



Leadership, Partnership, Stewardship

Wake County Business Plans *FY 2007 - 2009*

Community Services Department
Geographic Information Services

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GIS Business Plan – 2007 – 2009

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Wake County Community Services

Geographic Information Services Business Plan

1. Statement of purpose

Wake County Geographic Information Services (GIS) strives to be a service-focused central resource of geographic information for Wake County, providing spatial data and solutions which enable our customers to accomplish their business purposes.

2. Scope

Geographic Information Services serves as a clearinghouse and central distributor of geographic information for Wake County. To support this distribution effort, GIS has a primary responsibility for developing and maintaining core geographic databases needed by our customers. In order to meet these two business needs, GIS staff provides technical support including needs analysis, programming/application development, hardware/software support, database development, training, and project management. The technical support provided by staff is tightly integrated with the two business services in that staff must have the technical infrastructure, expertise, and support to provide and maintain the information, services, databases and capabilities that our customers need.

Wake County GIS provides these services to three primary customer groups: Wake County governmental agencies, other governmental jurisdictions, and citizens/private sector. Over the past few years, our customers have begun to rely more heavily on our on-line services. We have taken this opportunity to apply some of these staff resources to other tasks. As a result, our internal and external customers are significantly impacting and directing the division's workload and priorities.

3. Desired Outcomes

A Geographic Information System that is

- Tightly integrated with other County and municipal data systems
- Easy and intuitive to use
- Secure
- Readily available and highly reliable
- Able to incorporate new technology
- Capable of providing users with GIS functionality needed to perform their work
- Scalable in functionality depending on the users' needs

Graphic and attribute geographic information that

- Is efficiently updated
- Is current, accurate, and complete
- Is shareable

- Includes metadata (data about the geographic data)
- Can be integrated with information in other data systems that have geographic identifiers
- Reflects historical information
- Includes information needed by our system users to carry out their responsibilities
- Provides public access to mapping information while maintaining sensitivity to citizens' right to privacy
- Conforms to commonly accepted industry standards

GIS staff and system users who are well trained and equipped to

- Provide geographic and land records information
- Provide technical assistance (programming/application development, system integration, project management, database development/management, training, etc.)
- Provide maps, digital data, and complex geospatial analyses
- Assist in leveraging joint projects and partnerships with other agencies
- Foster independence in other departments using GIS technology by providing users with appropriate training, tools, and applications, enabling them to accomplish their own routine GIS tasks

4. Define Priorities

Geographic Information Services is continually challenged by the task of prioritizing our interdependent services and projects. This task becomes more difficult as we weigh our internal needs with the needs of other customers (i.e., other Wake County agencies, governmental agencies, the private sector, and the public). When we ask our users which of our two services (i.e., gathering and updating geographic data versus distributing the information) is more important, our users respond in one of three ways:

- a) Different tasks have different needs for currency, accuracy, completeness, and format (i.e., map, report, digital data, etc.).
- b) It doesn't do the user any good for the information to be up-to-date and accurate if they don't have access to it.
- c) They need the information to be current, accurate, and in a format that they can use AND to be readily available. These users perceive our two services as one.

Most organizations do not have unlimited budgets and staff resources that allow them to fully fund and provide services at the level requested. GIS, just like other Wake County agencies, has had to make difficult choices when balancing our users' needs and suggesting how to handle conflicting demands. GIS staff approaches the task of prioritizing services or initiatives by considering the following factors:

- Is the initiative required by the department to do their business (such as providing information to other departments or to their customers)?
- How extensive is the customer base (i.e., the number of agencies as well as number of users) that is requiring or relying on the initiative?

- Will the initiative meet more than one need (i.e., leveraging our existing resources to obtain maximum results for our investment)?
- Will the initiative assist us or other staff in becoming more efficient in carrying out our responsibilities?
- Will the initiative assist County staff in becoming more self-sufficient with their GIS needs by providing computer hardware, software, applications, networks, and data infrastructure to efficiently produce, store, analyze, and access geographic information?
- Does the initiative allow users to look at geospatial information in a more useful way?
- Is the initiative required to provide information and/or assistance for master planning efforts, special studies, or analyses that are requested by the Board of Commissioners and/or other agencies?
- Does the initiative support health, safety, and public welfare?
- Does the initiative support a mandated service?
- Does the initiative have a positive impact on the County's economy?
- Does the initiative contribute to improving the quality of life in Wake County?

<h2>5. Status Report</h2>

Current conditions impacting service delivery

- Significant staff resource devoted to the project to integrate GIS's Integrated Parcel Maintenance System (IPM) with the Land Records/CAMA System
- Increasing number of requests from County agencies to
 - Geocode, map, analyze and report on incidents and/or addresses
 - Assist in developing and/or maintaining GIS databases
 - Perform robust/complex geospatial analyses and produce maps to show the information
 - Investigate new functionality and recommend ways to incorporate the functionality into Wake County's GIS
 - Investigate agencies' GIS needs (applications, GIS software and hardware)
 - Help other departments integrate GIS related technology that they have acquired using grant funds with Wake County's Geographic Information System
- Involvement in projects to replace existing GIS applications with newer applications
- Staff resources required to keep older applications (MAPS) operational while replacements are developed
- Involvement in projects to upgrade hardware and software and coordinate those projects with Information Services (IS) and City of Raleigh
- Need for a basic level of training for our ArcGIS users as new ArcGIS software versions are released
- Need to coordinate multi-jurisdictional projects with other jurisdictions (Computer Aided Dispatch, MAPS Rewrite, Census Bureau Projects (such as the Boundary Annexation Survey Project, etc.) and county line mapping
- Impact of the economy on the demands placed on our Customer Service staff by the development community

Key issues faced / How the issues are addressed

- Significant staff resources devoted to Integrated Parcel Management/Land Records/Computer Assisted Mass Appraisal (CAMA) Project
 - Wake County and FSI staff are working on an additional release of the IPM application that is scheduled to be installed during the later part of FY 06-07
 - Assistance from Information Services for database configuration and tuning
 - Training and assistance from Information Services (Applied Technology Section) to incorporate more formal project management techniques

- Increasing requests from County agencies to
 - Geocode, map, analyze and report on incidents and/or addresses
 - Fully document procedures to geocode incidents and/or addresses
 - Equip and train staff from other departments to perform this function, especially when data privacy issues are involved
 - Enable more efficient methods of geocoding, using: Alternate Street Name Tables, Alias Names Tables, Customized Parameter files, and Composite Address Locators

 - Assist in developing and/or maintaining GIS databases
 - Work closely with departments who will be using GPS technology to procure the appropriate equipment, encourage adequate training, and agree on a methodology for transferring the data to and from the GPS receivers and the GIS
 - Develop partnerships with other governmental agencies to acquire and maintain data whenever advantageous to Wake County
 - Encourage departments that are responsible for data to acquire and maintain the data, when appropriate
 - Concentrate whenever possible on multi-use databases
 - Work closely with departments on contracted projects that involve the delivery of GIS data to make sure that the data is delivered in the agreed upon data format
 - Design and develop data systems that enable agencies to gather and update the data based on their business rules
 - Integrate improved workflows between agencies and jurisdictions
 - Assess the need for an “address points” database and explore resources and methodologies for data collection and maintenance
 - Develop a strategy for validation and quality control of the address databases used by our customers

 - Perform robust/complex geospatial analyses and produce maps showing the information
 - Develop application(s), such as the Analytical Mapping Interface (AMI) and plotting applications, that assist departments in performing GIS data analyses and plotting, thereby enabling them to assume responsibility for these tasks on their own

- Increase the use of ArcGIS’s Model Builder to automate geoprocessing where possible
- Document procedures for GIS staff to use in performing geospatial analyses for other agencies
- Provide training to staff that enhances their capabilities to develop tools and applications
- Periodically generate and make available data and maps (PDFs) of commonly requested geospatial analyses

- Investigate new functionality and geographic information and recommend ways to incorporate them into Wake County’s GIS
 - Assign appropriate GIS staff the task of investigating new functionality such as ESRI’s Route Server, In-Vehicle Navigation (IVN), GIS/Wireless Communication, digital data submission, mobile computing, web portals, different types of imagery, and weather information from the National Weather Service
 - Discuss funding opportunities with other agencies and the County’s lobbying agency (Ferguson Group) to learn about grant opportunities and partnerships
 - Leverage state and federal GIS application efforts, such as NC OneMap (<http://www.nconemap.com/>), Geospatial One-Stop (<http://gos2.geodata.gov/wps/portal/gos>), and the National Spatial Data Infrastructure CAP Grant (<http://www.thecarbonproject.com/gaia.php>)

- Investigate the GIS needs (GIS software, hardware, data, training, etc.) of County agencies requesting our assistance
 - Develop a more formalized procedure, for documenting and recommending agencies’ GIS needs
 - Assign appropriate staff within GIS the task of investigating requesting agencies’ GIS needs
 - Discuss funding possibilities with requesting departments, including grant and partnership opportunities with other jurisdictions
 - Work with appropriate IS staff to determine and recommend cost-effective hardware solutions

- Projects to replace existing GIS applications with new applications and upgrade hardware and software
 - Work closely with the Information Services’ Applied Technology Section to develop project plans and use project management methodology for replacing existing applications
 - Use the services of contractors whenever cost effective and ensure that there is a task for knowledge transfer from the contractor to County staff in the scope of work
 - Periodically update a hardware and software replacement plan

- Staff and User Training
 - Work closely with other agencies and jurisdictions to jointly conduct GIS training whenever feasible, cost effective, and beneficial

- Encourage the appropriate use of free or inexpensive web training
- Provide a basic level of training for Wake County’s GIS users
- Equip and train existing and potential GIS users to utilize the technology to become more self-sufficient in meeting their needs and in working in a collaborative manner with GIS staff
- Need to coordinate multi-jurisdictional projects with other jurisdictions (Computer Aided Dispatch, MAPS Rewrite, CAP 2006 Grant Project, etc.)
 - Maintain communication (formal and informal) with other local jurisdictions
 - Work closely with the City of Raleigh’s GIS staff on the MAPS Replacement Project, enhancements to iMAPS, Aerial Photography Projects, and development of procedures to ensure application stability and reliability for shared GIS applications
 - Participate in multi-jurisdictional organizations such as the North Carolina Geographic Information Coordinating Council, Triangle ArcUsers’ Group, etc.
 - Work closely with agencies to minimize and/or eliminate data redundancy
 - Continue to share data with municipalities and other governmental organizations within the County

Status of Current Initiatives (FY 06-07, as of December 2006)

ArcGIS Migration

GIS Server and Hardware Upgrades

- Completed GIS Server upgrades
- Completed replacing all of Geographic Information Services’ PC monitors with dual 20” flat panel LCDs
- Completed upgrading GIS software on all County PCs from ArcGIS 8.3 to ArcGIS 9.1
- Rebuilt the GIS SDE (Spatial Data Engine) Production Server and upgraded the operating system to Linux 3.0
- Worked with IS to implement a backup strategy for the GIS databases and servers with emphasis on disaster recovery
- Built the GIS WEB Test and GIS WEB Production ArcIMS servers

ESRI Software Training

- Conducted customized in-house ArcGIS Training for Emergency Management
- Conducted a one-on-one ArcGIS overview session for Ryan Lewis, EMS
- GIS Analysts participated in an ESRI certified “Introduction to Geoprocessing Scripts using Python” training class, using Wake County’s IS Training facility
- GIS Property Mapping Team participated in on-going training in the use of the new Integrated Parcel Maintenance (IPM) Application
- Provided support on ArcGIS to GIS staff including custom tool installations, custom “How-To” documentation, and one-on-one training sessions

ArcGIS Software Licensing Plan

- Completed the GIS Software licensing plan and completed the process of converting ArcView level ArcGIS clients to concurrent licensing, where applicable
- Continued the use of the ESRI Developer Network (EDN). *(EDN provides software developers with a library of all ESRI server-based software to use for research, development and testing of applications, a special help system and a collaborative developer Web site. It allows us to explore application development alternatives before making software purchases.)*

ArcGIS Software Installation

- All Wake County ArcGIS software users are now using ArcGIS 9.1

Data Conversion to ArcGIS's Geodatabase format

- All layers have been converted to the new Geodatabase format

MAPS Replacement

MAPS Application Replacement

- Application Team has completed the Needs Analysis Phase of the project
- Application Team has begun programming the ArcEngine and ArcGIS applications to replace the MAPS program
- Application Team has contracted with ESRI Technical Services for programming assistance on the ArcEngine application
- Application Team has contracted with ESRI Technical Services for programming the "Zoom to Scale" and "Print to Scale" functionality for the browser-based version of MAPS

Land Records/Computer Assisted Mass Appraisal (CAMA) System

Integrated Parcel Maintenance System (IPM) – *(This is the new property mapping application that was written by Farragut Systems, Inc. and Wake County GIS to take advantage of ESRI's ArcGIS software and the Land Records/CAMA System that is being developed by Wake County IS, Revenue Department, FSI, and IIS.)*

- Version 4.0 of the IPM application is currently in production

Integration of IPM with the Land Records/CAMA System

- Interface has been developed to pass data between the IPM and the new Land Records/CAMA System
- Because the actual schedule for the integration of the two systems was dependent on the schedule for the Land Records/CAMA system, IPM was designed to and is currently working stand-alone (i.e., staff is passing hardcopy reports to the Revenue Department)
- Once the two systems are fully integrated, staff will realize improved data currency, accuracy, completeness, and greater efficiency of data entry and workflow
- Integration testing is currently on going with a project completion of integration implementation during 4th Quarter FY 06-07

Street Dictionary

- Staff was trained in the use of the Street Dictionary interface
- Staff continued to work with Revenue, IS, and IIS (contractor) to update and revise the functionality of the interface
- Staff is currently investigating the feasibility of the Street Dictionary for maintaining the master lookup table of subdivision names for the Property Mappers and Revenue Department

Investigation and application of new technology (GPS, mobile computing, AVL, 3D visualization, etc.)

Global Positioning [Satellite] System (GPS) technology – *(GIS continued to support Environmental Services in their use of GPS technology to locate domestic wells and collect information about the well.)*

During the past year, GIS staff:

- Worked with Environmental Services' Well Section to purchase and set-up two additional GPS receivers for that Section as field staff has increased
- Started working with Environmental Services' Technical Assistance Section to collect septic and on-site wastewater disposal data on an evaluation basis

Automatic Vehicle Location (AVL) System Technology– *(AVL technology is designed to track vehicles and staff using Global Positioning Satellite System technology. Wake County will initially focus on using the technology for Public Safety, with future application of the technology for appraisers, inspectors, animal control officers, etc. The AVL System will be integrated at some level with Wake County's GIS in order to use Wake County GIS's street maps.)*

- GIS staff participated in the evaluation and selection of an AVL vendor in FY 05-06
- County awarded a contract to Motorola for the AVL server hardware and software
- Contracts was awarded for 247 GPS modems, cables, and antenna
- GPS modems and software clients were installed and tested in 10 Sheriff/CCBI vehicles

In-Vehicle Navigation (IVN)

(IVN works in conjunction with the AVL system to provide emergency responders with a digital street map in their vehicle and the location of their own vehicle on the map at all times. These maps will display the quickest routes to an incident or the nearest predetermined facility (i.e., hospital). The system can also display various types of GIS data such as water, parks, and buildings)

- GIS staff served on a committee to investigate In-Vehicle Navigation technology and assisted in preparing an implementation plan for Wake County
- GIS staff participated in the evaluation of the vendor proposals

Address Points Database

- Developed an application for inventorying and locating building addresses on parcels with multiple addresses as well as non-traditional addresses, which may take the form of communication equipment, meters, cell towers, and lighted signs

2005 Aerial Photography/Digital Orthophotography Project

- Surdex Corporation delivered all imagery (both black/white and color orthos) at ½ foot pixel resolution in May of 2006

- Spatial Focus (QC consultants) and the County completed QC and QA of all of the imagery and made it available to the public, other governmental units, and Wake County staff (in .TIF and MrSID formats) in 2006.
- Public distribution included free downloads from the County's data download site and DVD sets that could be purchased for the cost of distribution.
- Orthoimagery was loaded into ArcSDE in October of 2006, making it available in the iMAPS application

Investigation of Oblique Aerial Photography Technology

(Oblique aerial photography provides views of an area or building from 4 different directions)

- In 2004, Wake County GIS hosted demonstrations by Pictometry of the technology involved and the uses of oblique aerial photography at the request of the Revenue Department.
- It was the general consensus of those agencies attending the demonstrations that this was an interesting product, but not a priority for Wake County at this time
- Public Safety, who was involved in the demonstrations in 2004, expressed a renewed interest in the product in 2005.
- In 2006, Surdex Corporation informed GIS staff of the possibility of using ESRI's Image Server software to generate comparable functionality as the Pictometry product.
 - As of November of 2006, ESRI has not released this software. Surdex had planned to use Raleigh's new 2006 aerial photography to produce some obliques to demonstrate the possibilities.
 - In the interim, Surdex is partnering with Multi-Vision Corporation, who is scheduled to give a demonstration to Wake County and Raleigh Public Safety personnel in December.

Scanning and Rectifying Wake County's 1958, 1974, 1981, and 1988 Aerial Maps

- GIS contracted with Geodesy Associates, LLC in April 2005 to scan and rectify approximately 6,300 aerial images to Wake County's mapping coordinate system grid.
- This project had three primary objectives:
 - Create a digital backup copy of the original aerial photographs for safe keeping
 - Create a digital aerial image of the 1958 and 1974 aerials and 1981 and 1988 orthophotographs that can be overlaid with other digital GIS information
 - Provide a more efficient way to produce copies of the historical aerial maps than using older ammonia-based blueprint machines
- GIS staff reviewed the quality and edge match of each scanned aerial images during 2006 and requested that Geodesy correct the poor quality images. Staff rechecked all redelivered images and created image catalogs using the best images available for each year. Staff rejected less than 100 images, primarily due to the quality of the original mylar, which was beyond Geodesy's control.
- Over the next few years, staff will continue to investigate the scanning technology to see if some of the darker originals can be lightened without causing the digital imagery to be cloudy/milky.

NC OneMap (<http://www.nconemap.com/>) - (NC OneMap is a project spearheaded by the United States Geological Survey (USGS) and administered by the NC Center for Geographic Information and Analysis, to

integrate data from Federal, state and local government organizations through a single web browser. The web browser accesses the jurisdictions' data directly from their servers. This is part of "The National Map" project.)

- Wake County GIS continues to maintain and update a live web service for participation in NC OneMap.

NSDI CAP 2006 Grant Project - *(Wake County GIS is partnering with the North Carolina Department of Environment and Natural Resources, US EPA, the City of Charlotte, and the Carbon Project, Inc., (a private sector company) in a grant from the National Spatial Data Infrastructure (NSDI) Cooperative Agreement Program (CAP). Under the grant, the Carbon Project, Inc. will take the lead in developing an easy-to-use application for emergency incident response and recovery that accesses online geographic data services from organizations throughout the country, incorporates information collected using Global Positioning Systems (GPS), and allows users to seamlessly share event-specific location information. Once completed, the application will be available at no cost to all governmental agencies throughout North Carolina and will support analytical and decision-making processes related to the emergency incident response and recovery community. Wake County GIS's contribution to the project will involve up to 3 weeks of staff time participating in the design sessions, providing input into the functional requirements to ensure that the tool would meet the needs of local governments, and field-testing and validating the application. The application will be compliant with National Spatial Data Infrastructure framework datasets in order to ensure wider use and interoperability by agencies with different GIS software.)*

- Wake County GIS staff participated in biweekly conference calls and 2 design sessions, providing input into the functional requirements to ensure that the tool would meet the needs of local governments.
- The Carbon Project, Inc. is scheduled to deliver the application to project agencies early in 2007 for further testing.

Efforts to further extend GIS technology and expertise into additional departments (Board of Elections, Budget and Management Services, Emergency Management, Environmental Services, Facilities/Design/Construction, Human Services, Sheriff's Office)

GIS/Emergency Operations Center Support and Functional Enhancements – *(During FY 03-04, GIS, Environmental Services, and Public Safety contracted with PlanGraphics, a GIS consulting firm, to examine how Wake County could better use GIS technology to support response to natural and man-made emergency situations. This study coincided with a similar study performed by PlanGraphics for the City of Raleigh. Emergency Management (EM) and GIS have prioritized some of the tasks included in the consultant's study based on Emergency Management's priorities. Emergency Management's priorities include: (1) sharing information by "pushing it out" to affected parties, (2) downloading information from Raleigh/Wake Emergency Communications Center and municipalities for use by Emergency Management, (3) obtaining real time information about power outages from Progress Energy, (4) generating "damage" maps, (5) generating maps of key location information (schools, railroads, hazardous materials locations, day care locations, etc.), and (6) taking advantage of plume modeling capability.)*

- During 2005 and 2006, GIS staff continued to discuss the project and document additional needs raised by Emergency Management and other agencies supporting the Wake County Emergency Operations Center.
- GIS staff has addressed some of the application needs in response to the heavy rains and flooding from Tropical Storm Alberto in June of 2006 by mapping the locations of flooded roadways in Wake County. Staff also began investigating the use of a live CAD feed from the Raleigh/Wake Communications Center in order to track and map road hazards due to flooding, downed trees, and power lines.

- GIS staff compiled a GIS layer of existing gas stations within the County by comparing and combining datasets from Wake County Revenue Department and the North Carolina Division of Waste Management. This information would be used by Emergency Management to advise the public should an evacuation order be issued in response to a disaster, such as a hurricane or an event at the Shearon Harris Nuclear Power Plant.
- Emergency Management has purchased the WebEOC software to replace the EM2000 software that is used in the Emergency Operations Center and will be upgrading The Communicator software. GIS staff will be working closely with Emergency Management to determine how to integrate the software packages with Wake County's GIS.

Continue development of databases and interfaces to support planning, development, and open space functions

Open Space Support

- Completed updates and analyses for 9 open space corridors and the new Southeast Park that was adopted by Board of Commissioners
- Added newly acquired properties to the inventory
- Incorporated properties that have been identified for fee simple/easement purchase into projects for each area
- Worked with Parks, Recreation, and Open Space Division to inventory open space easements and identify violations and encroachments. Created custom GPS forms to locate violations for investigation.
- Continued to provide maps and geographic information to PROS and Facilities/Design/Construction as part of Wake County's continuing effort to preserve open space

Wake County Radon Study

- Worked with Environmental Services to complete database update for Phase III of Wake County's Radon Study. Generated maps and reports for possible correlations between radon levels in air and groundwater with geologic formations
- Combined Phase II results with Phase I and the Air Study completed in 1990's by NC Radiation Protection Division
- Completed Phase III Radon Study sample list for Wake County Radon Study based on geology and number of sites needed for statistically valid samples. Results will be added to database in Fall 2006

Watershed Management - *(Projects to preserve and improve water quality)*

- Completed an analysis showing the estimated impervious surface trend for residential parcels zoned R80W/R40W. Worked with ES's Stormwater Committee to update regulations based on the findings.
- Worked with ES, Dr. George Hess (PhD), and NCSU Natural Resources class to develop runoff curve numbers for specified land uses within the County's jurisdiction. Results are being utilized in stormwater management efforts.
- Identified areas historically prone to storm event flooding throughout County and municipalities. Worked with various staff from each organization to update this information throughout the year.

- Worked with Environmental Services and NC Floodplain Mapping Program to release the new floodplain mapping data. This data was adopted by Board of Commissioners and municipalities and is referenced in local ordinances. Data is available for download from GIS website and is viewable in iMAPS web application and MAPS internal application.

Disaster Debris Management Program

- Worked with Environmental Services and Facilities/Design/Construction to identify potential properties for Temporary Debris Reduction and Storage (TDRS) sites following a storm event. Continuing to work with these groups to adjust criteria (i.e., parcel size, road access, presence of wetlands/floodplain, proximity to subdivisions, etc.) until suitable sites with interested landowners are found.
- Provided extensive technical support for DARRT (*Disaster Assistance Response and Recovery Technology Project*) Application testing: reviewed materials, attended meetings, and installed and tuned iterations of the application components on the test web server
- Worked with Angeline McInerny of Environmental Services (with Access database design support from Alex Zapparoli, Solid Waste Division) to design and test an interim Debris Tracking application for use during the Ice Storm season (while DARRT was in development)

Groundwater Information Management System (GIMS)

- Continuing to work with Environmental Services to upload/download domestic well GPS data for use in Groundwater Information Management System (GIMS). Working with inspectors to download well location points for GPS receivers, geographically correct these points, and incorporate them into the Well SDE database for use in GIMS.

Providing appropriate GIS information and functionality via the Internet

iMAPS Enhancements – (<http://imaps.co.wake.nc.us/imaps>)

- Rebuilt the test ArcIMS server
- Created new Map Services for the 2004 Raleigh Orthophotography and a Raleigh Development Plans View
- Uploaded new floodplain data to the Data Download site and to the Environmental Features View of iMAPS
- Created detailed documentation of iMAPS Recovery Procedures
- Spent one week working with an ESRI consultant on new iMAPS features (zoom to Latitude/Longitude, zoom to approximate scale and enhanced print function)
- Redesigned auxiliary iMAPS pages to match look and feel of new wakegov.com site

Wake County GIS WebPages

- Continued refining and updating the data formats and selection that are offered via our GIS Digital Data Download pages (<http://www.wakegov.com/gis/gisdigitaldata.htm>)
- Updated the Data Download site design to enhance user friendliness and removed outdated data formats
- Uploaded new Metadata to the Data Download site, as records are updated/completed
- Updated new and updated PDF maps (<http://www.wakegov.com/gis/pdfmaps.htm>)

- Created a web page that directs customers to the public FTP site for unzipped parcel data and gives instructions for using the FTP site for customers who have problems unzipping our data
- Uploaded Image Catalogs and a “Read Me” file for the 2005 Orthophotos on the Data Download site

RDU International Airport Authority – Noise Information

- Continued to maintain the ArcIMS site that provides access to RDU’s interactive maps showing Noise Levels from incoming and outgoing flights. Maps can be accessed at (<http://198.85.228.132/rdu/viewer.htm>)

Revaluation Support

Analytical Mapping Interface (AMI) (*AMI is a browser-based mapping interface that is launched by the user from within the CAMA system to display valuation characteristics. AMI is also used to spatially identify properties or neighborhoods to which certain valuation attributes should be applied.*)

- FSI and IIS are testing the AMI application to support the Revenue Department’s analytical mapping needs for property valuation and neighborhood delineation processes
- Application development will be completed in 2nd – 3rd Quarter of FY 06-07

Other Revaluation Support

- Staff provided mapping and analyses using GIS polygon data to support LR/CAMA quality control on values in the CAMA database files for zoning, city limits, etc., to ensure that CAMA data be as accurate as possible prior to the 2008 Revaluation.
- Staff assisted with various mapping and analyses projects to assist in the VCS (neighborhooding) portion of the revaluation preparation, including training and technology transfer to allow Reval staff to create and plot their own maps

Mapping

County Line Mapping Projects - (*Work with Franklin, Harnett, and Granville Counties to jointly locate the County lines, have the North Carolina Geodetic Survey (NCGS) install geodetic monuments along the jointly agreed upon county lines, and record surveys of the lines in the appropriate Register of Deeds Offices and with the State*)

- Wake County staff began working with Franklin County and the NCGS in the Fall of 2004 in response to confusion by a developer and their engineering company over the location of the Wake/Franklin County line that the two counties had been using since 1992.
- Wake and Franklin County agree on the location of the line and the procedure that needs to be followed.
- Progress on the project has been slow as attorneys from both counties worked through legal procedures with the State. The counties will have to submit a local bill to the General Assembly if the line from the USGS Maps is altered to include 4 lots in Richland Hills Subdivision.
- North Carolina Geodetic Survey’s (NCGS) State and County Surveyor is in the process of having a private surveyor survey the 1992 County line that was taken from the USGS Maps. NCGS plans to submit this line to both counties for their review and approval in early 2007. After both Counties approve the line, the local bill will be submitted to the General Assembly.

Emergency Management Data Layers

GIS staff worked with Emergency Management, Environmental Services, Revenue Department, and Human Services to pinpoint the location of the following facilities:

- Gas Stations – using data from the State and the Revenue Department
- HazMat Sites – using data supplied by Emergency Management
- Rest Homes – using data supplied by Human Services
- Nursing Homes – using data supplied by Human Services
- Family Care Facilities – using data supplied by Human Services
- Daycare Centers and Home Centers – using data supplied by the State

Computer Aided Dispatch (CAD) System

- Continued discussions with Wake County staff, municipal Public Safety staff, and the Raleigh/Wake Communication Center concerning on-going CAD data maintenance and database/policy changes affecting the CAD database(s)
- FireView Software Upgrade – During FY 06-07, staff executed a contract with the Omega Group to upgrade the FireView software. Wake County GIS uses this software to calculate and produce a quickest appropriate response database for the 911 System. This project also includes installing the FireView software for Fire Services and EMS. The software will allow Fire Services and EMS to import incident records from the CAD system and records management system into FireView for analysis and planning.
- Locution Computerized Voice Dispatching System – GIS staff continued to provide street name and common place updates for the system on a quarterly basis
- GGM to MGU Upgrade – Staff is in the process of executing a contract with Motorola to upgrade the GIS-to-CAD interface software. Staff is in the process of preparing the geographic data to convert it for the new software.

6. Demand Analysis

Factors causing fluctuations in demand for GIS services:

- Continued population growth in Wake County
- Condition of the economy
- Changing focus and priorities of elected officials and County management
- Continued demands being placed on other departments to do more with less, resulting in increased use of technology including GIS
- Natural disasters
- Increased emphasis on Homeland Security
- Increased focus on national data standards for data sharing (Homeland Security Databases project, NC OneMap, etc.)
- Increased recognition by government agencies, the private sector, and citizens of the value and usefulness of geographic data analyses and of displaying information spatially
- Recurring schedule of certain activities (8-Year Property Assessment Revaluation Cycle, elections, aerial photography reflights, departmental master plan projects and updates)

- New and expanding information requirements mandated by other departments
- New and major initiatives by County agencies and other governmental jurisdictions which require involvement by Wake County GIS staff and the use/integration of GIS technology, such as:
 - Land Records/Computer Aided Mass Appraisal (CAMA) System
 - Public Safety related projects
 - Property acquisition
 - Site planning for County facilities
 - Environmental projects and studies (radon, disaster debris management program, etc.)
 - Recreation Land Dedication Ordinance support and integration with the Subdivision Information System
 - Planning/Permitting System
 - Stormwater Management Study
 - 2008 Property Revaluation Project
- Expectation of users that GIS will support and integrate new technology
 - Internet and Intranet
 - Global Positioning System (GPS) technology
 - Automated Vehicle Location (AVL) technology
 - In-Vehicle Navigation (IVN) technology
 - Mobile computing
 - 3D Visualization and Modeling
- Demand for new and/or updated geographic datasets (address points, Homeland Security points of interest, impervious surface, etc.)
- Increased awareness by the public of Wake County’s mapping tools, (iMAPS, GIMS, etc.) and their desire to include/link functionality from other applications, such as GoogleEarth and MapQuest into Wake County’s applications
- Lifecycle of technology (software and hardware) and the integration of data systems

7. Define Approaches for Achieving Outcomes
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Individuals who directly or indirectly use Wake County’s Geographic Information System are demanding a higher level of system functionality, availability and reliability; more sophisticated geospatial analyses; more efficient data integration with other systems; and more effective ways to visualize geographic information. We believe that this is partly the result of users and policy makers becoming more familiar with the capabilities of the technology through use of services that Wake County, other local governments, and the private sector are providing. GIS technology is now being integrated into every day functions as diverse as individuals using GPS receivers, MapQuest, or GoogleEarth to plan travel routes to viewing demographic studies on the nightly news. The general population has become more accustomed to viewing information visually and spatially. The public understands that this technology, i.e., hardware, software, applications, and data, can provide a comprehensive look at issues, incidents, and/or resources by supplying a spatial view of data relationships. As a result, they can better understand the relationship of geographic

information. The private sector has also come to realize that this helps them become more productive as well.

The needs of our customers continue to change just as technology changes. Our customers' needs, rather than the availability of new technology, should drive our business plans. Staff has to deal with the challenge of when to employ new technology to accomplish the organization's business, how/when to efficiently move from existing technology to new technology with limited financial and staff resources, and how to deal with all the competing interests. We feel that a solution involves working with other departments to propose and carry out projects that will leverage the available resources and do so in a way that ensures that existing needs or requirements do not go unmet.

Wake County GIS is involved in several initiatives that will comprehensively address many of the outcomes identified in Section 3 of this business plan.

1. The **Land Records/CAMA Project** is a major initiative by Wake County to develop a comprehensive land records system involving tax assessment, tax collections, property revaluation, land records management, property mapping, and spatial analysis. The system is a collaborative effort between Wake County, IIS, and Farragut Systems, Inc. Goals for the system include:
 - Improving currency of information
 - Improving accuracy of map and attribute data
 - Improving completeness of graphic and nongraphic geographic information
 - Creating efficiencies in workflow between departments
 - Improving system integration with existing and future applications

GIS staff has been and will continue to be involved in the following tasks:

- Implementing the plan for defining, achieving, and maintaining data currency and completeness
- Implementing a new workflow for land records documents that will enable digital data to be efficiently passed between systems and databases and easily incorporated into application interfaces
- Upgrading the Integrated Parcel Maintenance System (IPM) to newer versions with increased functionality and full integration with the Land Records/CAMA system

Wake County staff has also begun investigating a new permitting (environmental and building) and inspections system. This system will be integrated with the Land Records/CAMA System in the near future.

2. Continue to offer and expand a **GIS Training Program** for all GIS users based on their needs and available interfaces
 - Continue the use of the Information Services Training Facilities in the Wake County Office Building and Human Services Building for GIS related training
 - Continue using GIS staff as trainers where practical
 - Investigate the need for an introductory GIS training class for interested employees and managers

- Explore on-site training options in cooperation with other agencies (such as the City of Raleigh and the State of North Carolina) to realize cost savings
 - Create an “Introduction to iMAPS” online video training for the public
3. Implementation of new **GIS Applications**
- Browser-based Analytical Mapping Interface (AMI) to support the Revenue Department’s Reval Effort
 - Reengineering the MAPS application, including development of several versions scaled to meet the functionality needs of different users
 - Development and/or incorporation of off-the-shelf applications to enhance the use of GIS technology in Wake County’s Emergency Operations Center (such as flood modeling)
4. **GIS System Management**
- Continued maintenance of a structured development and test environment infrastructure for all major application areas
 - Continued move toward hardware and software standards being utilized by Information Services such as Dell Servers and Linux Operating System on Oracle RAC
 - Transfer of additional Oracle Database Administration responsibilities to IS
 - Implemented backup and disaster recovery procedures for GIS data with Information Services and participated in the annual Sunguard disaster recovery test
 - Continuing to pursue the purchase and use of “virtual server and workstation” technology for GIS application development and GIS data management
5. **Efforts to improve efficiency**
- Expand GIS’s existing Mapping Document Tracking Database to project and monitor the currency and the number of parcels to be mapped in the GIS parcel layer
 - Continue to work with the North Carolina Department of Transportation (NC DOT) to refine the process where counties obtain DOT’s Right-of-Way Projects in digital format during DOT’s Right-of Way-Acquisition Phase
 - Continue to transfer responsibility from the Planning Department to GIS to address all subdivision plats during the plat review process. Staff believes that this would significantly reduce the number of plats that are recorded with incorrect parcel address numbers and would save staff time required to correct the addresses after a plat has been recorded.

8. Performance Measures

Over the past few years, GIS staff has placed a great deal of emphasis on improving the currency, accuracy, and completeness of information entered into the GIS databases. Staff has collected information that helped us determine how many tasks or units were accomplished during a period of time (i.e., parcels created, addresses assigned, street segments mapped, customers assisted, etc.) We have not had systems or agreed-upon-

standards to measure our performance against an accepted definition of currency. As part of Wake County's GIS/Land Records/CAMA Integration Project, staff will be discussing a definition of currency with our system users.

	FY 04-05 Actual	FY 05-06 Actual	FY 06-07 Estimate	FY 07-08 Projection	FY 08-09 Projection
Parcels created in GIS per year	12,033	14,157	13,693 (a)	14,400 (b)	15,000 (c)
Addresses assigned per year	203	238	486 (d)	486 (e)	486 (f)
Street centerline segments mapped/addressed per year	2,151	2,408	2,802 (g)	2,412 (h)	2,412 (i)
Master Street Address Guide (MSAG) Ledgers submitted to telephone company contractor per year	1,170	1,142	1,060 (j)	1,140 (k)	1,140 (l)
Currency of geographic information					
Parcel Lines - Percentage of plats mapped within <u>x</u> business days of the recordation of the plat or deed <i>(The new Interactive Parcel Maintenance (IPM) system, when fully integrated with the Land Records/CAMA System, will enable GIS to provide property mapping to our users at a more acceptable level of currency. The new procedures and workflow will allow parcels to be mapped soon after recordation rather than waiting for the tax-based activation of triggers (first lot sold or a building permit issued).</i>	In transition between former business rules and new business rules to map documents as recorded	Currency to be determined by data users once new IPM/Land Records / CAMA system is fully integrated	To be determined based on discussions with users during '07	To be determined based on discussions with users during '07	To be determined based on discussions with users during '07
Street Centerlines / Addressing Information					
Streets segments and address ranges mapped within <u>x</u> business days of staff receiving the plat (percentage to be negotiated with users)	In transition between former business rules and new business rules	To be determined based on discussions with users during 2006	To be determined based on discussions with users during 2006	Based on decisions made during 2006	Based on decisions made during 2006
Percent of ledgers (Wake County street/address information) forwarded to BellSouth for entry into the MSAG within <u>3</u> days of mapping	90%	95%	95%	95%	95%

	FY 04-05 Actual	FY 05-06 Actual	FY 06-07 Estimate	FY 07-08 Projection	FY 08-09 Projection
Number of annual updates to the CAD Geofile with new street centerline graphics	5	5	5	5	5
Corporate limits Percentage of annexation ordinances mapped as of the effective date of the annexation	97%	95%	99%	99%	99%
Number of "visits" on GIS's iMAPS web site	1,061,823	1,470,609	1,663,368 (m)	1,673,340 (n)	1,680,000 (o)
Number of maps in PDF format downloaded from GIS's PDF Download Page	7,274	8,270	12,096 (p)	13,488 (q)	13,500 (r)
Number of special projects prepared for Wake County and other governmental agencies	90	100	87 (s)	96 (t)	96 (u)
Number of special projects prepared for the public	45	37	51 (v)	48 (w)	48 (x)
Percentage of time that special projects requests are delivered on time or ahead of schedule based on customers' requested delivery date	90%	95%	95%	95%	95%
Number of requests for information					
- Telephone calls (Customer Service and Addressing)	6,677	7,051	8,990 (y)	9,120 (z)	9,120 (aa)
- Counter Assists	2,857	2,440	2,400 (bb)	2,412 (cc)	2,400 (dd)

- (a) Parcels Created – FY 06-07 Estimate – July '06 – Oct '06 Actuals + July-Oct monthly average (1,141) for remaining 8 months
- (b) Parcels Created – FY 07-08 Projection – monthly average of 1,200 parcels/month
- (c) Parcels Created – FY 08-9 Projection – monthly average of 1,250 parcels/month
- (d) Addresses Assigned – FY 06-07 Estimate – July '06 – November '06 Actuals + monthly average of 39/month for remaining 7 months)
- (e) Addresses Assigned – FY 07-08 Projection - monthly average of 39/month
- (f) Addresses Assigned – FY 08-09 Projection - monthly average of 39/month
- (g) Street Centerline Segments – FY 06-07 Estimate – July '06 – November '06 Actuals + monthly average of 201/month for remaining 7 months)
- (h) Street Centerline Segments – FY 07-08 Projection – monthly average of 201/month
- (i) Street Centerline Segments – FY 08-09 Projection – monthly average of 201/month
- (j) MSAG Ledgers – FY 06-07 Estimate - July '06 – November '06 Actuals + monthly average of 95/month for remaining 7 months)
- (k) MSAG Ledgers – FY 07-08 Projection of 95/month
- (l) MSAG Ledgers – FY 08-09 Projection of 95/month

- (m) iMAPS Visits – FY 06–07 Estimate – July 06 – Oct 06 Actuals + monthly average of 138,614 for remaining 8 months
- (n) iMAPS Visits – FY 07–08 Projection – monthly average of 139,445/month
- (o) iMAPS Visits – FY 08–09 Projection – monthly average of 140,000/month
- (p) PDFs Downloaded – FY06-07 Estimate – July 06 – Oct 06 Actuals monthly average of 950
- (q) PDFs Downloaded – FY 07–08 Projection – 1,124/month
- (r) PDFs Downloaded – FY 08–09 Projection – 1,125/month
- (s) Special Projects – Government – FY 06–07 Estimate – July 06 – Oct '06 Actuals + monthly average of 8 for remaining 8 months
- (t) Special Projects – Government – FY 07–08 Projection – 8/month
- (u) Special Projects – Government – FY 08–09 Projection – 8/month
- (v) Special Projects – Public – FY 06–07 Estimate – July 06 – Oct 06 Actuals + monthly average of 4 for remaining 8 months
- (w) Special Projects – Public – FY 07–08 Projection – Average of 4/month
- (x) Special Projects – Public – FY 08–09 Projection – Average of 4/month
- (y) Telephone Calls – FY 06-07 Estimate – July 06 – Oct '06 Actuals + monthly average of 707 for remaining 8 months
- (z) Telephone Calls – FY 07-08 Projection – Average of 760/month
- (aa) Telephone Calls – FY 08-09 Projection – Average of 760/month
- (bb) Public Assistance – FY 06–07 Estimate – July 06 – Oct 06 Actuals + 6-month average of 200/month
- (cc) Public Assistance – FY 07–08 Projection – Average of 201/month
- (dd) Public Assistance – FY 07–09 Projection – Average of 201/month

9. Milestones of Service Accomplishments

For the last three years, a large percentage of Geographic Information Services attention and resources have been focused on the development and integration of the IPM with the Land Records/CAMA System. We anticipate completing the remaining work on this project during late FY 06-07. *(Note: The project to integrate the Integrated Parcel Maintenance application with the Land Records/CAMA system is dependent on the completion of additional releases of the LR/CAMA system by IIS, Revenue Department's contractor.)*

FY 2006-2007

ArcGIS Software Upgrades

- Migrate all applications and data to ESRI's software version 9.2 by the 4th Quarter of FY 06-07

ArcGIS Conversion

- Complete conversion of ArcSDE databases to Version 9.x by the end of the 4th Quarter of FY 06-07

Interactive Parcel Maintenance/Land Records/Computer Aided Mass Appraisal Integration

- Complete development, testing, training, and implementation of the Interactive Parcel Maintenance (IPM), Versions 4.0 during the 4th Quarter of FY 06-07, including full integration with the LR/CAMA system

Street Dictionary

- Test functionality of requested enhancements for maintaining the subdivision lookup table
- Implement and train staff in the procedures for maintaining the master lookup table of subdivision names within the Street Dictionary

MAPS

- Complete the development of both ArcEngine and ArcGIS versions of MAPS replacement interfaces

Analytical Mapping Interface (AMI)

- Work with FSI and the Revenue Department to complete installation of AMI to support the 2008 Property Revaluation effort

2008 Property Revaluation Project

- Continue to assist the Revenue Department in implementing ArcMap-based analyses and mapping for complex analytical needs for the Reval Project that are not met by AMI

Groundwater Information Management System (GIMS)

- Provide guidance, geographic data, and technical assistance to Environmental Services' consultant in the development of Wake County's GIMS
- Work with ES and their contractor (CDM) to complete modifications/improvements to the application as well as adding septic/on-site wastewater data

Disaster Assistance Response and Recovery Toolkit/Disaster Debris Management Plan

- Work with Dewberry staff to get the DARRT application operational on the internal production web server
- Test and refine the stored query process used to distinguish between system and non-system roads within the County's jurisdiction for the purpose tracking those roads on which Wake County has responsibility for collecting storm debris

Stormwater Management Project

- Assist Environmental Services in investigating and recommending ways to meet their GIS/mapping needs to support the Stormwater Management Project initiatives

Open Space Support

- Continue to provide data analysis on potential open space acquisition sites in priority corridors as well as the Falls Lake watershed

Planning/Permitting System

- Participate, as requested, in the project to investigate and plan for a new Permitting and Inspections system, concentrating on the necessary linkages to the GIS and requested functionality (such as routing)

GIS/Emergency Operations Center Support Projects

- Work with Emergency Management and Information Services' Applied Technology Section to develop a project plan for this project, incorporating information that has been gathered since PlanGraphics' Study (March 2004) elaborating on GIS's and Emergency Management needs and priorities
- Assist Emergency Management in implementing applications and existing commercial software packages that integrate GIS functionality into the Emergency Operation Center with the new WebEOC software package

- Explore opportunities with the City of Raleigh for joint projects
- Assist Emergency Management in mapping facilities and infrastructure in conjunction with Homeland Security projects
- Continue to investigate, recommend, and implement, as feasible, ways to perform flood prediction modeling (possibly using known locations that typically flood and stream gauges)
- Continue to investigate Wake County's need for different types of aerial photography (oblique aerial photography, color infrared (leaf-on), and satellite photography) and coordinate a multi-departmental and multi-jurisdictional approach to acquire funding for the photography
- Update digital maps for Progress Energy of the multiple county operations area around the Shearon Harris Nuclear Power Plant for planning and emergency response purposes

Mobile GIS/Mobile CAMA Project

- Continue to investigate ESRI's free ArcReader and ArcExplorer software and GeoPDFs as approaches to make GIS information and functionality available to County staff via mobile computers. Work with Emergency Management, Sheriff's Office, I/DP/P, and Environmental Services to load ArcReader on some PCs in these offices to test the functionality.
- Test new hardware technologies, such as tablet PCs, for possible use for Mobile GIS

Automatic Vehicle Locating System (AVL)

- Continue to provide GIS support, as needed, during the implementation of the AVL system
- Achieve Go-Live for tracking and dispatching emergency vehicles that are closest/quickest to an incident

In-Vehicle-Navigation (IVN)

- Participate in the evaluations and subsequent selection of an IVN vendor and support the implementation of the system
- Develop and implement a plan for updating the emergency vehicles' "map clients" with current street network data
- System is scheduled to be operational in the 3rd Quarter of FY 06-07

FireView Software Upgrade

- Provide project management for implementation of the software and procedures for EMS and Fire Services to extract and analyze incident records from CAD and the Firehouse Records Management System
- Work with the vendor to develop a script that will format the data produced for the new version of the software with that of the legacy ESRI Avenue programs

GSA Street Sign Information Management System

- Provide technical advice and solutions to GSA Field Services concerning ways to meet their street sign inventory and tracking needs

County Facilities Inventory

- In addition to continuing to maintain a point database of all County facilities, GIS staff will meet with General Services, Facilities/Design/Construction, and other interested agencies to assess needs for internal and external (Internet) interfaces for access by County staff and the public to information regarding facility location and attributes of the facilities.

Location of County Lines

- Discussion and agreement on the procedures to jointly locate the Wake/Franklin County line was assigned to the Wake County Attorney's Office, Franklin County's attorney, and attorneys from the State in March of 2005. Wake and Franklin County staff were interpreting the General Statutes to allow both Boards of Commissioners to agree on the location of the line that we have been using since 1992, survey and monument the line, and then record the survey documents with the appropriate agencies. The State has interpreted the General Statutes to require us to take the issue to the General Assembly if we deviate from the line from the USGS Maps that we have been using since 1992.
- Wake and Franklin Boards of Commissioners have officially requested NCGS's help in surveying the county line from the USGS Maps. NCGS is scheduled to deliver the survey to Wake and Franklin County in January of 2007.
- Both counties have recommended that the USGS line be slightly altered near the Richland Hills Subdivision. If both Wake and Franklin County's Board of Commissioners approve this, we will have to submit a Local Bill to the General Assembly requesting the change and then request NCGS to monument the approved line. The approved survey will then be recorded in the Register of Deeds Offices and with the State.

Geocoding Procedures

- Investigate and test more efficient methods of geocoding, using: Alternate Street Name Tables, Alias Names Tables, Customized Parameter files, and Composite Address Locators

Use of Global Positioning Satellite Technology

- Upload/download information to/from the GPS receivers assigned to Environmental Services' Well Section on a weekly basis to assist with ES's project to locate domestic wells. Update the GIMS website once a month
- Revise and create new data entry forms for the GPS receivers for Environmental Services' Water Quality staff to locate domestic wells and septic tank components. GPS receivers will be utilizing ArcPad 7.0 software upgrade
- Work with PROS (easements and trails), GSA (irrigation systems and signage), and ES's Solid Waste Division (storm debris disposal) in creating forms and uploading/downloading information to/from the GPS receivers
- Assist other departments in recommending hardware and software, developing procedures to upload/download information as they begin using GPS technology

GIS Needs Analyses

- Assist agencies who are requesting new and/or additional GIS assistance and technology to acquire the appropriate hardware, software, and training necessary to connect to Wake County's GIS and effectively use the software (example: Human Services, PROS, Field Services, etc.)

Special Project Mapping

- Continue to evaluate and provide for the analytical and mapping needs of departments and the public, looking for opportunities to expand the types of products offered (examples: additional PDFs of frequently requested maps, maps showing trends [development activity, crimes, public health issues, etc.], products that more effectively help users to visualize the information)
- Train staff from user departments to prepare maps and analyses where appropriate
- Provide mapping and analytical support to other divisions and departments in the preparation of master plans and other documents

Hardware Acquisition

- Work with Information Services to purchase and replace all GIS workstations with new updated equipment

FY 2007 -2008

ArcGIS Software Upgrades

- Continue to upgrade ESRI products to newer versions when appropriate

Interactive Parcel Maintenance/Land Records/Computer Aided Mass Appraisal Integration

- Continue to enhance IPM, including revisions that take advantage of the features of ArcGIS 9.2

Street Dictionary

- Document bugs and suggest enhancements

MAPS Rewrite

- Continue to enhance the new interfaces based on user input

Analytical Mapping Interface (AMI)

- Continue to support the Revenue Department in the use of AMI

2008 Property Revaluation Project

- Continue to assist the Revenue Department in implementing ArcMap-based analyses and mapping for complex analytical needs for the Reval Project that are not met by AMI and provide other needed Reval support

Groundwater Information Management System Project (GIMS)

- Work with users to evaluate and implement enhancements to the database and the application

Disaster Assistance Response and Recovery Toolkit/Disaster Debris Management Plan

- Analyze the needs of Environmental Services for additional functionality, assess resource needs, and determine an approach for additional development

Stormwater Management Project

- Provide database and GIS analytical support as required to support the project
- Work with project contractors to leverage their development efforts

Open Space Support

- Continue to provide data analysis on potential open space acquisition sites in priority corridors as well as the Falls Lake watershed

Planning/Permitting System

- Provide resources and support to Information Services and selected software vendors for GIS interfaces and integration with the selected system

GIS/Emergency Operations Center Project

- Work with Emergency Management and Information Services Applied Technology Section to implement a project plan for this project, incorporating information that has been gathered since PlanGraphics' Study (March 2004) elaborating on GIS's and Emergency Management needs and priorities
- Continue to assist Emergency Management in implementing upgrades to the Communicator System and WebEOC to integrate GIS functionality into the Emergency Operation Center
- Explore opportunities with the City of Raleigh to jointly work on projects
- Assist Emergency Management in mapping facilities in conjunction with Homeland Security projects
- Continue to investigate, recommend, and implement, as feasible, ways to perform flood prediction modeling
- Continue to investigate Wake County departments' need for different types of aerial photography (oblique aerial photography, color infrared (leaf-on), and satellite photography) and develop multi-departmental and multi-jurisdictional projects to acquire funding for the photography
- Update digital maps as requested by progress Energy of the multiple-county operations area around the Shearon Harris Nuclear Power Plant for planning and emergency response purposes

Mobile GIS

- Continue to explore uses of ArcReader, GeoPDFs, emerging technologies as ways to provide GIS data to users with mobile computers

Automatic Vehicle Location System (AVL)

- Continue to provide support to this project as it relates to the CAD system

- Continue to investigate uses of this technology

In-Vehicle-Navigation (IVN)

- Continue providing support to this project as it relates to GIS and the 911 system

FireView Software Upgrade

- Continue providing support to this project as it relates to GIS and the 911 System

GSA Street Sign Information Management System

- Continue to provide technical advice and solutions to GSA Field Services concerning ways to meet their street sign inventory and tracking needs

County Facilities Inventory

- Work with users to develop internal and public interfaces for County facilities data access as determined by the needs analysis carried out in FY 06-07

Location of County Lines

- Based on the progress in completing the project to jointly locate the Wake/Franklin County line, Wake County staff will begin working with Harnett County to jointly locate that line that both counties have been using since the early 1990s, survey and monument that line, and then record the survey with the appropriate agencies.

Geocoding Procedures

- Continue to develop new methods/technologies to support geocoding functions

Global Positioning [Satellite] System (GPS) Projects

- Continue to explore additional uses of GPS technology in County departments

Mapping Issues

- Mapping Currency Agreement - Once the IPM and Land Records/CAMA Systems are fully integrated, GIS staff will discuss and document standards on mapping currency with data users. Staff feels that having this discussion prior to the full integration of the systems would be premature given the complexity of the systems.
- Investigate technology (such as Optical Character Recognition and digital plat submission) as ways to improve productivity

GIS Needs Analyses

- Assist agencies who are requesting new and/or additional GIS assistance and technology to acquire the appropriate hardware, software, and training necessary to connect to Wake County's GIS and effectively use the software (example: Human Services, PROS, Field Services, etc.)

Special Project Mapping

- Continue to evaluate and provide for the analytical and mapping needs of departments and the public, looking for opportunities to expand the types of products offered (examples: additional PDFs of frequently requested maps, maps showing trends

[development activity, crimes, public health issues, etc.], products that more effectively help users to visualize the information)

- Train staff from user departments to prepare maps and analyses where appropriate
- Provide mapping and analytical support to other divisions and departments in the preparation of master plans and other documents

Address Database

- Develop a strategy for validation and quality control of the address databases used by our customers

Web Navigation Mapping

- Explore technologies available for providing navigation assistance (maps and directions) utilizing County data

Hardware Acquisition

- Continue to evaluate needs for replacement/upgrades/additions to current software and hardware and work with Information Services to procure

FY 2008-2009

ArcGIS Software Upgrades

- Continue to upgrade ESRI products to newer versions when appropriate

MAPS Rewrite

- Begin investigating the feasibility of migrating the application from ArcEngine/ArcMap to a browser-based ArcGIS Server application platform

Analytical Mapping Interface (AMI)

- Begin investigating the feasibility of migrating the application from ArcIMS to a browser-based ArcGIS Server application platform

Groundwater Information Management System (GIMS)

- Begin investigating the feasibility of migrating the application from ArcIMS to a browser-based ArcGIS Server application platform

ES Stormwater Mapping Project

- Provide database and GIS analytical support as required to support the project

Open Space Support

- Continue to provide data analysis on potential

Planning/Permitting System

- Continue to work with Information Services to enhance the application interfaces with GIS

Aerial Photography Project

- Select a consultant to help prepare an RFP for new aerial photography and digital orthophotos during FY 09-10

GIS/Emergency Operations Center project

- Work will be contingent on progress made in FY 07-08

Mobile GIS

- Continue to investigate new uses of mobile GIS and new technologies to support those applications

Automatic Vehicle Locating System (AVL)

- Continue to investigate new uses for the AVL technology and work to support those applications

In- Vehicle Locating System (IVN)

- Continue to investigate new uses for the IVN technology and work to support those applications

County Facilities Inventory

- Continue to support internal and external users' needs for access to County facilities data as required

Location of County Lines

- Based on the progress in completing the project to jointly locate the Wake/Franklin and the Wake/Harnett County, Wake County staff will begin working with Granville County to jointly locate that line that we have been jointly using since the early 1990s, survey and monument that line, and then record the survey with the appropriate agencies

Geocoding Procedures

- Continue to develop new methods/technologies to support geocoding functions

Global Positioning [Satellite] System Projects

- Continue to explore additional uses of GPS technology in County departments

GIS Needs Analyses

- Assist agencies who are requesting new and/or additional GIS assistance and technology to acquire the appropriate hardware, software, and training necessary to connect to Wake County's GIS and effectively use the software

Special Project Mapping

- Continue to evaluate and provide for the analytical and mapping needs of departments and the public, looking for opportunities to expand the types of products offered (examples: additional PDFs of frequently requested maps, maps showing trends

[development activity, crimes, public health issues, etc.], products that more effectively help users to visualize the information)

- Train staff from user departments to prepare maps and analyses where appropriate
- Provide mapping and analytical support to other divisions and departments in the preparation of master plans and other documents

Address Database

- Follow up on the strategy developed in FY 07-08 for validation and quality control of the address databases used by our customers

Web Navigation Mapping

- Follow up on strategy developed during FY 07-08 to provide navigation assistance (maps and directions) utilizing County data

Hardware Acquisition

- Continue to evaluate needs for replacement/upgrades/additions to current software and hardware and work with Information Services to procure

Mapping Issues

- Investigate technology (such as Optical Character Recognition and digital plat submission) as ways to improve productivity

10. Resource Requirements by Business Program

a. Staff

As a service agency supporting Wake County's diverse departments, Geographic Information Services recognizes that we must continually reassess our focus, priorities, assignments, and staffing levels in light of the ever-changing needs of our users and the lifecycles of various data and automation projects. Over the last few years, we have documented principles that should guide GIS's staffing requirements in our Business Plan. Staff continues to apply these principles to our projects:

- GIS must be staffed, trained, and equipped to meet our users' needs. GIS offers wide ranging assistance, including customer assistance, mapping, spatial analysis, business process planning, database design and development, application development, and project management.
- User needs drive our workload and priorities
- GIS's staffing level is based on GIS providing a core of geographic information and functionality for our users
- GIS encourages other agencies to take responsibility for the creation, maintenance, and use of geographic information for which they are responsible. In instances where a department does not want to do business this way, GIS will negotiate work plan arrangements using resources provided by the department to provide the agreed upon level of service

- Automation should be implemented to make staff more efficient, allowing them to minimize backlogs and/or enter new information into the system

Over the few past years, a number of projects and agreements have significantly affected the division's staffing assignments.

- Assistance for Environmental Services - In the spring of 2003, Environmental Services transferred a vacant Full-Time-Equivalent position to GIS to backfill work that GIS was performing for Environmental Services. GIS filled this position in August of 2003 to give Geographic Information Services a fifth GIS Analyst. As a result, GIS has been able to expand our in-house training capabilities as well as increase our presence and offerings via the Internet, not only for GIS but for Environmental Services as well.

In exchange for this transferred position, we assigned a GIS Analyst to work with Environmental Services on a jointly developed/approved work plan. Over the past three years, the employee has focused on such projects as watershed protection, well contamination, radon testing, GPS Pilot Project to locate wells, and open space acquisition for water quality. Based on discussions with ES during the summer of 2005, GIS has made additional staff resources available to work on ES projects beginning in the 1st Quarter of FY 05-06.

- Computer Aided Dispatch (CAD) Project Management – In 2000, GIS staff assumed project management responsibilities for the planning, selection, and implementation of a new GIS-based CAD System for the Raleigh/Wake Emergency Communication Center. The new system had to be technically capable of dispatching the closest appropriate emergency resource. The GIS Analyst's role continues to evolve from that of a project manager to one that provides support as needed by serving on committees, attending meetings, and researching and troubleshooting any problems that arise regarding the geofile portion of the CAD system. There are constant requests by the County's and Municipal Fire and EMS agencies to extract and analyze data from the system and produce the results in map-form. This person is also overseeing the transition of the database maintenance for use with the CAD vendor's new maintenance software product – MGU, which better integrates the maintenance with our ArcGIS platform. GIS's IT Specialist currently handles most of the routine GIS to CAD processing. We are transitioning this person into being the main point of contact for the non-routine CAD-related requests.
- Implementation of the Land Records/CAMA Project – The new Land Records/Computer Aided Mass Appraisal (CAMA) system, in conjunction with major GIS software and application upgrades, will be fully integrated during the 4th Quarter of FY 06-07. The Property Mapping Team anticipated a "learning curve" during early 2005 when they began using the IPM property mapping application, but then quickly returned to and surpassed previous productivity levels. As part of this project, the Property Mapping Team will be able to map parcels sooner, thereby improving currency. In addition, the team should be able to map additional information

(easements, recombinations, etc.). We will not fully understand the impact of the additional work until we are able to weigh the additional work against the efficiencies to be recognized by using the fully integrated system. Technical staff will also be freed up for new tasks when the project is completed.

- E-Gov (Applied Technology) Projects - GIS staff has been involved in a number of E-Gov funded projects (IPM/Land Records/CAMA, GPS Pilot Project, Automatic Vehicle Location System (AVL) and GIS/Emergency Operations Center Project). GIS staff sees our involvement in these types of projects increasing as County staff recognizes how GIS technology can complement and augment their work.
- Transfer of most routine database administration tasks to Information Services. With the implementation of a more centralized Oracle database configuration, Information Services have assumed a number of database administration responsibilities.
- Expansion of GIS capabilities into new agencies. GIS plans to continue working with Human Services during the coming fiscal years as they expand their use of the ArcGIS licenses they recently acquired. In addition, staff will continue to work with Planning, Facilities/Design/Construction, PROS, and Public Safety to integrate and extend GIS capabilities into their work processes.
- Continued use of GIS Internet Applications to provide information. One of Geographic Information Services' desired outcomes is to make an appropriate level of geographic information and functionality available to the public via the Internet. Many of Wake County's customers have continually voiced their desire for reliable access to public land records/GIS information via the Internet 24 hours a day, 7 days a week, 365 days a year. When customers access information in this way, it reduces the demand placed on GIS and allows staff assigned to customer service to carry out other responsibilities. GIS has experienced a reduction in the number of telephone calls and walk-in customers that has allowed us to assign staff to performing more special projects for County agencies. It may be too early, however, to attribute this reduction in customer service demand solely to GIS's iMAPS and Digital Download applications or to other land records applications (Register of Deeds' BOOKS application and Revenue's Real Estate Records On-Line). Other factors such as the economy have also contributed to this reduction.

Although there are definite cost and efficiency advantages to staff being able to provide information via the Internet, GIS staff is sensitive to the "privacy" concerns of Wake County's citizens concerning what type of land records information should be available via the Internet. Therefore, local governments in North Carolina have to weigh the concerns for privacy against the requirements to make public information available according to North Carolina's Public Records laws as well as the demands of users for information 24 hours a day, 7 days a week as we seek to allocate resources.

Over the next few years, GIS will continue to concentrate on areas that were identified as deficiencies in GIS's previous Business Plans in order to meet users' needs:

- *New and expanding user needs* – Demands continue to increase for GIS functionality, especially in areas to support environmental initiatives, homeland security/emergency operations, public safety, public health, human services, and geocoding addresses.
- *Exploration of emerging technologies* – User departments are increasingly interested in the application of GIS and new technologies, especially the use of mobile computing/handheld devices, the use of GPS, AVL, and IVN. These technologies can enable direct access to GIS by field personnel.
- *More sophisticated user base* – User departments are coming up with new GIS needs that go beyond simple queries and map preparation. Some of these needs include more complex data analyses and modeling and the need for more sophisticated user interfaces.
- *Demand for web-based interfaces* – The public expects GIS information and tools to be available via the Internet. Also, browser-based applications that are used internally are becoming an accepted methodology for inexpensive, lightweight user interfaces
- *Integrated GIS* – GIS is perceived as an integrated component to land-related applications. Examples include the Public Use Facilities Database, Recreation Land Dedication Ordinance, Land Records/CAMA, Groundwater Information Management System, and the Subdivision Information System.

GIS staff is organized into four teams in order to meet the needs discussed in GIS's Business Plan:

Customer Service Team – 3 Mapping Technicians. Provides information, maps, digital data, and reports to County agencies, other governmental agencies, and the public. The Team's supervisor assigns special short-term projects.

Addressing/E911 Team – 2 Mapping Technicians, 1 Information Technology Specialist, and a GIS Analyst (Supervisor). Serves as a clearinghouse for addressing and street centerline information to the Raleigh/Wake Communications Center, Wake County Planning Department, municipalities, utilities, Wake County Public School System, and the public. Updates a street centerline, address points database, zip code layer, and public safety related graphic databases. The Addressing/E911 Team has recently assumed street addressing responsibilities for new subdivisions from the Planning Department.

Property Mapping Team – 5 Mapping Technicians and a Mapping Supervisor. Responsible for updating property mapping and corporate limit lines for all of Wake County and passing this information to appropriate agencies (Revenue Department, municipalities, etc.)

Application/System Team – Information Technology Engineer (Supervisor), Computer System Administrator, and 4 GIS Analysts. Team works closely with users to develop

databases and applications to provide users with needed information and functionality. Performs complex geospatial analyses for other departments. Works with Information Services to install and configure servers, PCs, and plotters used to access the GIS. GIS's Analysts are assigned either to specific departments, projects, and/or functional support roles.

b. Operations

Geographic Information Services' budget both directly and indirectly supports County and other governmental agencies that need mapping and GIS related services.

Salaries/Benefits – Approximately 81% percent of GIS's annual operating budget goes to salaries and benefits for the Division's 20 employees.

GIS provides a wide range of services to three main user groups: (1) Wake County agencies, (2) non-County governmental agencies, and (3) the citizens and private sector. Staff charges a minimal fee for maps, special projects, digital data, reports, and blueline print maps prepared by staff for the public. Allowable charges for these services are limited by the North Carolina Public Records Law and cover some indirect costs and the cost of materials. The Wake County Board of Commissioners has adopted GIS's fee schedule. The public also may obtain many of these products, at no charge, by using GIS's on-line Internet services.

Wake County GIS also provides services to other governmental agencies (municipal, adjacent county, regional, State, and Federal agencies), quasi-governmental agencies (Raleigh Durham International Airport Authority), and educational agencies (Wake County Public School System and local colleges and universities). These non-County agencies typically request maps, reports, and/or analyses (i.e., special projects). Staff tracks the amount of time and the products generated for each of the special projects but does not charge for the services, unless the project requires extensive plotting. GIS also provides non-County agencies with digital map and attribute data. GIS staff copies most of this digital data to Wake County's FTP site and the municipalities access the site to download the information or they download the data directly from GIS's Digital Download Application available via the Internet.

GIS also provides a wide range of services to County agencies. These services include: programming, training, ongoing mapping responsibilities, database design and development, project management assistance, digital data, and special projects. These services are provided at no direct cost to those agencies. GIS staff tracks the type and length of training that we provide to our internal customers as well as the number of hours spent producing special projects for these departments.

Hardware and Software Maintenance Costs – Approximately 8% of GIS's operating budget goes to annual hardware and software maintenance. This includes annual hardware maintenance on the GIS servers, data storage devices, and the large format plotters and printers located in GIS. The cost of hardware maintenance changes annually

as hardware gets older, eventually resulting in the vendor no longer offering hardware support. GIS's operating budget also includes software maintenance for some Microsoft products, software running on the GIS servers, desktop image analysis software, and all ESRI's GIS software used by all Wake County departmental users. Wake County has completed the process of migrating to ESRI's new ArcGIS software. ESRI's licensing costs have dramatically changed as new products have been introduced. Wake County GIS staff took this opportunity to review the functionality of the new software and compare that to each user's needs in an effort to provide functionality within the funds that are available.

Software Purchase Costs – GIS's annual budget includes a small amount of funding (approximately 1%) for desktop application software, replacement desktop software, and programming, system monitoring, and diagnostic tools. Some vendors do not provide software maintenance/upgrades. Therefore, users have to repurchase the software packages periodically to get the upgrades to the software's functionality. Funds have also been included to acquire software needed to address unanticipated needs or new products.

Some user departments have purchased ESRI's GIS software with funds from their budgets. GIS staff has found that departments are more likely to fully use software if they purchase the package rather than it coming out of a central account. As stated above, GIS assumes software maintenance cost of GIS licenses acquired by other departments, usually after the first year.

Dues, Training, Conference Registration, and Associated Travel Costs – (Approximately 4% of GIS's annual budget). Experience has shown that GIS professionals are more effective if they participate in professional associations with their peers to discuss how other agencies are implementing this diverse and rapidly changing technology. Staff also needs technical training to stay current on GIS software, mapping techniques, and desktop tools (MS Access, Word, Excel, LotusNotes, etc.). Wake County GIS's mappers are involved in the North Carolina Property Mappers' Association that offers an annual school and conference for mappers to maintain their skills. Staff also participates in such organizations as the National and State chapters of the Urban and Regional Information Systems Association (URISA) and the National Emergency Numbering Association (NENA). Staff tries to take advantage of local, regional, State, and National user groups sponsored by software vendors.

Over the past few years, staff has used Internet training ("Virtual Campus") provided by ESRI. This has proved to be a very cost effective method of training since it does not involve travel and the employees are able to work on the training as their schedule permits at their desk.

Miscellaneous Office Supplies and Equipment (approximately 1% of GIS's annual budget). GIS's budget includes expected funding for the following items:

- Office supplies
- Office furniture/equipment
- Advertising (for vacant positions and for public hearings)

- Books/subscriptions to technical magazines/newsletters
- Computer equipment (other than PCs or plotters)
- Equipment repair
- Printing
- Postage
- Telecommunications (telephones, cell phone, and pagers)

Plotter/Printing Supplies

GIS's annual budget includes funding (approximately 1%) for plotter and blueprint machine supplies. Plotter supplies include ink cartridges, printheads, and plotter paper. The large format plotters in GIS are used by a number of departments who do not have their own plotters. In addition, staff plots maps for our public customers on these plotters. GIS's budget also includes funds for blueprint supplies (blue line paper and ammonia) for the blueprint machine. The blueprint machine is primarily used to produce paper copies of older maps and aerial photography. During FY 05-06, Wake County contracted with Geodesy Associates to scan and geo-rectify approximately 6,300 aerials taken during 1958, 1974, 1981, and 1988. GIS users with ArcGIS software and access to the appropriate disk drive are able to overlay these images with other information in the GIS database as well as generate plots of the maps on the large format color plotters. At some point during FY 06-07, we anticipate being able to phase out use of the blueprint machine, thereby being able to reallocate the cost of the ammonia and blueprint paper to plotter supplies.

The Planning Department, Inspections/ Development Plans/Permits, Fire Services, Revenue, Facilities/Design/Construction, and Emergency Management have also been able to justify plotters for their area based on the numbers of plots or need for immediate plotting. Each agency is responsible for budgeting and paying for hardware maintenance contracts or for service calls. All of the plotters are networked so other departments can use them as needed.

Professional Services/Other Programming Assistance

GIS technology is changing rapidly and unanticipated needs continue to arise. In order to respond to these types of needs, Wake County GIS has annually requested funds for professional services or other programming assistance (approximately 4% of GIS's budget). These funds are used for fairly small projects. Professional services and programming funding for E-Gov projects are requested separately.

c. Capital

Wake County Geographic Information Services' capital project needs do not relate to facilities. GIS is presently involved in work on a number of projects that are being funded out of the capital accounts (CIP and the Automation Account) due to the magnitude of funding and the use of these projects by numerous agencies.

Computer Aided Dispatch (CAD) System Project – Wake County and the City of Raleigh staff successfully implemented a new “GIS-based” Computer Aided Dispatch system in

October of 2003. The project was initially funded out of a CIP account. During FY 04-05, GIS staff's role in this project changed, making the transition primarily from project manager to data provider and technical advisor as the system and operating procedures and issues stabilized. There will continue to be on-going operating costs that are included in Information Services' budget involving hardware and software maintenance.

Digital Orthoimagery (Aerial Photography) Update – Given the growth of the County, funds have been included in the County's FY 09-10 CIP for a 5-year aerial photography update cycle. Beginning in FY 03-04, staff discussed joint funding possibilities with the United States Geological Survey (USGS), area municipalities, adjacent counties, and the State Government departments.

The City of Raleigh has signed a contract with Surdex for color orthophotography for their jurisdiction through 2009. Raleigh and Wake County have agreed to share all products (color and black/white orthophotos) developed in these projects.

d. Technology

Since the earliest days of GIS in the 1960s, GIS has been a multi-disciplinary field incorporating advanced and developed machines and methods from information technology, surveying, photogrammetry, statistics, and mapping. Today, GIS professionals continue to introduce and incorporate technology from other disciplines. For many organizations, the key issue involves whether the technology is new or proven. As responsible stewards of public funds, local governments can seldom afford to be on the "bleeding edge" of technology. Wake County strives to integrate proven technology but we recognize that there are times when exploration and experimentation of new technology will be necessary, especially when existing solutions are not adequately or efficiently serving our users' needs.

Wake County will continue to explore and integrate new technology, with our Geographic Information System. Some of the initiatives include:

- Use of Global Positioning System (GPS) Technology –Wake County GIS and Environmental Services have completed an E-Gov funded project to explore the use of GPS. Environmental Services staff is using handheld GPS receivers and GIS software to locate and collect attribute information on wells and will soon be collecting data on septic tanks. This information was integrated with the Groundwater Information Management System (GIMS). The lessons learned from this pilot project are being applied to other areas (PROS, GSA, etc.) interested in GPS technology during the coming fiscal years.
- Mobile Computing – A number of initiatives are underway that will further explore the use of mobile computing devices in conjunction with GIS. Emergency Management has recently purchased tablet PCs and loaded GIS software and data on the PCs for field use. Staff will continue to experiment with ESRI's ArcReader and ArcExplorer software that will allow users to read/query maps and data from a laptop or tablet PC. Mobile computing, as mentioned in the section on GPS technology, will

also be explored as a way for staff to view GIS data as well as enter spatial and attribute information while in the field.

- Automated Vehicle Location Technology (AVL) – IS's Applied Technology staff is implementing AVL technology for emergency response vehicles. Environmental Services' Animal Control Division has also been exploring the use of AVL technology to monitor the location of their officers as well as to help assign the closest officers.
- In-Vehicle Navigation (IVN) – IS's Applied Technology staff is implementing IVN technology for EMS and Sheriff vehicles.
- Document Scanning Technology – A number of agencies are already involved in projects that incorporate scanning technology into their businesses. The Register of Deeds has been scanning legal documents (deeds, plats, etc.) for a number of years. During FY 02-03, GIS staff investigated using software to recognize metes and bounds descriptions embedded in deeds and plats using Optical Character Recognition (OCR) technology to automate the mapping of parcels. The use of this technology could improve the accuracy of property mapping by eliminating keying errors that could occur when the mappers enter information into the mapping software. Based on our investigation, we determined that the system we investigated did not consistently recognize the characters on the scanned deeds. Staff will revisit the technology at some point over the next few years to determine if improvements have been made.
- Imaging Technology – Three years ago, GIS purchased ERDAS, a desktop image processing software package. The software uses color and black/white aerial photography as well as infrared and multi-spectral satellite imagery. Staff has experimented with the software using aerial photography to identify and measure impervious surfaces.

Staff has been briefed by the State on the National Agriculture Imagery Program (NAIP) that acquires color infrared imagery during the agricultural growing seasons (leaf-on) at one-meter resolution. Wake County acquires photography during the winter (leaf-off) season at a ½-foot resolution. Staff will continue to talk with other Wake County agencies to determine if there is a need for this type of imagery and investigate possible funding sources to assist the State and Federal agencies acquire the imagery.

- Document Linking – GIS staff will continue to investigate the feasibility of linking deeds and plats from the Register of Deeds' images to parcels. This could provide additional efficiencies for Wake County's property mappers as the mappers have estimated that they spend a large percentage of their mapping time placing annotation (dimensions, lot numbers, etc.) that is already shown on recorded documents. This project could result in the ability for GIS users to pick a parcel on the GIS and view a

recorded document similar to the existing MAPS functionality that allows users to access the Mobile Video building photos and Property Record Cards (PRC).

- Replacement Computer Hardware Based on New Technology
 - GIS has acquired a “virtual server” requested in the FY 06-07 automation CIP fund and is working to install it
 - GIS is working with IS to replace GIS workstations with new equipment requested in the FY 06-07 automation CIP account
 - GIS will request funds for a new large format plotter to replace an aging older technology plotter. Plans are to also request funds to replace two small printer plotter devices with newer more rugged technology.
- Integration of Data Systems – Using technology to integrate information in various data systems will continue to be an important outcome for GIS. Five of the most visible projects for this type of integration involve integration between GIS and the Land Records/CAMA system, the Computer Aided Dispatch System, GSA’s Facility Management (FM), various data systems needed in the Emergency Operations Center, and the new Planning/Permitting System.
- Visualization Technologies – Staff will continue to explore the use of 3-D renderings and virtual “fly-through” as ways to more effectively display and analyze information.
- Internet and Browser-Based Applications – One of Wake County GIS’s desired outcomes is to use technology that allows users to access appropriate geographic/land records public information easily. GIS’s iMAPS (Internet Mapping Access application) has proven to be very useful to the public and governmental staff. Staff is maintaining the Groundwater Information Management System and will be assuming responsibility for the Disaster Debris Management Application in the future, once Environmental Services’ contractor successfully completes acceptance testing. In addition, staff will be working with other agencies to continue improving the links between Internet applications and datasets (Parks Facilities, facilities used by County agencies and Board of Election data).
- ArcIMS/ArcGIS Server/Products from Orion - Installed ArcGIS Server on a test server (one of the virtual servers that we are building) so that we can move forward with testing and then training Applications staff on this new application (for both internal and external browser based applications)

Charles Friddle
Wake County Geographic Information Services Director
GIS Business Plan (FY 07-09)