grantors will require a follow-up summary, or request maps created by the GIS programs, within a pre-determined time frame. Therefore, once committed, the local historic preservation program will be expected to produce results.

In conclusion, the development and implementation of a Geographic Information System for local historic preservation organizations provides an abundance of benefits in the management of cultural and architectural resources. As the use of GIS becomes more prolific in the historic preservation field, the local programs will be able to benefit from the improved support and data resources that may become available. Until that time, these local government and non-profit
organizations must look to related industries, state and federal programs, and the GIS pioneers in the historic preservation field for inspiration. Although the development of a local GIS historic preservation program requires commitment and dedication, the final results will be better management of historic resources, an increased awareness of preservation within the community, more effective preservation advocacy efforts, a concise database for historic research, and an improved quality of life through preservation planning. With benefits such as these, the time and monetary costs become negligible. Through careful planning and execution of GIS programs, local historic preservation organizations can have a positive impact on their communities and accomplish the goal of all preservationists – the protection of our historic resources for future generations.


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