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Advantages of using ArcIMS 4.0.1 for project tracking

Sanborn provides customized data conversion, digital mapping, and consulting services to its clients. In this paper we discuss how Sanborn is using ArcIMS to improve client/vendor communication by allowing its customers to view the status of their projects online with an internally developed product, SanTrack. Also included is a discussion of Sanborn's plans for enhancing SanTrack using ArcIMS 4.0.1 with ArcMap Server.

BACKGROUND

Sanborn clients want to be well informed about the progress and status of their project(s). An important aspect of good client relations is two-way project communication. In the past, Sanborn has handled this two-way feedback with written status reports and/or weekly phone calls. However, many Sanborn clients requested a web-based solution to accommodate this communication, and many requests for proposals that Sanborn received required that an online project status system be available. In addition, Sanborn project managers and senior management needed to be able to track the status of all subcontractor activities online. As a result, Sanborn developed a project status tracking tool, SanTrack, using ESRI ArcIMS 3.1 with the HTML viewer. SanTrack Phase I (SanTrack PI), the current version, has been in place at Sanborn for 18 months and is in need of modernization.

SanTrack PI contains a login prompt, which provides a mechanism to add client security to the site (discussed later in this paper) and allows Sanborn to convey messages to its clients (see Figure 5). SanTrack PI allows clients to view the status of their projects, which is one of six status types: *Not Needed, Not Started, In Progress, Completed, Correction, Accepted*. SanTrack PI uses ESRI shapefile polygons, allowing Sanborn to display the current status in different colors as symbolized with the STATUS field (see Figure 4). Each polygon can also be labeled based on a NAME attribute. Figure 1 is an example of a SanTrack PI Status Viewer screen for Sanborn's Denver Wastewater project.
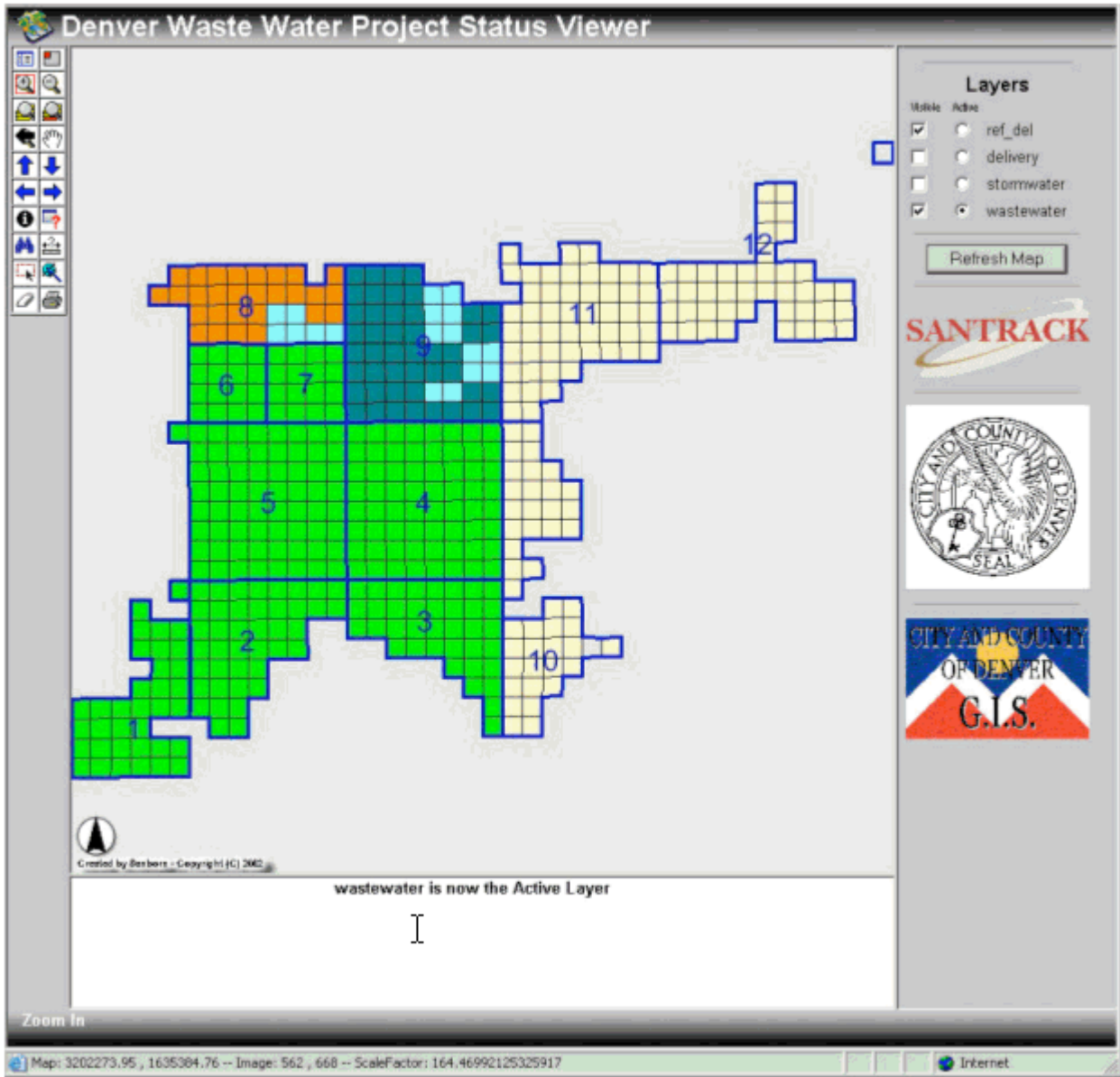
Figure 1

SanTrack PI allows multiple layers, and the status of each layer is displayed. For example, the status of wastewater, stormwater, etc. can be viewed on a single project web page.

Sanborn's production and project management staff members needed a way to update shapefiles for different projects. To meet this requirement and to guarantee that the shapefiles are always in a "valid" state, Sanborn developed an internal program called ViewTrack. ViewTrack was developed using ESRI MapObjects 2.1 and Visual Basic 6.0, allowing for a point and click update process with minimal chance of user error. All shapefiles are stored on the ArcIMS 3.1 server, which is required if ArcSDE is not in use. ViewTrack allows the files to be managed without the need for all Sanborn staff members

to know where the files reside or how they are internally managed. This proves to be very helpful when other Sanborn offices use the product over a virtual private network (VPN). Figure 2 is an example of the ViewTrack tool being used to maintain SanTrack PI data.
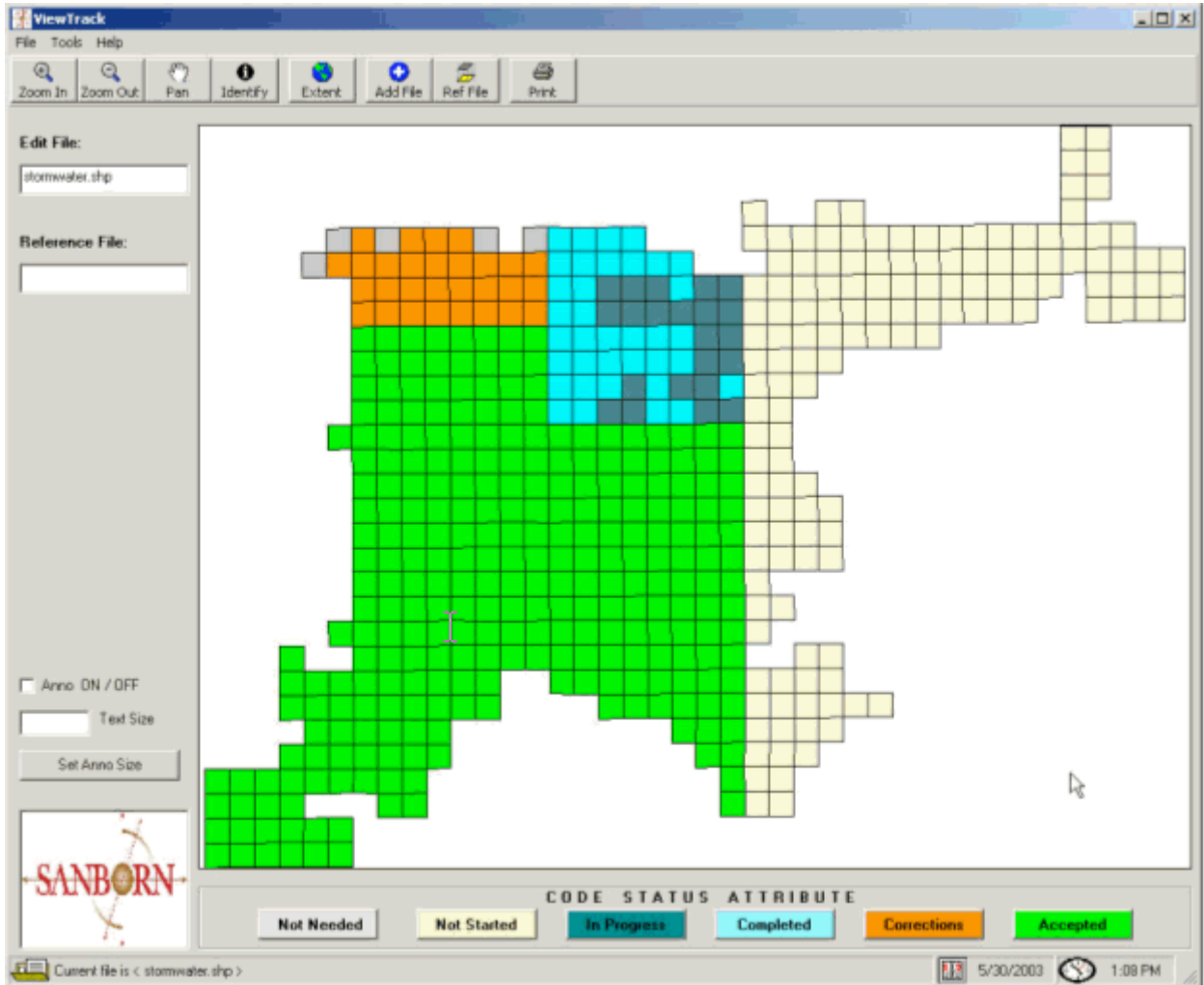

Figure 2

The remainder of this paper presents the next version of SanTrack, in which Sanborn prototyped an existing conversion project for the City and County of Denver to discover what benefits Sanborn and its clients could gain by using ArcIMS 4.0.1 with ArcMap Server. After logging in, clients can view the project status (just as with SanTrack PI), and in the future they will be able to do much more.

NEW SYSTEM ARCHITECTURE

SanTrack Phase II (SanTrack PII) will be developed from the ground up. Sanborn will incorporate lessons learned from SanTrack PI, including feedback from clients, project managers, sales staff members, and senior management. We started with the HTML viewer for SanTrack PII because it does not require any plug-ins to be loaded, allowing Sanborn to analyze the benefits of SanTrack PI vs. SanTrack PII without having to take different viewers into account.

The new architecture for SanTrack PII is ArcIMS 4.0.1 on Microsoft Windows 2000 Server with Tomcat 4.1.12 using Java 1.4.0 and IIS 5.0. The product was installed using the installation guide on the CD and was supplemented by Article ID: 24280 - Install IIS 4.0/5.0 with Tomcat 4.1.12 using J2SDK 1.4.0 for ArcIMS 4.0.1 on Windows from the ESRI support center. Both the ArcMap server and the ArcIMS 4.01. spatial server – Raster updates were also loaded The installation went smoothly using the documentation provided on the CD and in the article. The only problem was that Sanborn had not set up a new web address for the new SanTrack PII site, so we configured it afterwards. This was much easier with ArcIMS 4.0.1 than with ArcIMS 3.1 because with version 4.0.1, a post-installation menu option is provided that can be run after the initial installation is complete. This allows the system to be configured and reconfigured as needed. With ArcIMS 3.1, a complete reload is required to reconfigure the system.

Figure 3 shows one of Sanborn's first attempts with ArcIMS 4.0.1 and ArcMap Server for the SanTrack PII system using the standard HTML viewer.
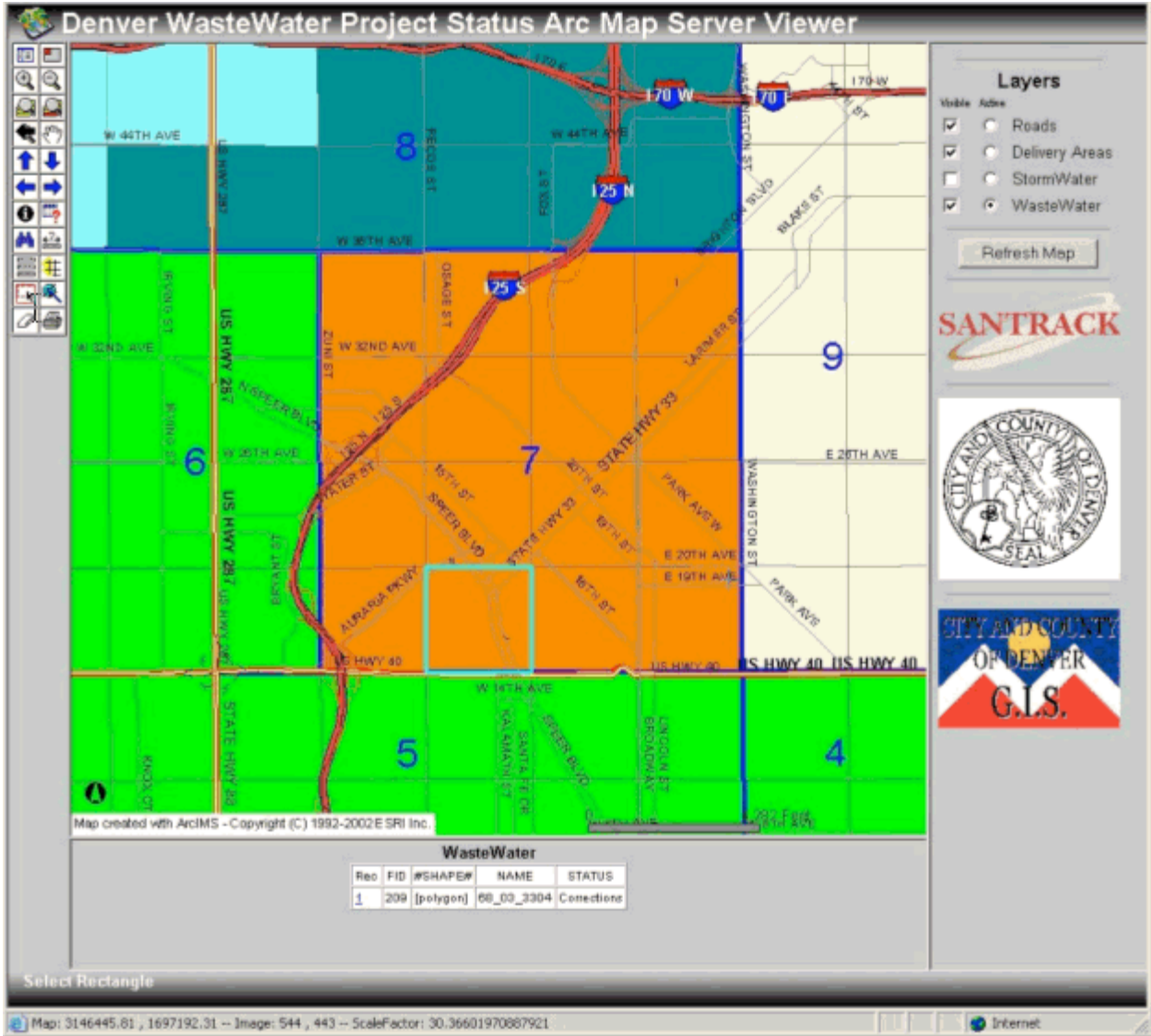
Figure 3

Some Sanborn clients requested a better legend display for SanTrack PI, and Figure 4 shows the improved legend display that is possible with ArcMap Server on ArcIMS 4.0.1. Notice that the additional ESRI StreetMap data overlaying the project area gives users a better reference as to were a particular tile of interest is located. The image in Figure 4 has three layers displayed: Roads, Delivery Areas (Area Outline), and Wastewater.
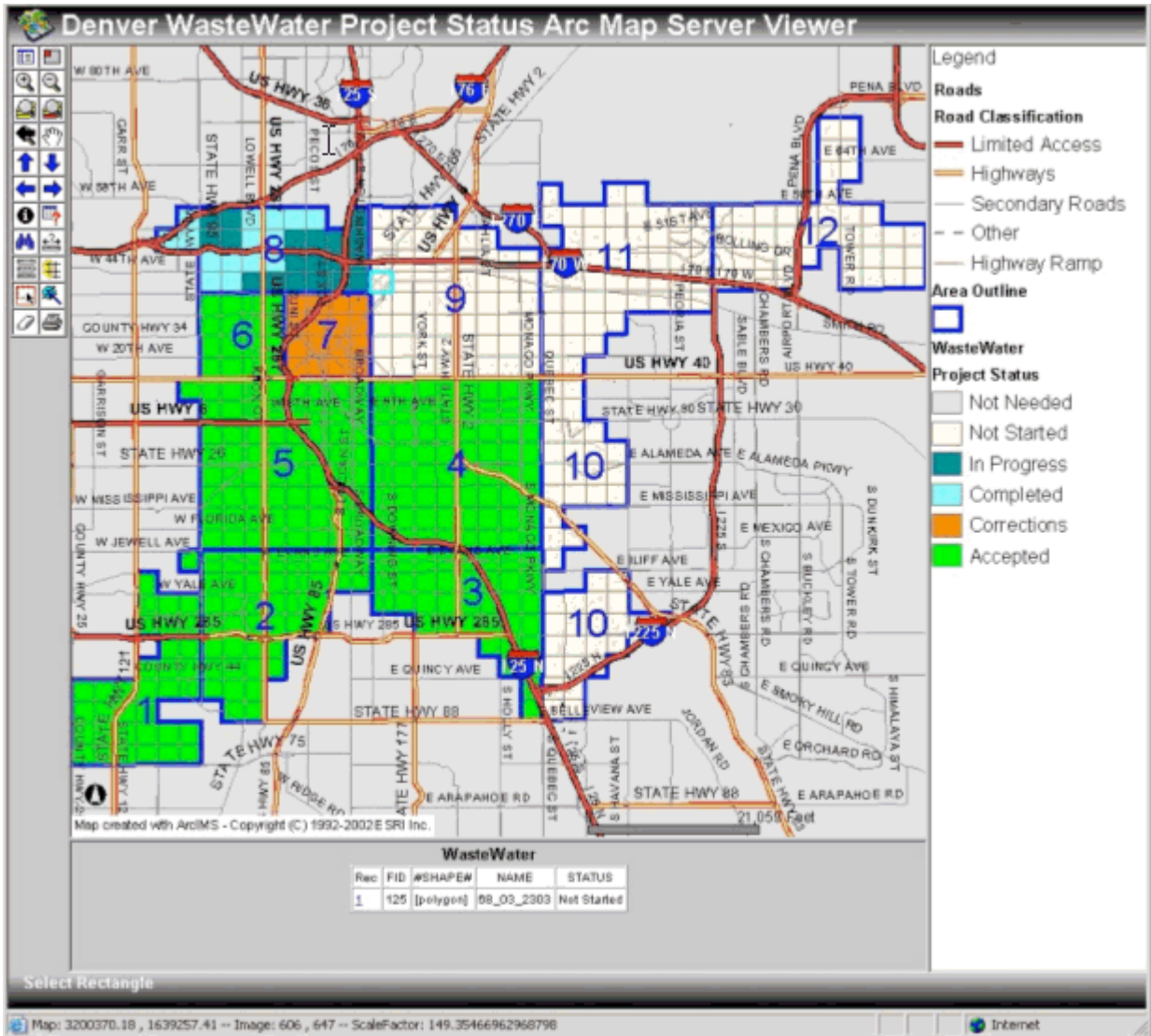
Figure 4

DATA SECURITY AND PRIVACY

When serving maps to clients, it is vital to maintain security and data privacy. Projects from different clients can simultaneously communicate with the web server, and people from each project should only have rights to access their own data. To achieve this level of security, Sanborn validates each client through a login process and keeps the spatial server behind the Sanborn corporate firewall.

Even greater security could be achieved with a platform-specific validation, such as the Windows NT challenge/response authentication. Alternatively, 40-bit or 128-bit encrypted SSL communication could be implemented with the aid of a company such as

Verisign. As of this writing, Sanborn has not heard of a conversion customer that needs this level of security. The current level of security provided in SanTrack PI and PII was quickly and easily implemented.

Figure 5 is a sample of the SanTrack PI and PII login screen that is used to provide Sanborn clients with security for their projects.

Figure 5

CURRENT ENHANCEMENTS BEING IMPLEMENTED

As mentioned earlier, Sanborn decided to update SanTrack with ArcIMS 4.0.1 and ArcMap Server. Listed below are a few enhancements and improvements that are being implemented in SanTrack PII.

- ESRI StreetMap or other street map data can be used by Sanborn to overlay symbolized street data on its clients' tracking areas.
- Sanborn has more control over legend names and display attributes, allowing for better Legend displays.
- With ArcMap Server, it is much easier for Sanborn to use data types other than shapefiles without having to use ArcSDE.
- Sanborn can disperse project data to various production departments as needed instead of storing it all on the ArcIMS server, as was required with SanTrack PI.
- Better feature Symbology is provided with ArcMap Server using ArcIMS 4.0.1.
- Map Notes are being added to give clients better feedback and the ability to address issues.
- ArcMap Server provides better control over layer names.
- Terrain data / Raster data is easier to implement, allowing Sanborn to display what areas are high, medium, or low density for data capture. This allows the client to have a better idea of which areas could be processed faster or slower because of heavy terrain, heavy urban area, etc.

Figure 6 is an example of a background orthophoto with ESRI StreetMap data and project status tracking tiles for Denver Wastewater.
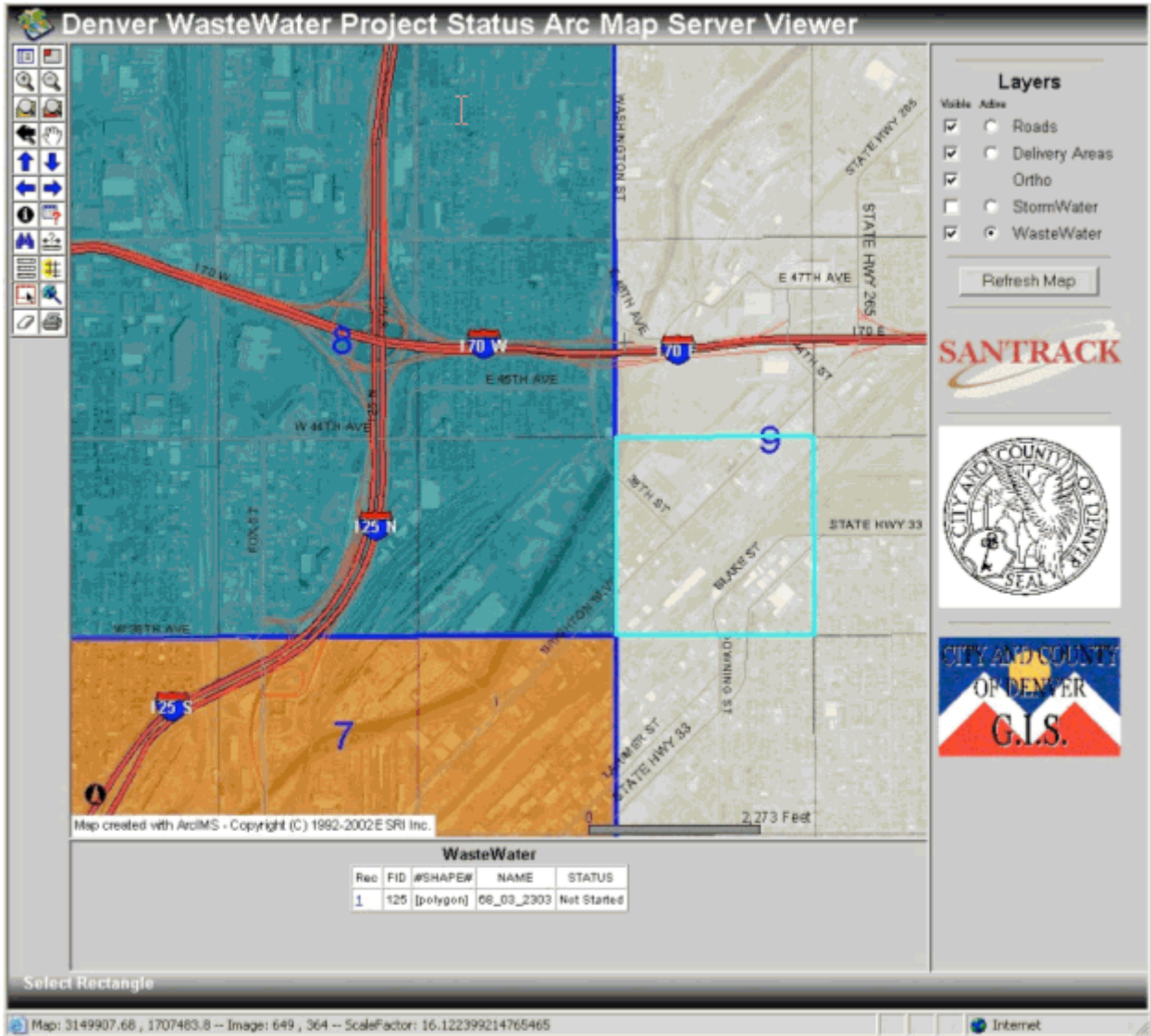
Figure 6

FUTURE WORK

Additional improvements are required to justify the implementation of SanTrack PII using ArcMap Server and ArcIMS 4.0.1. A few of the issues that must be resolved are listed below.

- o A Java viewer will be required if edit notes are to be part of Phase II.
- o Edit notes, using both image and feature servers needs to be provided. This will allow clients to QC and redline corrections to their data on the web, which means that a client's data must be displayable. This could result in more complicated

business processes, as well as more security issues for the ArcIMS data because the "real" data will be displayed along with the status tracking polygons.

o Hyperlinks must be used to provide additional capabilities to the client. This could be used to link the site to schedules, phone logs, etc.

o Sanborn's six project status types have been sufficient, but sometimes other status types would have made more sense. Sanborn needs the ability to dynamically create and maintain status tracking types to make SanTrack PII more flexible.

o As Sanborn moves away from its hybrid conversion approach to more of a pure ArcGIS approach, different methods for maintaining tracking files will be developed and should be easier to create and maintain.

o Sanborn would like to move away from ViewTrack and start using ArcGIS to maintain the status of existing projects. This means that some customized menus and programs will be required to assure that the files are always in a "clean" state.

o Metadata using ArcIMS Metadata Server must be investigated and implemented in a way that pertains to data conversion and data migration projects.

o Sanborn needs to evaluate the ESRI ArcGIS Job Tracking Extension (JTX) to see if it can be utilized for future SanTrack development efforts.

o Sanborn must increase the use of SanTrack for internal project tracking at all Sanborn offices, which will allow management and production staff members to access the status of any project at any time.

o Sanborn needs to improve performance of the ArcMap Server. The system is particularly sluggish on slower Internet connections using modem speeds. Performance also degrades as the volume and distribution of data increases.

o As a project progresses from a tile (coverage, shapefile) environment to a seamless (GeoDatabase) environment, project tracking and project status reporting becomes much more difficult without creating artificial tiling to track a project. The methods described in this paper may not address this issue. SanTrack Phase II will need to be modified to enable seamless project status reporting to clients; alternatively, an entirely different approach to project status reporting could be required.

CONCLUSION

Sanborn has successfully implemented a project tracking website (SanTrack) for its clients using ArcIMS 3.1 and plans to maintain and enhance the site for better communication with its customers. To meet evolving client and internal needs, Sanborn needs to further develop its project tracking capabilities using ArcIMS 4.0.1 and ArcMap Server. We are optimistic that ArcIMS 4.0.1 and ArcMap Server will provide added functionality to allow SanTrack PII to move into Sanborn's mainstream production process.

ACKNOWLEDGEMENTS

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