**Town of Hume**

**20 North Genesee Street**
**Fillmore, NY 14735**

# GEOGRAPHIC INFORMATION SYSTEM NEEDS ASSESSMENT

*for the*

# TOWN OF HUME

May 2011
MRB Group Project No. 0809.10001.000

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# I. Executive Summary

Using a New York State Archives grant, The Town of Hume has contracted with MRB Group, P.C. to conduct a GIS Needs Assessment for the Town. The objectives of the study include developing an understanding of how GIS technology can be applied in Hume and defining the data, human, technological and monetary resources necessary to construct the system. The Needs Assessment is the necessary first step in the planning process to build a Geographic Information System (GIS), which has the potential to improve efficiency dramatically and to save money in local government.

The Town of Hume has invested in computer infrastructure and entered into shared services agreements for assessment and code enforcement as means to increase efficiency and control costs. There are also significant data resources available to the Town. Some water, wastewater, drainage and other physical infrastructure has been mapped in a GIS format by Southern Tier West Regional Planning and Development Board (STW) and Alfred University. Selected historic sites have also been mapped. Allegany County has recently converted their tax maps from AutoCAD to an ESRI GIS format. The State of New York Office of Cyber Security currently makes digital orthophotography of Allegany County available as a Web Map Service (WMS). The Town has made investments over the years in water and wastewater infrastructure and frequently uses paper map sets with pipe sizes and other important information. The Town engineering consultant has this data in an AutoCAD format which could be readily converted to a GIS format for use in management applications. The needs assessment found that the most commonly used records with a geographic component are:

- Tax roll (assessment, tax collection, resident location/notification)
- Water district customers (billing, service notifications)
- Sewer district customers (billing, service notification)
- Tax maps (owner location, assessment, easements)
- Water system mapping
- Sewer system mapping
- Town highway map

Allegany County and STW Planning have both invested in GIS resources, including a public web viewer currently provided by STW. There will be opportunities for shared GIS services with those agencies and other towns as the Town of Hume moves forward with GIS development. However, implementation of GIS technology for Town management activities, particularly infrastructure, will be most effective when the local data can be viewed, updated and analyzed on Town computers. Our recommendation is that free GIS viewer software, ArcGIS Explorer, be installed on Town computers and configured with both the framework data sets (roads, tax parcels and aerial photography) and data specific to the individual user needs, such as the water distribution system or historic sites. Additional GIS software may be required for specific management applications, such as pavement management.

STW currently provides tax parcel data for Allegany County via an Internet map viewer. This map application is linked to a web-based assessment application provided by Systems Development Group and should meet the needs of the public for access to assessment data. Town assessment and code enforcement services are provided under shared services agreements with several other towns. Hume should discuss integration of GIS technology with the other towns sharing code enforcement. Automating those records in a GIS environment can significantly reduce the time required by the Town Clerk and the Town Assessor to enter and use the building permits, notices and other paper forms generated by the code enforcement officer.

The Town should anticipate the need for some degree of GIS coordination. This will be required not only for effective data sharing with the County and STW, but also for ongoing technical support and analysis services, such as revisions to special districts or new initiatives, such as zoning. We recommend that the Town budget some money each year for GIS coordination, whether or not that work is provided through a shared service agreement or by a contractor.

The residents of the Town of Hume have a significant investment in three areas of infrastructure: Highways, Water and Sanitary Sewer. All three areas will benefit from being integrated into a Geographic Information System through greater efficiency in daily management activities and an improved ability to schedule regular and preventative maintenance activities. We recommend that the Town obtain the NYS Streets and Address GIS database for an accurate road centerline file. Pavement management may become an immediate concern as natural gas exploration and drilling move into the Town. We have recommended a pavement management solution. We also recommend that the existing water and sewer maps be converted to a GIS format. Once in a usable format, the water and sewer data can be enhanced with the GPS data collected by STW and Alfred University. The GPS data will first need to be verified.

The Town of Hume is moving toward integration of Geographic Information System technology at an opportune time. Significant geographic data resources are available now that were not available even two or three years ago. The Town can take advantage of these resources, along with free GIS software, to begin the integration process and take advantage of the efficiencies and improved service to the public that GIS will bring. As the Town uses GIS for the recommended applications, more opportunities for GIS tools will be discovered by the users and can be integrated in future years. GIS is evolving as a "background" technology and will eventually have some role in all Town processes that include a spatial component. With this Needs Assessment, the Town of Hume has a road map to take advantage of this evolution and to provide continually improving services to the Town residents while achieving the efficiencies that budgets in today's economic climate will demand.

# II. PROJECT OBJECTIVES

## A. WHAT IS GIS?

According to the National Science Foundation, a Geographic Information System (GIS) is "a computerized database management system used for the capture, storage, retrieval, analysis and display of spatial (e.g. defined by location) data."

Much of the data that municipal workers use on a daily basis has a spatial component, that is, a location on the face of the earth. In the case of local government, the spatial component is almost always a street address. A GIS map display provides the ability to visualize the location of features that are important to the day-to-day operation of a municipality, such as property lines, buildings, roads and easements to name a few. In addition to displaying objects, a GIS allows users to analyze spatial patterns, display how the various data sets interrelate, and model how data will change in response to certain stimuli.

Typically, a GIS is made up of layers of information on a map. The layers can be thought of as transparent overlays. The bottom layer is called the land base or base map. The land base is made up of physical and cultural features such as roads, buildings, streams and landmarks that provide reference points to help orient and locate other mapping features. Then additional overlays such as the location of school districts, agricultural district boundaries, utilities or real property data (tax maps) can be superimposed in any sequence.

The basic GIS system can be supplemented with aerial photography as an additional layer that provides an accurate view of other features on the ground. A GIS view is similar to looking out of the window of an airplane and seeing the ground, but you can see other features or assets of interest that are not visible from the airplane, superimposed, and annotated.

Other data sets available to supplement this information include: topographic data to display terrain, demographic census information to display population characteristics and cadastral data to display private and public land ownership. Associated technologies such as a Global Positioning System (GPS), when used in conjunction with a GIS, can display the precise location of features such as manholes, property corners or crash locations. GPS can even provide the exact location of moving resources, such as emergency vehicles, by displaying them on the GIS map. GPS also supports the accurate location of assets for field data collection activities that fulfill GASB 34 infrastructure inventory requirements.

## B. OBJECTIVES OF THE STUDY

A GIS Needs Assessment is necessary to effectively plan the implementation of GIS technology within a government entity. It is also required by New York State Archives for any subsequent GIS grant funding. The primary objectives of this project are to:

- Understand how the various departments within the Town presently operate and utilize data, particularly spatial data.
- Identify where spatial data is presently located within the Town, and who is currently maintaining the information.

- Evaluate the format, quality, quantity and accuracy of existing spatial data.
- Identify data elements that should be communicated across departments, but currently are not being shared.
- Identify where and how the Town can more effectively apply GIS technology to day-to-day operations.
- Identify spatial data, software applications and components that can significantly improve the efficiency and effectiveness of operations within the Town of Hume.
- Develop a plan to implement the technology, including data development, management, training, computer hardware/software requirements and budgetary estimates.

# III. METHODOLOGY AND PROCEDURES

## A. CONDUCT KICK-OFF MEETING

On December 15, 2010, John Trimber, GIS Manager for MRB Group, P.C. conducted a project Kick-Off meeting at the Town Museum in Hume. He presented a description of GIS to representatives from the Town along with examples if GIS implementation by other governments around the state to highlight how GIS technology can be used to improve operating efficiency. There was a discussion of the needs assessment process and implementation planning. As New York State Archives will no longer be funding GIS implementation for individual governments, the Town will look to develop cooperative arrangements for implementation with Allegany County and potentially other towns within the County. The Needs Assessment schedule was discussed and the interviews were deferred until February so that the Town Clerk would be available to participate. Copies of the Kick-Off Meeting presentation slides are attached as Appendix C.

## B. INTERVIEWS

Representatives from the Town of Hume departments were interviewed by John Trimber between February 18th and 28th. The objectives of the interviews were:

- To gain additional information about the functions of each department.
- To develop a deeper understanding of the data resources used by each department.
- To identify additional data resources that might be beneficial to each department.
- To understand the current level of computer usage by each department.
- To advance the discussion of how GIS technology can be applied to the daily operations of each department.

## C. COMPILE THE RESULTS OF THE INTERVIEWS

Each interview was summarized during the first two weeks of March and a matrix developed which showed current geographic data and map usage. The data matrix is attached as Appendix B, and the interview summaries are attached in Appendix A.

### D. DEVELOP THE NEEDS ASSESSMENT IMPLEMENTATION PLAN

The interviews and data provided by Allegany County and Southern Tier West Regional Planning and Development Board (STW) were evaluated during the second half of March Current web services provided by STW and Systems Development Group were reviewed. The current version of ArcGIS Explorer was tested with the new Web Map Service for aerial photography being provided by the NYS Office of Cyber Security. A draft needs assessment and implementation plan was developed during the first two weeks of April, including estimates of projected costs.

### E. SUBMIT DRAFT NEEDS ASSESSMENT

The Draft Needs Assessment document and Appendices were delivered to the Town Clerk for distribution to the participants via the MRB Group FTP (File Transfer Protocol) site on April 20, 2011.

### F. TOWN OF HUME REVIEW

The participants in the Needs Assessment process provided comments back to MRB Group by May 20, 2011.

### G. FINAL PRESENTATION AND DELIVER OF THE PLAN

A final presentation of the GIS Needs Assessment and Implementation Plan was presented to the Town on June 3, 2011 at the Town Museum. Ten published copies of the Plan were also delivered to the Town Clerk at this meeting. A brief discussion was held regarding the implementation process.

## IV. PRELIMINARY ANALYSIS

### A. GENERAL FINDINGS

A total of 8 people were interviewed for the GIS needs assessment, with the information provided by the Town Supervisor and the Deputy Supervisor combined into one summary. The interview summaries may be found in Appendix A. The assessment and the code enforcement duties are performed through shared services agreements with other municipalities. Neither the assessor nor the Code Enforcement Officer has an office or computer at the Hume Town Hall. However, the Assessor does bring a laptop to the office and is able to connect to the Town server.

The Town Hall has a local area network and a central server which is due to be replaced this year. The potential GIS users that are located in other buildings do not have access to the server. Town computers are located at the highway, water and sewer facilities, as well as at the Town museum. All Town computers are connected to high speed Internet using either a cable modem (Road Runner) or DSL.

The Town recently completed a Comprehensive Plan, providing a framework for revitalization of the hamlets, economic development and future land use. The Town does not currently have zoning or subdivision regulations. Subdivision review is performed by Allegany County Planning.

The Town is not currently compliant with GASB 34. GASB stands for Government Accounting Standards Board. In June 1999, GASB Statement 34 (or **GASB 34**) was published. GASB 34 requires state and local governments to begin reporting all financial transactions, including the value of their infrastructure assets, roads, bridges, water and sewer facilities, and dams, in their annual financial reports on an accrual accounting basis. There is no legal requirement to implement GASB 34; however non-compliance may impact the bond rating of the municipality and increase the cost of borrowing for capital projects.

# V. DATA NEEDS ANALYSIS

## A. GENERAL DATA NEEDS SUMMARY

Most data used by the Town have a geographic component such as a tax parcel number or address. The most commonly used records are:

- Tax roll (assessment, tax collection, resident location/notification)
- Water district customers (billing, service notifications)
- Sewer district customers (billing, service notification)
- Tax maps (owner location, assessment, easements)
- Water system mapping
- Sewer system mapping
- Town highway map

The NYS GIS Coordinating Body identified several years ago three framework data sets that every government in New York needs to implement GIS technology effectively. These data sets provide the reference framework for other GIS data layers and applications. Those framework data sets are:

- digital orthophotography
- digital street/road centerline files with address information as attributes
- digital tax maps

The State has undertaken the development of the first two data sets and makes those freely available to governments within the State. Allegany County has recently converted the digital tax maps for the County from an AutoCAD to an Environmental Systems Research Institute (ESRI) geodatabase GIS format. The County also provides assessment data to the public with an on-line web service.

## B. Department Specific Data Needs Summary

### 1. Town Clerk/Town Board

The Town Clerk and Deputy Town Clerk use the Williamson Law Book software for most of their business processes and record management activities. Reports to the Town Supervisor and Board members are generally provided on paper, although the Supervisor and Deputy Supervisor have access to the software from the Supervisor's computer. The software has 5 modules:

- Town Clerk
- Tax Collection
- Bookkeeping
- Payroll/Budget
- Water/Sewer Billing

The tax collection software is also used when the Clerk needs to locate a property owner, as tax roll information is used in the software and includes owner name, address and the tax parcel number. A set of paper tax maps is provided annually by Allegany County and used to find the actual location of a tax parcel. The Town Clerk also manages records associated with four cemeteries within the Town, one of which is still active.

The Town Clerk would benefit from being able to access the tax maps in a digital format and perform simple search functions. She would also benefit from having the cemetery maps and records in a GIS searchable format to more efficiently respond to information requests or to potentially post some of that information on the Town website.

### 2. Assessor

The Assessor determines the values for real property parcels within the Town and establishes assessments for property taxes. The Assessor works full-time through a shared services agreement with Hume, Rushford, and 7 other municipalities from the Rushford Town Hall. He uses his own laptop computer with NYS Office of Real Property Tax Services (ORPTS) RPS assessment software installed along with assessment data in a Sybase data format. The Assessor is based at the Rushford Town Hall, but can connect his laptop to the Hume network when in the Hume Town Hall. Allegany County currently provides a web-based assessment application which allows assessors and the public to view assessment data. Tax maps are provided in a PDF format. The assessor would benefit from having the county GIS tax map available so that the map may be searched by owner name and other database fields or searched graphically with buffers and other GIS software tools.

### 3. Code Enforcement

The Code Enforcement Officer enforces building codes and issues code violation notices, building permits and certificates of occupancy. Copies of these documents are provided to the Town Clerk for recording purposes. Copies of building permits are also

provided to the Assessor for property valuation. The Code Enforcement officer works full-time through a shared services agreement with Hume, Rushford, and 6 other municipalities, with a desktop computer at the Rushford Town Hall. He does not have code enforcement software, with all notices and permits completed on paper forms. He does have RPS software and uses the assessment information to provide current owner information and other data. He would benefit from having the digital tax maps available on his desktop computer with the NYS digital aerial orthophotography as a layer to show land use and structures. Allegany County should have new orthophotography flown in the spring of 2012.

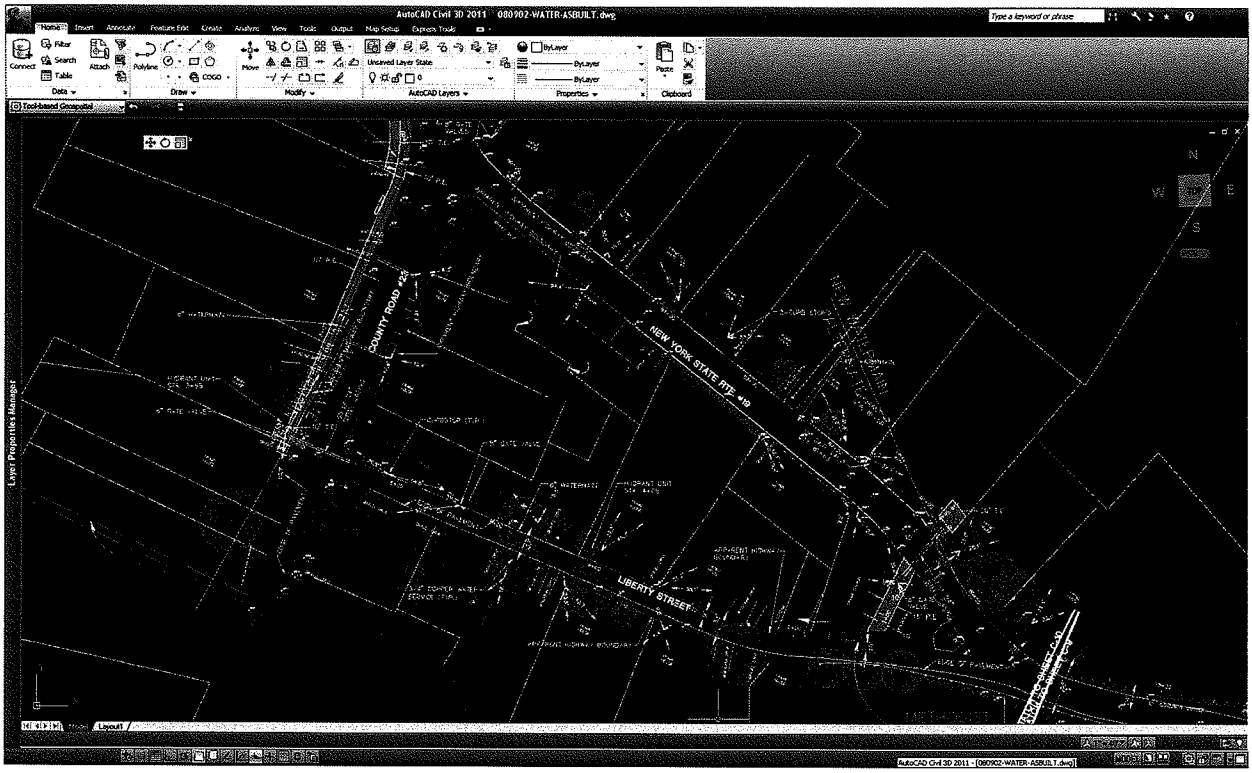
4. Highways

The Highway Superintendent is responsible for managing the street and road system within the Town. This effort includes issuing driveway permits, pavement management, maintenance of drainage structures (except bridges), and a gradual effort to surface the remaining gravel roads within the Town. There is snow plowing and sanding, ditch maintenance and maintaining all of the Town road signs. There are buildings and equipment. There is anticipation of a significant increase in natural gas well exploration and drilling activity, with a corresponding likelihood of significant damage to some roads due to heavy truck traffic. The Highway Department would benefit from having a GIS pavement management application, primarily so that preexisting road conditions can be documented prior to any additional gas drilling activity. The department would benefit from the GIS mapping of culverts, sidewalks, signs and other infrastructure, allowing for more efficient maintenance of those features as well as documenting the assets for GASB34 compliance. Some of this data exists in a GIS format collected by Southern Tier West Regional Planning (STW) around 2000. Additional GIS data for features within the Town of Hume, collected by Alfred University (date unknown), is also available from the Allegany County GIS department.

5. Water and Sewer

The Town of Hume has had a public water system for nearly a century, with a significant upgrade to the system occurring in 2001. Water service distribution is generally restricted to the hamlets of Fillmore and Hume, and also along the Route 19 corridor through the Town. The system shares a connection with the Houghton/Caneadea water system for emergency backup purposes. The 2001 upgrade involved the replacement of about 75% of the distribution system. Sanitary sewer service was provided to an area generally including the hamlet of Fillmore in 1986.The system consists of the collection of grey water from individual septic tanks which is then pumped to a wastewater treatment plant located north of Fillmore. The Water and Sewer Superintendent currently works primarily from paper maps of both the water and sewer systems. The mapping of the upgraded portion of the water system is most accurate, with "as-built" plans provided by MRB Group after construction was completed. Some infrastructure was mapped during the 2000 effort by STW, but would need to be evaluated for completeness and accuracy. The Superintendent would benefit from having the water and sewer plans in a GIS environment, as he feels that would

allow him to more effectively plan preventative maintenance and other operational activities, and also allow him to carry the system mapping with him into the field on his existing laptop computer. A screen shot of some of the existing AutoCAD data is shown below.




6. Museum/Historian

The Town Historian is responsible for managing the Town Museum and provides tours covering sites of interest within the Town. STW captured GPS locations for historic sites several years ago and the Historian has that data on a compact disk (CD) but has no way to use it. The Historian would benefit from a GIS viewer that could display the historic sites with a street map of the Town and/or aerial photography.

## C. Focus Applications Summary

The Town of Hume has invested in computer hardware, a local area network within the Town Hall, and Williamson Law Book software to manage the business functions of the Town. The Town would benefit from a GIS software viewer that would allow the Town staff to access existing GIS data available from the State and County. It would also give them the ability to use other GIS data sets, such as the infrastructure and historical points of interest captured by STW several years ago. The NYS digital orthophotography is now available as a free web service, and the State is currently developing a business plan to provide statewide tax parcels as a web service. Although the county tax parcels for the Town of Hume are now available through STW in a GIS format using an Internet viewer, infrastructure and other important layers are not included.

Once the GIS data is available, some of the Town GIS users, such as the Clerk and the Code Enforcement Officer, would benefit from a simple geo-coding application. The application would allow the user to input an address and immediately display a point on a road map that shows the approximate location. This type of application is used extensively by emergency management personnel, but can also be useful in other ways such as associating a particular address with buildings on an aerial photograph or giving directions to someone over the telephone.

A great deal of the time and expense related to Town operations are expended by the management of Town infrastructure. The Town acquired or created several special districts with the dissolution of the Village of Fillmore, including sewer, water, sidewalk and lighting. The Town would benefit from GIS applications that can assist with the management of that infrastructure. These applications should also allow the Town to quantify their assets for GASB 34 bookkeeping requirements.

As natural gas exploration and well drilling increase within the County and Town, Hume would benefit from implementing a GIS-based pavement management system that would document pavement condition before and after gas well activity so that the Town may be compensated for road damages. Pavement management may be best approached through a shared-services agreement with other Towns and/or Allegany County, as is current done with Assessment and Code Enforcement services.

# VI. IMPLEMENTATION PLAN

## A. SUMMARY

The implementation of GIS technology within the Town should leverage the significant GIS data resources that already exist, as well as integrate current and planned web GIS services available from others. A database schema (design) should be developed to incorporate all potential GIS data that may be useful to the Town. The GIS data captured by STW and Alfred University using Global Positioning Systems (GPS) for features within the Town should be evaluated for data format, accuracy and completeness. The data sets determined to have value should then be imported into an ESRI geodatabase which can reside on the Town server. ESRI is the de facto GIS software standard in the world and is used by Allegany County, STW and New York State agencies. Existing infrastructure plans for sewer and water, currently in the AutoCAD design format, should be converted to the ESRI GIS format and then compared with the STW and Alfred University data. An initial look at some of the STW data would indicate some positional accuracy questions that may have been caused by converting data sets between different coordinate systems – such as converting GPS data captured in latitude/longitude to the NY State Plane coordinate system used by the Allegany County tax maps. An example of the positional problem is shown below. The blue dots represent the STW GPS points and the blue lines show the water main from MRB Group as-built plans, brought in from AutoCAD.

We recommend that GIS implementation begin with the free ArcGIS Explorer software. This should be installed on the computers used by the Supervisor, Clerk, Water and Sewer Superintendent, Highway Superintendent and Historian. We believe that the Assessor and Code Enforcement Officer would also benefit from the GIS software, but as they do not use Town computers, that would need further discussion. The GIS software on each computer should be configured to each user. The collected data should be available to users in the Town office from the new server. Data required at other locations will need to be initially distributed to those computers. For instance, the computer used by the Sewer and Water Superintendent might have data associated with the sewer and water systems on that computer; and the GIS software might be configured to access and display that local infrastructure data while bringing in the most recent aerial photography "on the fly" from the NYS Internet mapping service. During the ArcGIS Explorer configuration process, other data layers of interest, such as soil mapping or DEC wetlands, may also be configured to access from other web services.

Long term, we recommend that the Town explore cooperative arrangements with Allegany County GIS and/or STW to host non-sensitive Town data on an Internet web service so that all users in the Town have access to the same data, and so that outdated versions of the GIS data sets are not accidentally being used. We also recommend that as the users in the Town become comfortable with the technology, that the Town explore GIS-based query and management applications for the Clerk, code enforcement and infrastructure management.

## B. MANAGEMENT

Geographic Information System (GIS) technology is a form of infrastructure that will allow the Town to manage their resources more effectively and provide better information for decision making. Like most computer-based technologies, GIS is continually evolving. Someone needs to coordinate the implementation of GIS services and development of data resources. In municipalities where no one takes responsibility for coordination, there is almost always little or no implementation accomplished after the needs assessment phase. Counties, cities and larger towns and villages have a full or part-time staff person responsible for managing the GIS and for providing data analysis and development services. In a town sized similar to Hume, the options are to either enter into a shared services agreement with the County and/or neighboring towns similar to the way Hume currently handles tax assessment and code enforcement, or to contract with a GIS consultant for a limited scope of work. Cooperative implementation grants are available from NY State Archives, but those will rarely fund GIS coordination. We recommend that the Town budget some monies each year to coordinate the GIS implementation process.

## C. DATABASE DESIGN

An overall GIS database design or schema is essential to the effective implementation of GIS technology. This process provides logical groupings of GIS data (tabular data, images, etc.) in standardized formats. When organized correctly, the database design significantly reduces the time required for data retrieval, analysis and display. It allows data to be readily stored on and accessed from a central server, reducing the likelihood of data analysis being performed with out-dated data sets.

An important part of the database design is determining the necessary attributes for each map feature. While a tax parcel feature may have ownership and assessment attributes provided by the assessor, the Town may also desire parcel attributes that can track building permit applications or link to historic photographs. Attributes associated with a water main may include all of the information about the pipe from the as-built plans (diameter, material, etc) but also might include inspection dates and asset value information for GASB 34 accounting purposes. The design process should involve review with the Sewer and Water Superintendent of infrastructure management software. If the Town decides to purchase a management software such as CarteGraph, they each have specific database design requirements that should be built into the Town's database design, so that the design and associated data do not need to be converted (at some cost) later.

The database design should anticipate GIS integration by the Town over a period of 3-5 years, but also be reviewed annually to accommodate potential changes in government management, such as the implementation of zoning or new special districts.

## D. TRAINING

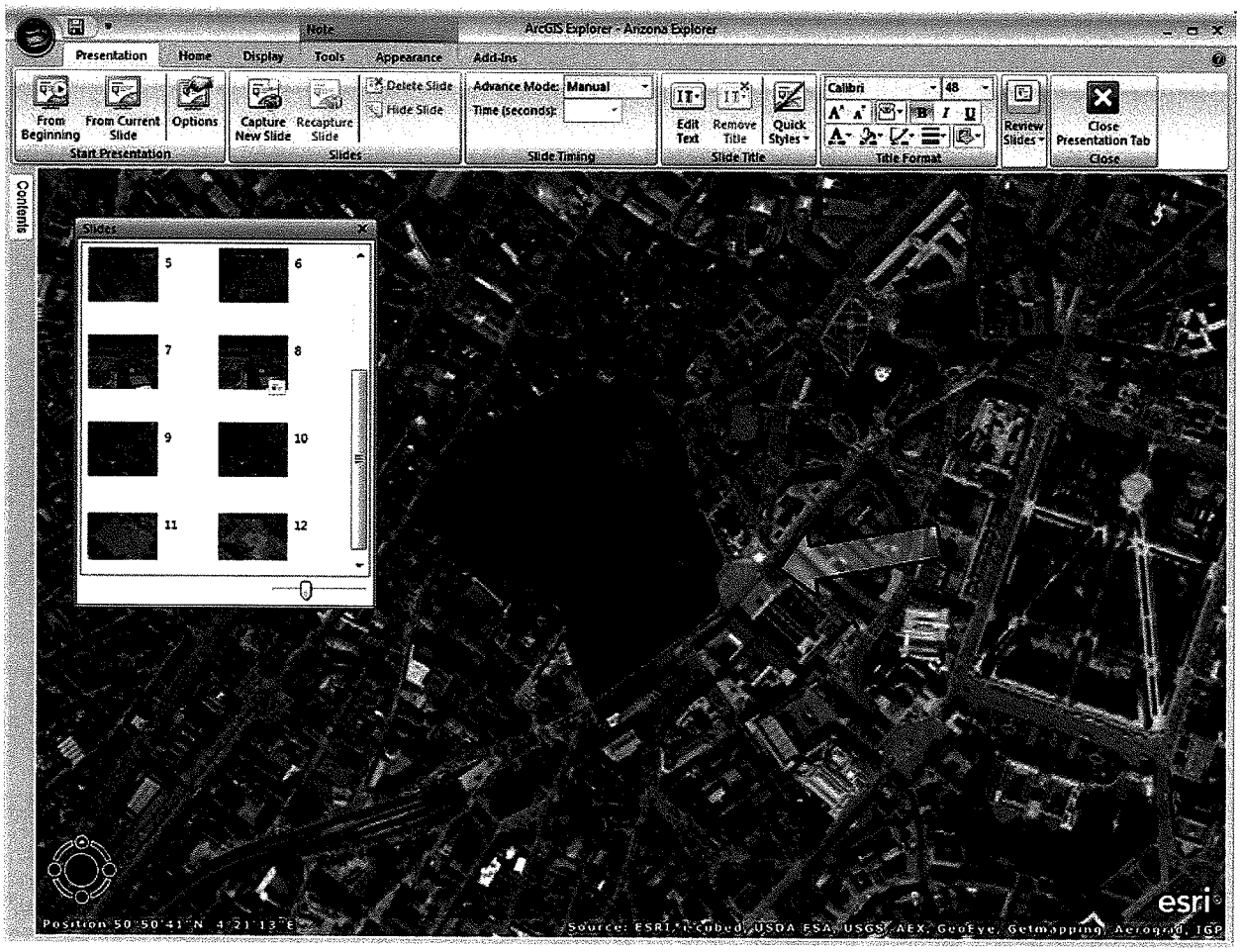
GIS software and data management training should be provided to Town staff for GIS usage to be implemented effectively. While the initial software recommendation, ArcGIS

Explorer, is very user-friendly, some familiarization with the software and GIS processes will go a long way toward integration of GIS into the daily Town operations. Training should be provided to the individual GIS users after the software is loaded and configured on their respective computers. The training will be hands-on and each user will be best served to have individual instruction. The ArcGIS Explorer software is easy to use and will not require more than one hour to demonstrate the functionality with the Town's data resources. The trainer should provide a simple one-page handout to each user for future reference.

## E. CONCEPTUAL SYSTEM DESIGN

### 1. Hardware and Software

The current computers used by the Town staff and the anticipated new Town server should be adequate to meet the minimum hardware specifications for the GIS software recommended for initial GIS implementation. We recommend that the most recent version of ArcGIS Explorer be installed on the user computers. This software is free and is designed to access and display data from Internet web services or a local server. There is some query capability and control over symbology, etc. An example is shown below.



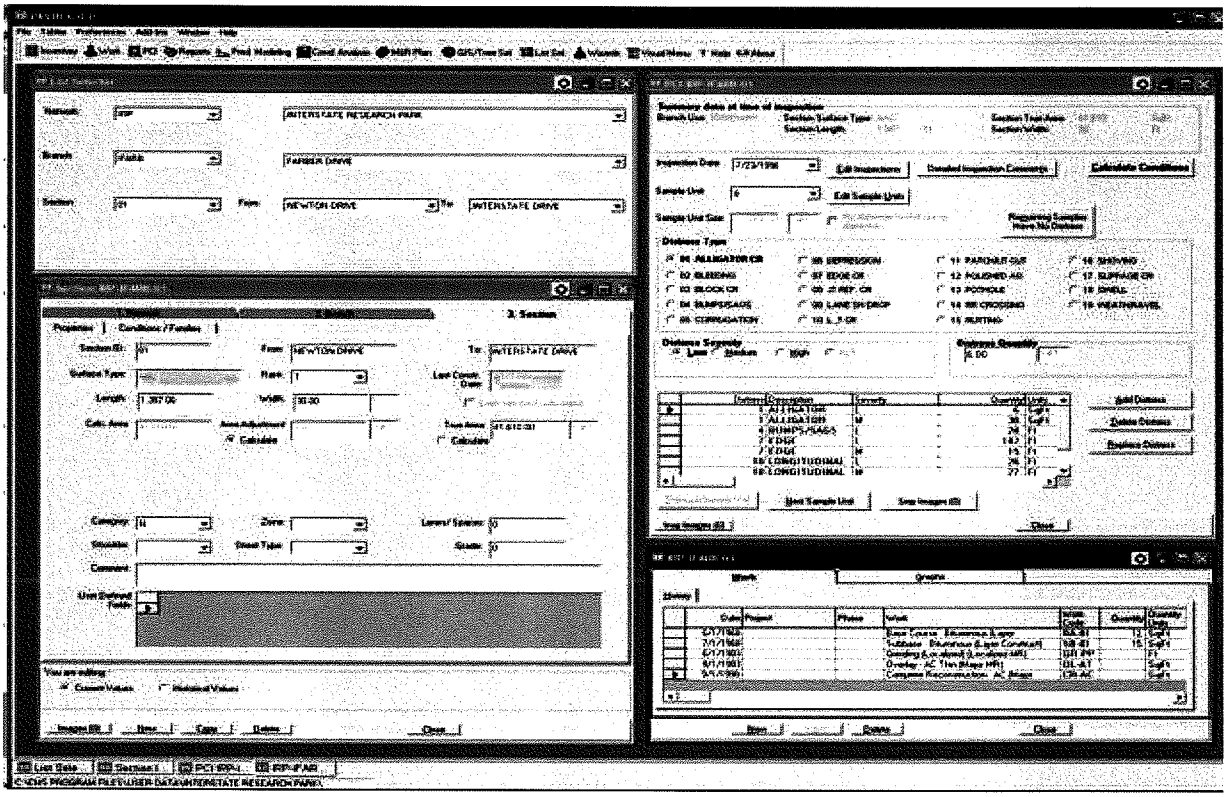
Water and sewer infrastructure can be managed in a GIS environment with a variety of methods. The recommended approach is that once the available mapping is in a GIS-compatible format, the current workflow and recording keeping processes should be reviewed and a software application selected that best matches the existing management practices and the size of the systems to be managed. Although there are some very sophisticated infrastructure management GIS software packages available, many do not have cost-effective options for smaller systems. It may be more appropriate to develop simple custom database applications in ESRI ArcView or Microsoft Access.

Pavement management of roads in a GIS environment involves both software and data collection of the existing pavement condition. The Highway department would benefit from software to enhance tracking of work history, predict pavement depreciation, and forecast budgeting levels.

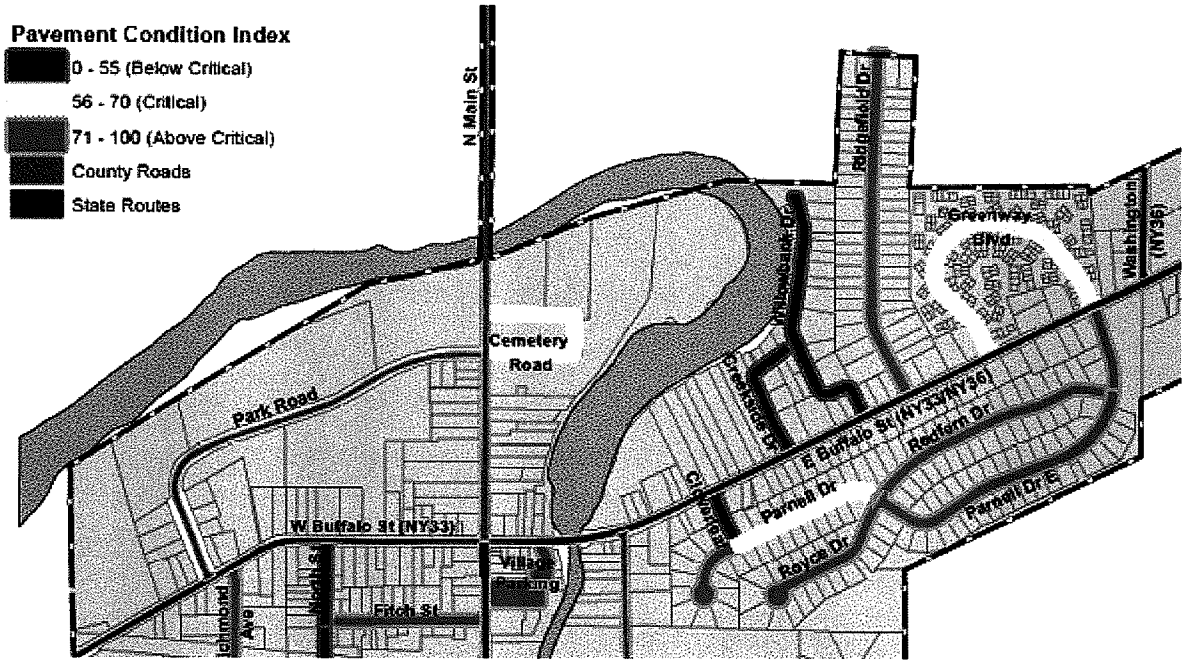
We recommend the Town implement MicroPAVER version 6.x computer program as developed by the U.S. Army Corps of Engineers Construction Engineering Research Laboratory. The program allows for storage of pavement condition history, nondestructive testing data, and construction and maintenance history, including cost data. This database provides many capabilities including evaluation of current conditions, prediction of future conditions, identification of maintenance and rehabilitation needs, inspection scheduling, economic analysis, and budget planning. MicroPAVER not only evaluates the present condition of the pavement using the pavement condition index (PCI) described in ASTM D 5340-98, but can also predict its future condition. The PCI is a numerical indicator that reflects the structural integrity and surface operational condition of a pavement. It is based on an objective measurement of distress type, severity, and quantity.

MicroPAVER also provides GIS capabilities for viewing and presenting pavement inspection and work plan information. The program assists in the setup and maintenance of pavement network data in a format compatible with ESRI ArcView software. It is recommended that the contract with a GIS consultant to setup the MicroPAVER database and GIS linkages and provide training on its use. The consultant should also be able to perform the initial condition survey and assist with the analysis process, if Town staff is not available.

***Sample MicroPAVER Data Entry***



***Sample GIS Export from MicroPAVER***



2. Server Configuration

There will be a limited number of GIS users in the Town that will be able to access data from the server in the Town Hall. Town computers in other locations are not likely to have direct access in the foreseeable future. We recommend that initially, the GIS data be organized in a file geodatabase on the Town server with copies of the file geodatabase provided to the other GIS users to load onto their individual desktop computers. Each user's ArcGIS Explorer should be configured to access Internet map services for aerial photography, tax parcels and road centerlines when available, rather than having those data sets stored locally. If conflicts on the Town server occur with users attempting to access the same GIS data at the same time, we would recommend that Microsoft SQL Server Express be installed on the Town server for multi-user support. The software is free, but would require some configuration expense. We believe that the long-term data sharing process should involve collaboration with Allegany County and/or Southern Tier West, using Internet-based web services. This will assure that all GIS users are working with the same versions of GIS data.

3. Data Development

**Comprehensive Plan Maps**

The maps included in the recently completed comprehensive plan, such as agricultural districts and the future land use map, should be converted to the geodatabase format and included as layers in the Town GIS.

**Special Districts**

NYS ORPTS requires that all special districts be shown on the tax maps. The special district layers for the Town of Hume should be copied from the Allegany County tax map geodatabase, verified with Town records and added to the Town geodatabase for use by the Town. Although STW has a tax map viewer for Allegany County available on the Internet, it does not currently include special district layers.

**Water and Sewer Plans**

The Water and Sewer system plans should be converted from the existing CAD format to a GIS format compatible with the geodatabase schema. The system mapping should then be reviewed with the Water and Sewer Superintendent for completeness, particularly the portion of the water system that was not updated in 2001. If additional mapping or updates are required, we recommend that the additional work be accomplished in the second year of the plan. The conversion should include the original survey data, collected by MRB Group prior to the 2001 design, with buildings, etc. that will provide good reference information for the Town GIS users.

**Existing STW and Alfred University GPS Data**

The data collected by STW and Alfred University needs to be verified and corrected, if possible. In addition to the historic sites data desired by the museum, they collected sidewalks, catch basins and other features that will be beneficial to include in the GIS. Some of the data appears to be shifted as if the data were collected in one coordinate system and then incorrectly converted to another system, and no documentation appears to be available, so it will take some effort to determine the usability of the datasets.

**Pavement Inventory**

Once the MicroPAVER database is set up and configured, and the required street directory and work history fields are populated, all of the town roads will require a field inspection to determine current conditions and enter that information into the database. We have included this effort in the first year implementation because of the likelihood that gas well exploration and drilling in New York will begin again by 2012. The field inspection phase is the most time intensive portion of the process and may be done by Town staff with training, if staff is available. Towns in other counties are looking at shared services agreements to somewhat reduce the cost.

**Cemeteries**

The Town has one active cemetery and three inactive cemeteries. Although cemetery management is not a priority for the Town, there is funding through NY State Archives to preserve those records and to develop a database for the active cemetery that would simplify information retrieval and manage the occasional burial. We recommend that the Town acquire Cemetery Information Management Software (CIMS) and initial training for use of the software, data entry and GIS capabilities.

# VII. BUDGET PROJECTIONS

*Please note that numbers provided are estimates and that formal quotes should be obtained prior to implementation.*

A. YEAR ONE

1. Management

GIS coordination and analysis services either as a shared service with other governments or under contract with a GIS consultant.....**$5,000.00**

2. Database Design

Develop a database schema that will incorporate all existing and foreseeable future data sets, following standard ESRI architecture to assure compatibility with Allegany County and Southern Tier West Regional Planning. Populate with currently available data such as special districts and maps from Comprehensive Plan.....**$4,800.00**

3. Data Conversion

MRB Group sewer and water data – Convert AutoCAD plans to ESRI geodatabase and coordinate system consistent with the Town database schema.....**$1,800.00**

Alfred University GPS data - Separate water, sewer, and storm points into separate feature classes, convert from UTM 83 to NAD 83, and migrate to Geodatabase.....**$600.00**

STW GPS data - Separate points into separate feature classes, convert from NAD 27 to NAD 83, fix previous coordinate conversion errors, and migrate to Geodatabase.....**$900.00**

4. Install ArcGIS Explorer

Install and configure ArcGIS Explorer with data on six (6) town computers. Provide training on the use of the software to the users of each computer.....**$4,200.00**

5. Pavement Management

| | |
|---|---|
| **Software** | |
| MicroPaver Version 6.1.6 | $1,095 |
| ESRI ArcView GIS Version 10.0 | $1,350 |
| | **$2,445** |
| **Phase 1 – Setup** | |
| Project Initiation | $585 |
| Database Setup and Data Entry | $6,259 |
| Quality Control | $1,000 |
| Installation, Setup and Training | $600 |
| | **$8,444** |
| **Phase 2 – Pavement Inspections** | |
| Field Inspections | $7,545 |
| Travel Time | $1,950 |
| Mileage Estimate | $1,200 |
| Enter Inspections into Database | $2,012 |
| Create Pavement Condition GIS Map | $600 |
| | **$13,307** |
| **Phase 3 – Pavement Management Report** | |
| Validate Prediction Model and Curve | $300 |
| Input Unit Prices | $300 |
| Create M&R Plan | $600 |
| Analyze Budget Scenarios | $600 |
| Create GIS maps for Different Options | $600 |
| Author Report | $2880 |
| Final Presentation to Client | $480 |
| | **$5,760.00** |

Total Pavement Management.....**$29,956.00**

**Year One Total** **$47,256.00**

B. YEAR TWO

1. Management

GIS Coordination & Analysis Services.....**$5,000.00**

2. Infrastructure Data Development

Evaluate and edit converted data (7.1.3) to eliminate duplicate or erroneous features and add missing attributes (pipe sizes, etc.). Identify missing any missing infrastructure features (valves, etc.) and field locate as necessary to complete coverage.....**$25,000.00**

3. Infrastructure Management

Option A - Acquire GIS compatible infrastructure management software for sewer and water, including installation, configuration and training.....**$30,000.00**

***Or***

Option B - Develop database applications and reports to match work flow for use with ArcView GIS desktop software.....**$10,000.00**
ArcView GIS software (NYS OGS state contract pricing).....**$ 1,350.00**
Software installation, Database setup and training.....**$ 1,500.00**

**Year Two Total:**

**Option A: $60,000.00**
**Option B: $42,850.00**

C. YEAR THREE

1. Management

GIS Coordination & Analysis Services.....**$5,000.00**
Develop or adapt Simple Address Geo-coding application.....**$5,000.00**

2. Cemetery Management

CIMS software.....**$3,000.00**
Software Installation, Set-up and Training.....**$1,500.00**

**Year Three Total: $14,500.00**

# APPENDIX A

## INTERVIEW NOTES

| | |
|---|---|
| **Municipality** | Town of Hume |
| **Department** | Code Enforcement |
| **Name** | Clair Beeman |
| **Location** | Rushford Town Hall (telephone interview) |
| **Description of Job Duties** | Provides Town Code Enforcement and issues building permits, certificates of occupancy and certificates of compliance |
| **Existing IT** | • Desktop computer in Rushford Town Hall<br>• No computer in Hume Town Hall |
| **Existing Software** | • RPS<br>• No code enforcement software |
| **Data Sharing w/ Others** | • Town Clerk – paper copies of forms and certificates<br>• Town Assessor – paper copies of building permits and certificates of occupancy |
| **Commonly Used Records** | • Tax Maps<br>• Building permits<br>• Code violations<br>• Assessment records (RPS) |
| **GIS Application Needs** | • Tax map viewer (County web service?) |
| **GIS Data Needs** | • Tax maps<br>• Flood Maps<br>• Street map with addresses |
| **Interviewee Notes** | • The Code Enforcement officer works full-time through a shared services agreement with Hume, Rushford, and 6 other municipalities.<br>• His office is in the Rushford Town Hall – he does not have an office or computer in any of the other municipalities.<br>• Copies of building permits and other notices and certificates are provided to the Hume Town Clerk, and information from those copies are entered into her municipal management software application |

| | |
|---|---|
| **Municipality** | Town of Hume |
| **Department** | Town Board |
| **Name** | Dennis Ricketts (Supervisor) & Dan Miller (Deputy Supervisor) |
| **Location** | Hume Town Hall |
| **Description of Job Duties** | Leadership – Town Board |
| **Existing IT** | • Local area network within Town hall, with a server (being replaced this year)<br>• Time Warner broadband Internet<br>• Desktop Computer with Windows XP (about 10 years old per Clerk) |
| **Existing Software** | • Microsoft Office |
| **Data Sharing w/ Others** | • Town Board<br>• Town Clerk<br>• Public |
| **Commonly Used Records** | • Financial reports |
| **GIS Application Needs** | • Facilities management – recent grant for park development with school district |
| **GIS Data Needs** | • Future land use outlined in Comprehensive Plan – Zoning?<br>• Water, fire and ambulance district mapping |
| **Interviewee Notes** | • The Town does not currently have zoning<br>• The Town does not have a planning board and refers subdivisions, etc. to the Allegany County Planning Board<br>• 2 fire districts and 1 ambulance district within the town |

| | |
|---|---|
| **Municipality** | Town of Hume |
| **Department** | Highways |
| **Name** | Kevin Peet, Highway Superintendent |
| **Location** | Hume Town Hall |
| **Description of Job Duties** | Maintenance of the streets and highways within the Town, including all drainage structures except bridges (maintained by NYS) |
| **Existing IT** | • Laptop computer (4 months old)<br>• Broadband Internet |
| **Existing Software** | • Microsoft Office |
| **Data Sharing w/ Others** | • CHIPS report (NYS DOT) |
| **Commonly Used Records** | • Highway map |
| **GIS Application Needs** | • Method for viewing and using road and drainage structure mapping in a GIS format<br>• Pavement management with anticipated natural gas development |
| **GIS Data Needs** | • Town road map<br>• Map drainage structures for DEC stormwater compliance<br>• Pavement inventory |
| **Interviewee Notes** | • The Town has 50.3 miles of streets and roads, of which 6 miles are unpaved<br>• The remaining unpaved roads are being gradually paved each year<br>• The Town attempts to resurface roads, as necessary, on a 4 year cycle<br>• The Town is involved in a shared services agreement for shoulder widening |

| | |
|---|---|
| **Municipality** | Town of Hume |
| **Department** | Water and Sewer |
| **Name** | Dana Potter |
| **Location** | Hume Town Hall |
| **Description of Job Duties** | Operation of the water treatment plant and distribution system, wastewater treatment plant and collection system. |
| **Existing IT** | • Desk top computers at shop and sewage treatment facility (5 yrs old)<br>• Laptop computer (1 yr old)<br>• RoadRunner at shop, DSL at sewer plant |
| **Existing Software** | • Microsoft Office |
| **Data Sharing w/ Others** | • Town Clerk (service records and billing) |
| **Commonly Used Records** | • Water and sewer system maps<br>• Water sampling records |
| **GIS Application Needs** | • Method for viewing and using utility mapping in a GIS format<br>• Management of sewer and water systems for preventative maintenance<br>• GASB34 inventory compliance |
| **GIS Data Needs** | • Access to GPS utility data collected by County<br>• Water / Sewer District Mapping<br>• Water and Sewer maps in GIS format |
| **Interviewee Notes** | • Water system has a shared connection to the Houghton/Caneadea water system for back-up purposes<br>• Major (75%) water system upgrade in 2001 by MRB Group, P.C.<br>• Infrastructure mapping captured with GPS around 2000 – believes Allegany County has the data<br>• No individual sewer or water connection records except as shown on plans or maintained by the Town Clerk for billing purposes |

| | |
|---|---|
| **Municipality** | Town of Hume |
| **Department** | Assessment |
| **Name** | Russell Heslin |
| **Location** | Rushford Town Hall (telephone interview) |
| **Description of Job Duties** | Assessment of property values in the Town |
| **Existing IT** | • Laptop computer<br>• No desktop computer or office in Hume town hall |
| **Existing Software** | • Microsoft Office<br>• RPS4 |
| **Data Sharing w/ Others** | • Town Clerk<br>• Code Enforcement |
| **Commonly Used Records** | • Assessment records<br>• Tax maps<br>• Building permits<br>• Certificates of Occupancy |
| **GIS Application Needs** | • Ability to view current aerial photography with digital tax maps from Allegany County |
| **GIS Data Needs** | • Digital tax maps |
| **Interviewee Notes** | • The assessor works full-time through a shared services agreement with Hume, Rushford, and 7 other municipalities from the Rushford Town Hall<br>• The assessor prefers to work with paper maps |

| | |
|---|---|
| **Municipality** | Town of Hume |
| **Department** | Town Clerk |
| **Name** | Sondra MacEwan |
| **Location** | Hume Town Hall |
| **Description of Job Duties** | Clerk duties include sale of licenses (hunting/fishing, dog, etc.), recording building and other permits, notices and certificates issued by Code officer, mailing tax bills and collection of tax payments, providing notices to residents for street work or utility service interruptions, managing town cemeteries, issuing driveway permits for the highway department |
| **Existing IT** | • Local area network within Town Hall<br>• Broadband Internet<br>• 1 desktop computer (6 years old)<br>• 3 laptop computers (1-2 years old)<br>• PC server – being replaced this year<br>• All computers running Windows XP<br>• Server is backed up nightly off-site (via Internet) |
| **Existing Software** | • Microsoft Office<br>• Williamson Law Book – municipal management |
| **Data Sharing w/ Others** | • Highways<br>• Sewer/Water<br>• Assessor<br>• Code Enforcement<br>• Town Board/Public<br>• Dog Control Officer<br>• Town Historian |
| **Commonly Used Records** | • Tax Roll<br>• Sewer/Water customers<br>• Building permits<br>• Tax maps<br>• Driveway permits<br>• Cemetery |
| **GIS Application Needs** | • Search by property owner or tax parcel number<br>• Identify properties impacted by street work, etc. for notification<br>• View tax parcels with special districts |
| **GIS Data Needs** | • Water / Sewer District Mapping<br>• Fire and ambulance district mapping |
| **Interviewee Notes** | |

| | |
|---|---|
| **Municipality** | Town of Hume |
| **Department** | Town Museum/Historian |
| **Name** | Rondus Miller |
| **Location** | Hume Town Hall |
| **Description of Job Duties** | Manages the Town museum and gives tours within the Town |
| **Existing IT** | Two desktop computers<br>Internet access - Cable modem |
| **Existing Software** | |
| **Data Sharing w/ Others** | • Recreational opportunities – access easements for Greenway, boat launches, snow mobile trails<br>• Historic sites |
| **Commonly Used Records** | • Town map |
| **GIS Application Needs** | • GIS data viewer |
| **GIS Data Needs** | • Historic and other sites of interest within the Town |
| **Interviewee Notes** | GPS location of historic sites and other points of interest captured several years ago by Southern Tier West RP&DB. Historian has CD |

# APPENDIX B

## DATA MATRIX

**TOWN OF HUME**

| Department | Name | Computer/age (all Windows o/s) | Internet | Special software |
|---|---|---|---|---|
| **Town Board** | Dennis Ricketts<br>Dan Miller | desktop/10 yr | cable | Williamson Law Book |
| **Town Clerk** | Sondra MacEwan | desktop/6 yr<br>3 laptops/1-2 yr | cable<br>cable | Williamson Law Book |
| **Assessor** | Russell Heslin | laptop | | RPS |
| **Code Enforcement** | Clair Beeman | desktop | | RPS |
| **Highway** | Kevin Peet | laptop/4mo | cable | |
| **Water & Sewer** | Dana Potter | 2 desktop/5 yr<br>1 laptop/1 yr | cable (shop)<br>DSL (treatment facility) | |
| **Historian** | Rondus Miller | 2 desktops | cable | |

## GEOGRAPHIC DATA & MAPS USED

| Assessment Roll | Water Customers | Sewer Customers | Highway Map | Tax Map | Sewer Maps | Water Maps | Historic Sites | Comprehensive Plan |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | | X |
| X | X | X | X | X | | | | X |
| X | | | X | X | | | | |
| X | | | X | X | | | | |
| | | | X | | | | | |
| | X | X | X | | X | X | | |
| | | | X | | | | X | |

# APPENDIX C

## KICK-OFF MEETING PRESENTATION SLIDES

# GIS Needs Assessment

# Kick-Off Meeting

*Town of Hume, New York*

**MRB Team**

Scott DeHollander, PE – Project Manager

John Trimber, LS – GIS Project Manager

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# What is GIS?

## GIS = Geographic Information System

- A GIS is a collection of computer hardware, software, and geographic data for capturing, managing, analyzing, and displaying all forms of geographically referenced information or "spatial data".
- Spatial data is data that relates to a geographic location on the earth's surface. Spatial data forms the key building blocks of a GIS.
- With GIS you can link information (attributes) to spatial data, such as people to addresses, buildings to parcels, work history to a fire hydrant, or streets within a network. You can then layer that information to give you a better understanding of how it all works together. You choose what layers to combine based on what questions you need to answer.
- In a GIS, spatial data may be analyzed and queried, with results displayed in maps, charts or graphs for better understanding.
- If you have used Google Maps or Google Earth, you have used a form of GIS!

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# Why Use GIS?

**A Geographic Information System helps you to:**

- **Plan more effectively**
- **Make better decisions**
- **Provide better services to the residents**
- **Manage your records, physical assets and other information more efficiently**

***"A picture is worth a 1000 words"***

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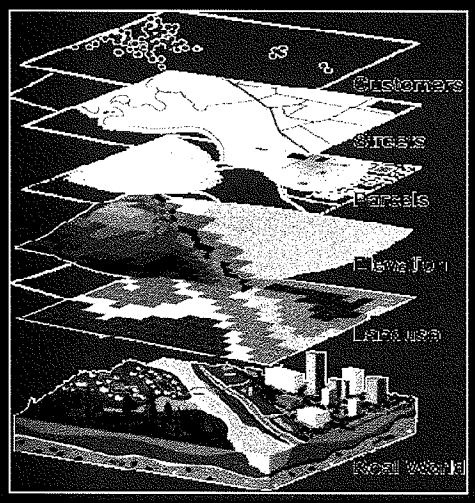
# Spatial Data

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# What Can I Do With GIS?

- See Where Things Are in Relationship to Other Things
  - Find a feature (ex. Where is my house)
  - Find a pattern (ex. Distribution of houses by year built)
  - Analysis (ex. How many houses are within a 100 year flood plain)
- Improve the Delivery of Services
  - GIS-based management systems for facilities, streets and other infrastructure
  - Building Permits and Code Enforcement
  - Cemetery Management
  - Neighborhood Improvement and Historic Structure Preservation

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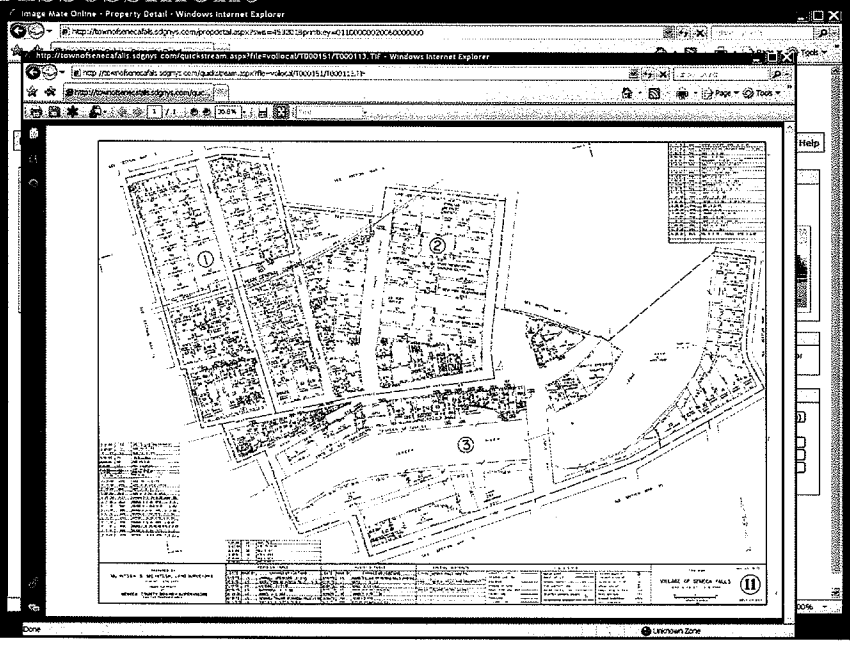
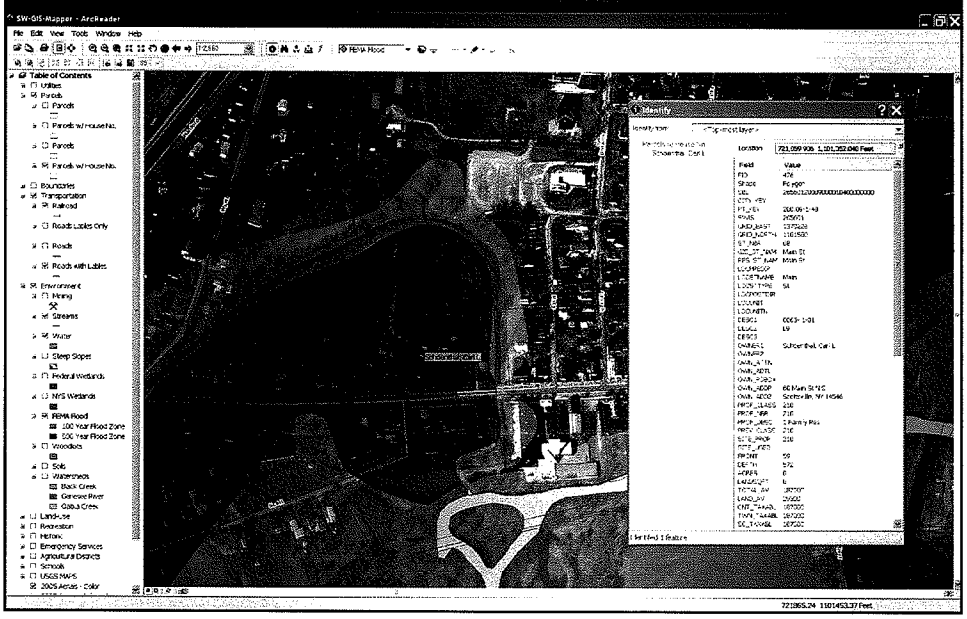
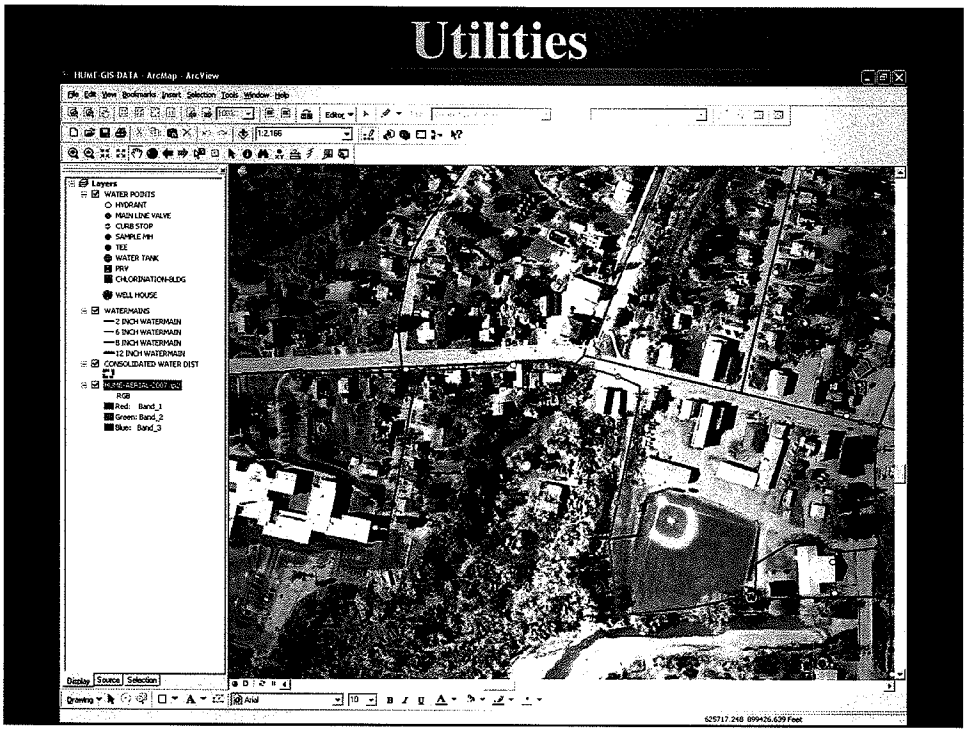
# Assessment



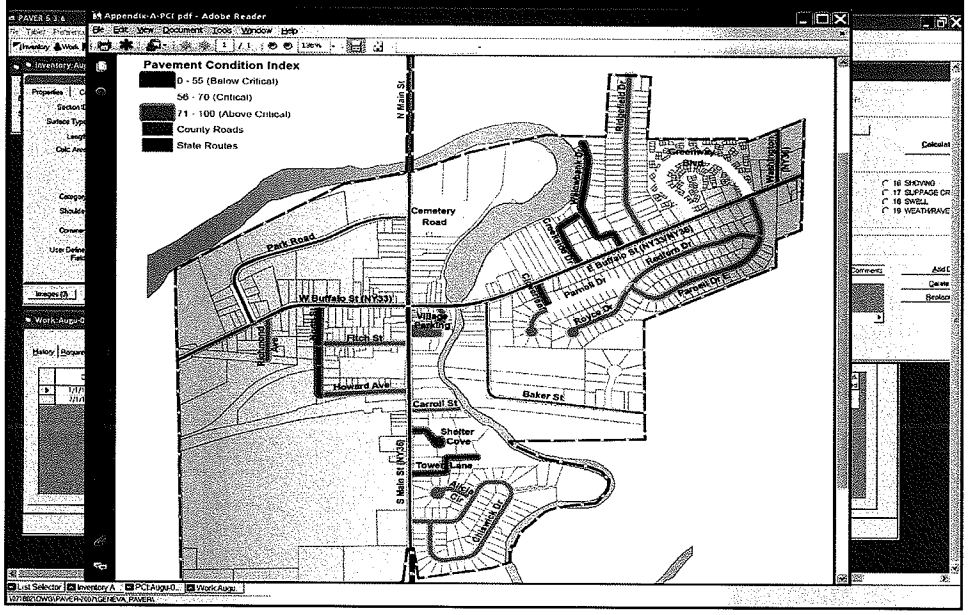
# Planning / Zoning / Code Enforcement



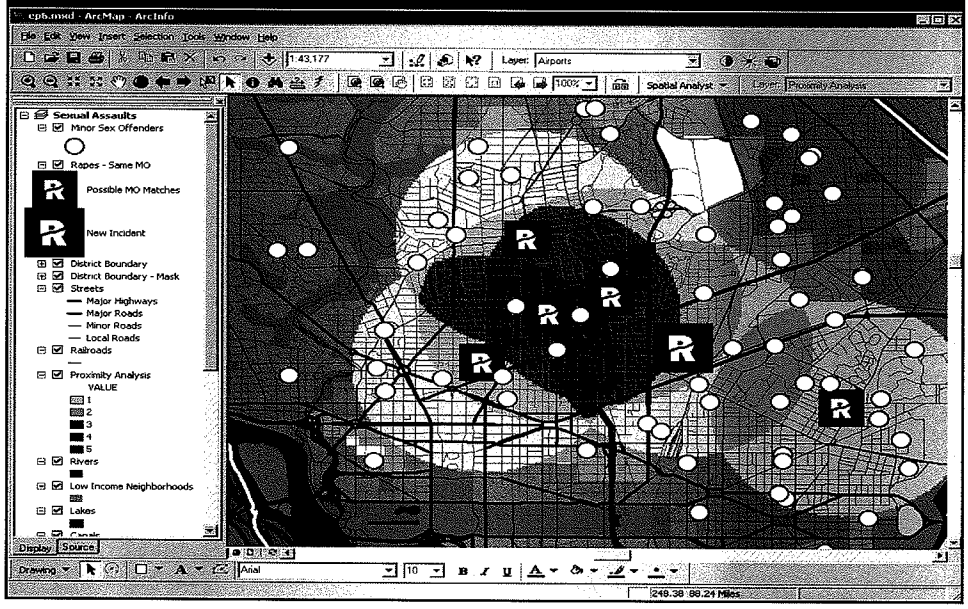
# Utilities



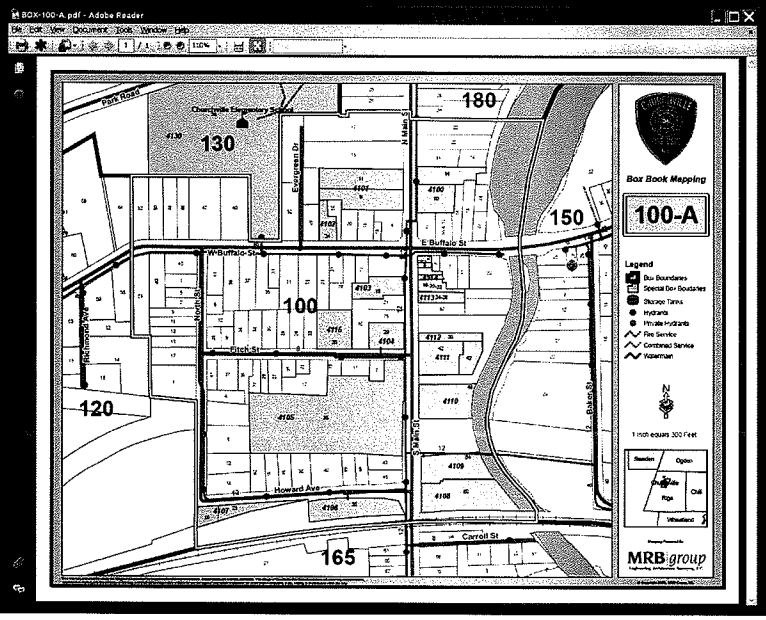
# Street Management




# Police – Crime Mapping & Analysis

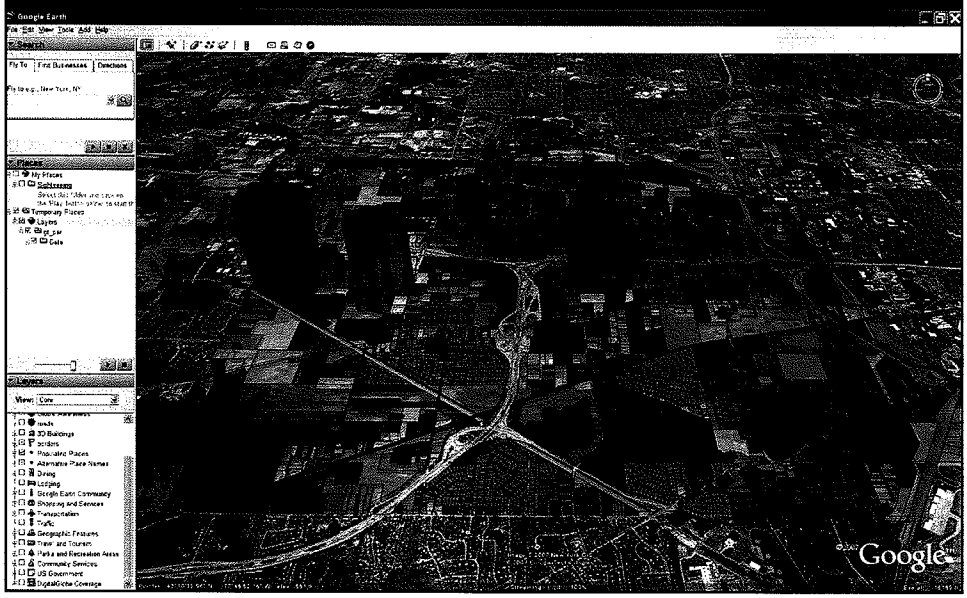


# Fire Protection

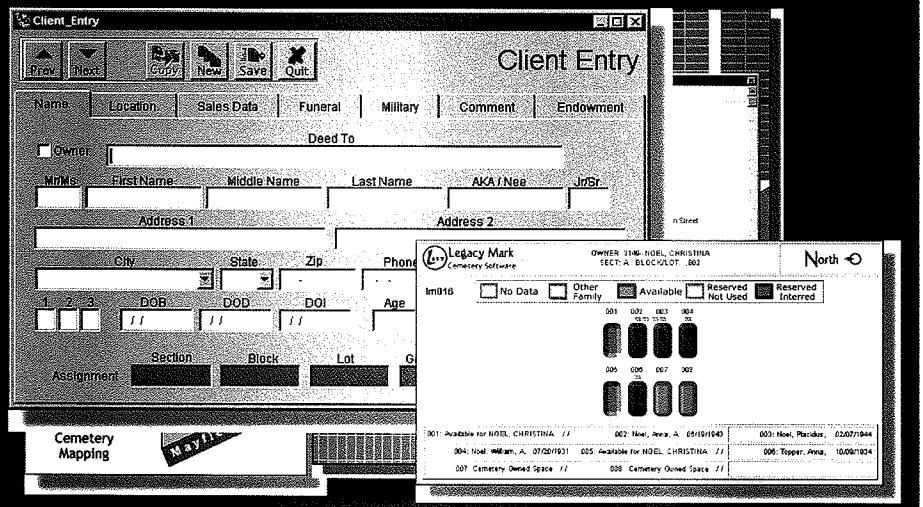



# Oblique Aerial Photography

# GIS Analysis




# Cemetery Management

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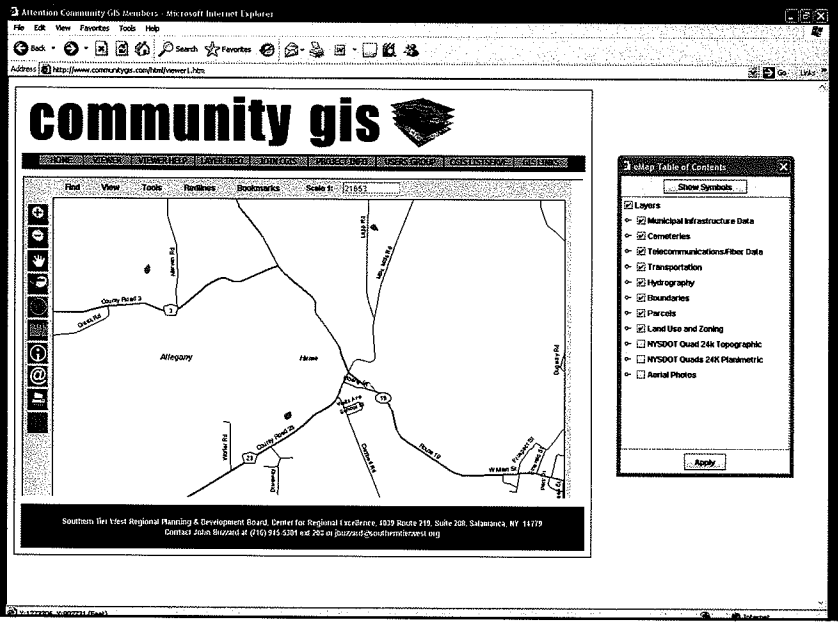
# Business Development

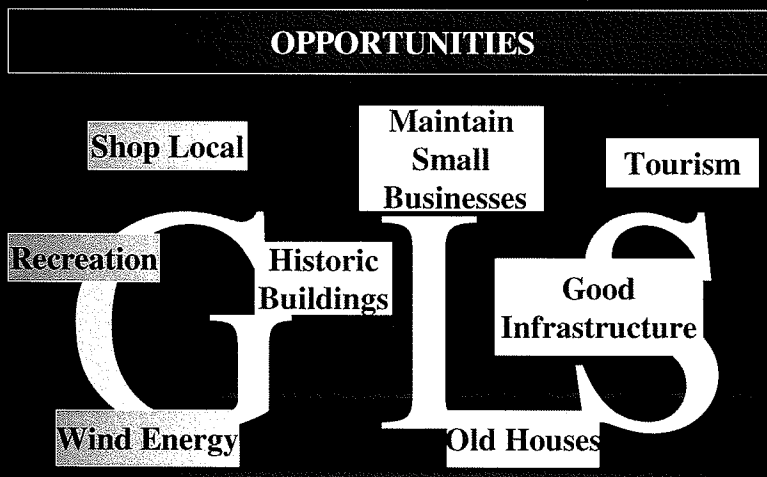

**MRB** *group*

Engineering, Architecture, Surveying, P.C.

# STWRP&DB INTERNET GIS



# Comprehensive Plan

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# GIS Needs Assessment

- Interviews with various departments in Town Government
- Determine needs for GIS integration
- Formulate costs and evaluate alternatives
- Implementation plan
- Required for additional LGRMIF grant applications

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## Interviews

- 30 to 60 minute +/- sessions with each department head and potential GIS user.
- Typical questions:
  - Description of duties
  - Existing IT inventory
  - Commonly used records and current format
  - Information sharing with other departments
  - Discuss potential data and application needs

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## Summary, Analysis and Report

- Summarize Interviews
- Prepare draft findings
- Develop potential solutions with costs
- Present draft solutions to Town for input and revisions
- Modify per Town comments and produce final GIS Needs Assessment and Implementation Plan
- Final presentation to stakeholders

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# Draft and Final Report

| | Village | | | | | | | | | | Town | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | GIS Administrator | DPW | Underground Utilities | Electric/ Lighting | Streets/Solid Waste | Water/Wastewater Treatment | Utility Billing | Code Enforcement | Police/EMS/Dispatch | Fire Department | Clerk | Assessor | Highway Department | Total |
| | x | x | x | x | x | x | x | x | x | x | x | x | x | 13 |
| | x | x | x | x | x | | | x | x | x | x | x | x | 11 |
| | x | x | x | x | x | x | | x | | | | x | x | 9 |
| | x | x | x | x | x | | | x | | | | | x | 7 |
| | x | x | x | x | x | | | | | | | | x | 6 |
| | x | x | x | x | x | | | | | | | | x | 6 |
| | x | x | | | | | x | | | | x | x | | 5 |
| | x | x | | | x | | | | | | | | x | 4 |
| | x | x | | | x | | x | | | | | | | 4 |
| | x | | | | | | | x | | | | x | | 3 |
| | x | | | | | | | x | | | | x | | 3 |
| | x | x | | x | | | | | | | | | | 3 |
| | x | x | | | x | | | | | | | | | 3 |
| | x | | x | | | | | | | | | | | 2 |
| | x | | | | | | | | | | | | | 1 |
| Total By Department | 15 | 11 | 7 | 7 | 9 | 2 | 3 | 6 | 2 | 2 | 3 | 6 | 7 | |

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# Implementation Grant Application

- Applications to NYS LGRMIF are due by February 1st of each year
- GIS Implementation Grant applications must use a recent Needs Assessment as the basis for any funding request
- Beginning in 2011, GIS Implementation Grant applications must be joint applications from 2 or more municipal governments
- NY State Archives considers the GIS grants as "seed money" and expects local governments to share in the cost of GIS development
- Current grant evaluation criteria favor the funding of records management activities over hardware/software

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# Proposed Timeline

*GIS Needs Assessment ( December 2010 - January 2011)*

- **Interviews**
- **Draft and Final Report**

*Grant Application (January 2011 – February 1st, 2011)*

- **Scope out Phase 1 of GIS Implementation based on GIS Needs Assessment**
- **Send out RFP's for items over $10,000**
- **Prepare and submit grant application by 2/1/2011**

*Implementation Phase 1 (July(?) 2011 – July 2012)*

- **If the Town is successful in receiving additional LGRMIF funding for Phase 1 implementation, project may commence on July 1st, 2011 or when funding becomes available.**

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# Questions?

Thank you…