GIS and Document Management Integration

Presented by:
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City of Greensboro, NC

ESRI Conference 2007

Presentation Goals

- Definition of “Document Management”
  - What it is?
  - Why it’s important
- Role of GIS in Document Management
- Pilot project details
- Future directions

Greensboro Overview

- Greensboro
  - Central North Carolina
  - Population: ±230,000
  - Area: 120 sq. mi.
  - Roughly 2,800 employees
  - FY 2006-07 Budget of $386M
- Wide range of municipal services
  - Water & Sewer
  - Storm Water
  - Solid Waste
  - Police and Fire
  - Building Inspections
  - Parks & Recreation
  - Libraries
  - Transportation
  - General government

Project Background: GIS

ESRI Environment

- ArcMap 9.1 (almost 9.2)
- ArcSDE (SQL Server)
- ArcIMS
- Enterprise wide, centralized GIS management
- Utilizing GIS technology since 1990

System Metrics

- Roughly 150 users of ArcMap
- Numerous ArcIMS users
- ±200 SDE Layers
  - 130,000 address points
  - 18,000 street segments
  - 90,000 parcels
  - 50,000 storm water inlets
  - 45,000 street signs

Integration of GIS with Enterprise Applications

- Evolution of GIS from basic mapping to spatially enabling enterprise applications
- Importance of Enterprise GIS
- Examples
  - Work Management
  - Call Center
  - Emergency Operations Center
  - Most Recently -- Document Management

What is Document Management?

Problem

- Documents are everywhere and increasing in volume
- In many different types and formats, from many sources
  - Not just paper… .xls, .pdf, .tiff, etc.
- Consuming valuable time and space
- Straining manual processes

Solution

- Store document digitally
- Indexed retrieval
- Give employees instant access to documents they need
- Provide within context of familiar business applications

Why is Document Management Important?

- Provides organization to unstructured information
- 90% of corporate memory exists on paper
- 90% of all documents handled each day are merely shuffled
- The average document gets copied 19 times
- Organizations spend $20 to file a document, $120 to find a misfiled document and $220 to reproduce a lost document
- 7.5% of all documents get lost
- 3% get misfiled
- Professionals spend 5-15% of their time reading information, but up to 50% looking for it
- There are over 4 trillion paper documents in the U.S. alone – growing at a rate of 22% per year

Why is Document Management an Enterprise Application?

- Documents have uses across departmental lines
  - Engineering documents used by street inspectors
  - Deed documents used by Legal, ROW procurement
  - Driveway permits used by Street Maintenance
- Store it once – Use multiple times
- Economies of scale
  - Document management systems are costly
  - Share resources (staff, hardware, etc.)

Why is Document Location (GIS) Important?

- Document have locations
  - Street segments
  - Addresses
  - Facility names
  - Rule of thumb... 80% of “information” includes a location
- GIS provides a means for retrieving documents based on location
  - Maps are more intuitive than “pick lists” or text queries
  - Example:
    - Select a building and retrieve the Fire permit
    - Select a document and find the corresponding GIS feature

Why is Document Location (GIS) Important?

- Retrieve documents of associated features
  - Allows selection of documents across multiple spatially related features
  - Examples:
    - Select an intersection and its associated streets, retrieving deeds, engineering drawings, accident reports, etc.
    - Retrieve all fire inspection reports within a Fire Demand Zone
- Increase inter-department sharing
  - GIS technology dissolves departmental “silos”

Project Goals

- Replace an aging in-house application
  - Only Engineering documents (200,000+)
  - VB6 & MapObjects based
  - Developed mid-1990's
  - Required installation on client PC's
- Intranet distribution
- Commercially available off-the-shelf solution
  - Provides "Best practices" solution
  - Eliminates need to support in-house
- Future integration path to other COTS and In-house applications
  - Call Center, Work Management, etc.

Project Goals

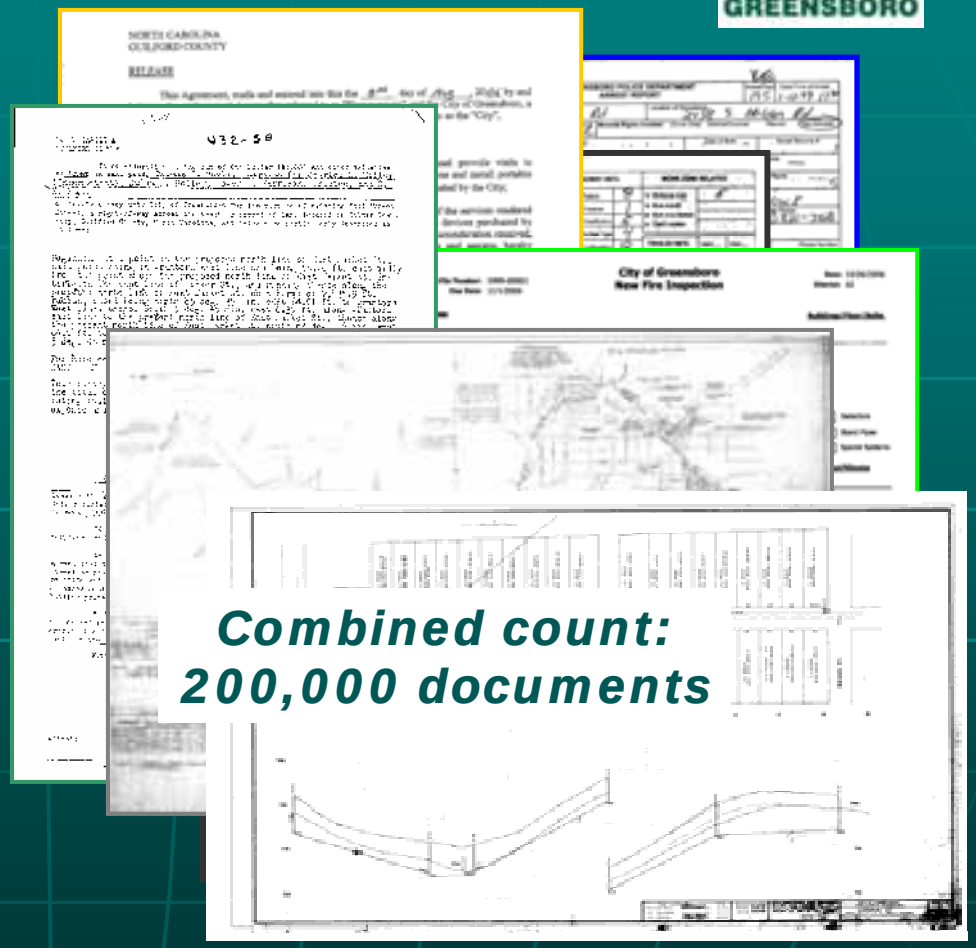
- Focus on Services Oriented Architecture (SOA)/WebServices
- WebServices allow programs written in different languages on different platforms to communicate in an event driven, standards-based way via XML documents
- XML documents contain:
  - "Start tag" – defines what's coming
  - "End tag" – concludes the document
  - "Content" – the information between the two tags
    - Elements are annotated with attributes that contain metadata about the element and its contents
- Web Services allows "disconnected" participating system upgrades
- Concluson: Create a GIS module for existing product

Partnership with Perceptive Software

- ImageNow by Perceptive Software
  - Document imaging, document management and workflow
  - ESRI Business Partner
  - Over 1,200 customers worldwide
  - Industry Focus: Higher Ed, Healthcare, Finance, Government
- Existing vendor for traditional “business” documents
  - Financial, Human Resources, etc.
  - Currently integrated with City’s ERP solution
  - Implemented in 1999
- Current System Metrics
  - Users: 30
  - Total Documents: 850,000 (many more pages)

Spatial Enabled Document Examples

- Fire Inspections
- Fire Investigative Reports
- Fire Permitting
- Fire Detectors
- Fire Plan Review
- Police Arrest/Accident Reports
- Driveway permits
- Engineering Drawings
- Deeds
- Project contracts
- And More...



Combined count: 200,000 documents

Application Structure Overview

- Documents stored on network drive (native format)
- ImageNow database (SQL Server) manages indexes
- Integration approach
  - Pre-populate feature class w/ unique ID number
  - Concatenation of feature ID with feature class ID number
  - Yields unique ID across all feature classes
  - Document attributes contain resulting concatenated key
- Linking of document via index value
  - Allows multiple documents per single GIS feature

Application Structure
ArcMap Client

- Extension to ArcMap
- Link document to feature
- Retrieve documents spatially
- Display in native viewer
- Display in ImageNow viewer
- Access to ImageNow tools
  - Mark-up
  - Rotate
  - Print
  - Stamp
  - Etc.

ESRI 2007.mxd - ArcMap - ArcInfo

File Edit View Insert Selection Tools Window Help

1:3,233

Layers
- Address Points
- Street Centerline
- Parcels
- Buildings
- Road Edge

ImageNow Results

Drawer	Folder	Tab	Field 5	Document Type	Pages
Engineering ...			222_264629	Deeds	1
Engineering ...			222_264630	K Drawing	2

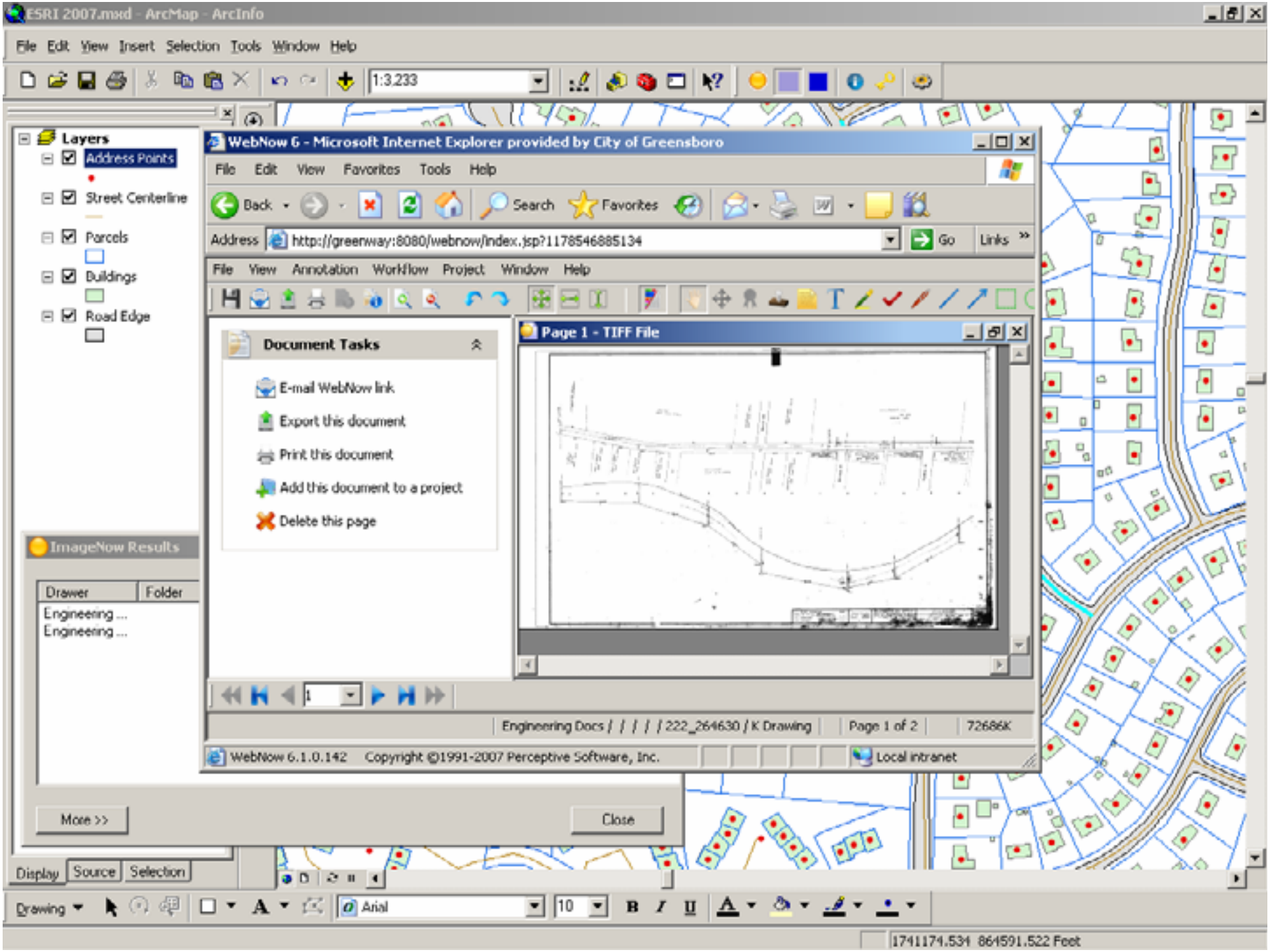
More >> Close

Display Source Selection

Drawing Arial 10

Number of features selected: 4

1740239.999 864785.165 Feet


ESRI 2007.mxd - ArcMap - ArcInfo
File Edit View Insert Selection Tools Window Help
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Layers
Address Points
Street Centerline
Parcels
Buildings
Road Edge
WebNow 6 - Microsoft Internet Explorer provided by City of Greensboro
File Edit View Favorites Tools Help
Back Search Favorites
Address http://greenway:8080/webnow/index.jsp?1178546885134
Go Links
File View Annotation Workflow Project Window Help
Document Tasks
E-mail WebNow link
Export this document
Print this document
Add this document to a project
Delete this page
Page 1 - TIFF File
Engineering Docs / / / / / 222_264630 / K Drawing
Page 1 of 2
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WebNow 6.1.0.142 Copyright ©1991-2007 Perceptive Software, Inc.
Local intranet
ImageNow Results
Drawer
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1741174.531 864591.522 Feet

Application Structure
ArcIMS Viewer

- ArcIMS Map Service
- Retrieve documents spatially
- Display in native viewer
- Display in ImageNow viewer
- Access to ImageNow tools
  - Mark-up
  - Rotate
  - Print
  - Stamp
  - Etc.

IMAGENow GIS Viewer - Microsoft Internet Explorer provided by City of Greensboro

File Edit View Favorites Tools Help

Back Search Favorites

Address http://helen:0000/Website/test/viewer.htm Go Links

IMAGENow GIS Viewer

Layers

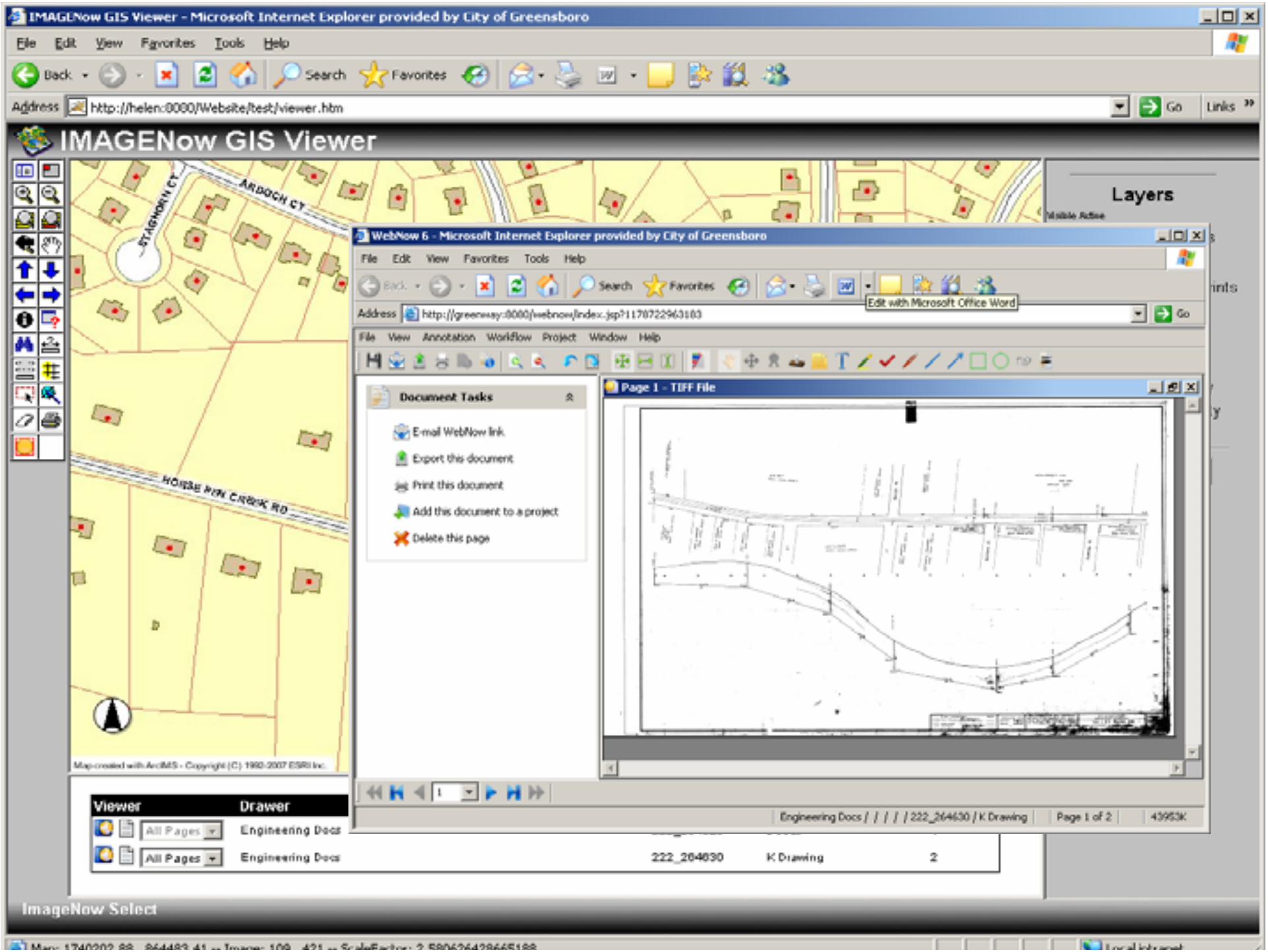
Visible Active

- Address Points
- Parcel
- Building Footprints
- Streets
- Road Edge
- Lakes
- Airport Runway
- Greensboro City Limits

Refresh Map

Viewer	Drawer	Folder	Tab	Field 3	Field 4	Field 5	Document Type	Pages
All Pages	Engineering Docs					222_264629	Deeds	1
All Pages	Engineering Docs					222_264630	K Drawing	2

ImageNow Select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File Edit View Favorites Tools Help
Back Search Favorites
Address http://helen:0000/Website/test/viewer.htm
Go Links
IMAGENow GIS Viewer
Layers
ARDOCH CT
STAGHORN CT
HOUSE PEN CREEK RD
Map created with ArcIMS - Copyright (C) 1990-2007 ESRI Inc.
WebNow 6 - Microsoft Internet Explorer provided by City of Greensboro
File Edit View Favorites Tools Help
Edit with Microsoft Office Word
Address http://greenway:0000/webnow/index.jsp?1170722963183
File View Annotation Workflow Project Window Help
Document Tasks
E-mail WebNow link
Export this document
Print this document
Add this document to a project
Delete this page
Page 1 - TIFF File
Engineering Docs / / / / / 222_264630 / K Drawing
Page 1 of 2
43953K
Viewer
Drawer
All Pages
Engineering Docs
All Pages
Engineering Docs
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K Drawing
2
ImageNow Select

Implementation Status

Currently

- Pilot Project
- Engineering Records
  - Link existing drawings
  - Deploy Intranet viewer
  - Replace legacy system
- Providing vendor enhancement feedback

Near-Term

- Expand to existing ImageNow users
  - Transportation
  - Fire
  - Police
- Expand to departments not now using imaging

Questions?

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http://www.greensboro-nc.gov/Departments/MIS/gis/