



Gaea Systems Pvt. Ltd.

Custom GIS Application - Desktop Editing Toolbox (DET) for the Maintenance and Management of County's Water and Sewer network

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Ver 1.0

Scope of Work

This field inventory and inspection includes the collection of the location of all water and sewer infrastructure features. It also includes the population of a sophisticated geo-database model that represents reliable and accurate information about the above and below ground water and sewer infrastructure within the County.

The County therefore has invested in the building of an accurate and reliable digital GIS network, as well as a sophisticated geo-database of the water and sewer system.

Tools and techniques to maintain the water and sewer infrastructure County (1) implementation of software tools that will allow the County to keep data up-to-date and accurate, (2) development of an approach to the way work orders are generated, completed and processed with regards to the flow of information from the field to the office, (3) A phased solution that will eventually allow GIS data to be edited and maintained in the field.

Scope of Services

The scope of this project includes **Phase I:** The evaluation and assessment of water and sewer infrastructure management within County, **Phase II:** The development of a custom GIS tool for streamlining the maintenance and upkeep of the County's water and Sewer digital information.

The following represent an outline scope of services:

Overview of the Desktop Editing Toolbox

The Desktop Editing Toolbox (DET) is a stand-alone application built using the .Net framework and ArcEngine. The application allows users to add, modify, and remove features associated with water, sewer, and storm water.

Architecture

Database Server		
Software		
1	Oracle 9i	
Operating System		
1	Microsoft Windows XP Professional.	
Software		
1	Visual.NET 2003, Version 1.1	
1	Type/formate	ESRI Shape file, Arc Files and ArcSDE Layers.
2	Software	ArcEngine 9.0, ArcSDE 9.0 - ESRI.
Hardware		
1	Processor	3.0 GHz, HT, Intel Pentium IV
2	Hard Disk Space	200 GB
3	RAM	1GB

b. Security and Administration

- The Network (Windows) username and user group define what data is displayed. A table in SQL Server stores group names and available layers. The application queries this table at runtime and displays the appropriate data.
- An edit session begins when the application is executed. There are 'Save' and an 'Exit' buttons at the top of the interface to manually save the data. Since all users will be checking their version from version 0, reconcile and post operations take place during each save. A conflict resolution window appears if there are conflicts and the user has the opportunity to make changes before saving again.
- The application disconnects from the license manager if the application is idle for 30 minutes.
- Layer files (*.lyr) are used to for SDE connectivity and symbology. The application reads a SQL Server table to determine which layer files should be added to the project based on user name. The County is responsible for creating and maintaining these layer files. The symbols associated with null values or other unique values will be created and modified by County staff.
- All layers belonging to the 'Basemap' group are automatically added to the map; however, no tabs are created for these layers. This allows users to view data that is not being edited.
- The 'Administrator' tab contains an option to allow the administrative group to set an auto-save option. Selecting this option automatically saves edits to the database, including, reconcile and post operations at a certain interval.
- Users are able to undo their edits since the last time a save took place.

a. User Interface

- There is toolbar at the top of the application with the following controls. They contain the same functionality as the Subdivision Application
 - Select Elements
 - Full Extent
 - Zoom In
 - Zoom Out
 - Continuous Zoom/Pan
 - Previous Extent
 - Next Extent
 - Pan
 - Select Features
 - Zoom to Selected Features
 - Clear Selected Features
 - Refresh
- There are separate tabs for each dataset (Water, Sewer, Storm water). The user appropriate tabs are exposed to the users according to their user name. (See Security and Administration)

- There are separate sub-tabs for each featureclass (Main, Manhole, etc.) The application reads the Geodatabase and creates these tabs at runtime.
- Each tab contains the functionality to perform the following:
 1. Create a new feature
 2. Delete an existing feature
 3. Keep attributes (This feature allows the user to copy the previous feature's attributes to a new feature)
 4. Checkbox for quality control
 5. Drop down box for quality control (Field or Office)
 6. Modify Feature attributes - A panel is located on each tab to allow users to enter data. The panel contains a label with the field name and either a text box or a drop down box for the user to enter data for the field. A scroll bar allows the user to scroll through all the fields for the feature.
 7. Automatically Generate a Line - This option is available for line featureclasses. The line generator allows users to select a starting point then select a second point to create a line. This is done using one of three methods. First the time sequence of the feature class is used to find the next point (that the County will create sequence attribute in the database.) Second, a proximity routine is used to find the closest point. Third, the user manually selects a point. The application draws a temporary line connecting the two points.
 8. The user accepts the temporary line by clicking the 'Save' button. A drop down box allows the user to assign the point layer being used to create lines.
- Point, Line and Attribute data are edited using this application.
- A Statistics tab is available for each user. The tab displays the following:
 - Username
 - Daily Total
 - Added Features
 - Modified Features
 - Deleted Features
 - Weekly total
 - Added Features
 - Modified Features
 - Deleted Features

Statistics are saved in a SQL Server table when the edits are saved.

- An as-built viewer is also available to each user. The approximate center of each as-built drawing was used to geo-index the County's digital as-built documents. These center points are implemented in this viewing application. An additional tab lists the scanned images that are located in the extent of current map. If the user zooms in, out or pans the map, the list of images is updated. When the user selects an image, the digital as-built drawing is displayed in an external viewer.

Deliverable: *Custom GIS Application- Desktop Editing Toolbox (DET) for the Maintenance and Management of County's Water and Sewer network.*