

Urb R Pl 969
GIS Application Summary
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Highway Access Management System – HAMS

The GIS Application that I analyzed is called the Highway Access Management System (HAMS) which was implemented at the Wisconsin Department of Transportation.

Purpose

The purpose of the HAMS system was to streamline the WisDOT process of access and driveway permit applications. The average time for reviewing a driveway or access permit application was around 5 days to 2 weeks. Moreover, the amount of data required to be reviewed was in several different formats (not all electronic) and cumbersome to handle. In some cases, the data available were more than required while in other cases some data were missing. This created a lot of complexity in analyzing different types of data together and presenting meaningful results and decisions. The purpose of developing HAMS was to provide GIS based decision support system in the shape of a one-stop Web portal designed to simultaneously answer all questions related to DOT reviews and to provide end-to-end automation for the business process and workflow of driveway permits and land division reviews. The main emphasis was on providing reliable and consistent results to end users in a timely fashion. This would result in not only monetary benefits but also societal benefits

HAMS Applications and GIS Analysis

The process of access management and driveway permit application reviews involves working with a multitude of data types and formats. It requires a review of the state statute, ROW, noise levels, setbacks, drainage and future considerations. The aim was to combine information from various data sources covering real estate, parcel, project, planning, engineering and mapping, in a GIS based decision support system that would serve some of the purposes already explained. WisDOT hired an engineering firm to build the application for a cost of approximately 1,500,000. The application outlook is very simple providing standard IE and ArcIMS feel. The standard starting point of HAMS involves either USGS Quads or Aerial Photographs as base maps. Data can be accessed for any location which covers the simultaneous addressing of temporal, legal, spatial, and automation aspects required for access and driveway reviews. HAMS is data warehouse with several components including a document management system; roadway data repository; an engineering, GIS, and USGS 24K quads server; as well as a core relational database that holds data on land divisions, keywords, the State Access Management Plan, statutory access controls, and data from a workflow tracking system. The real estate data provides access to copies of deeds and other relevant information. The parcel data provides access to information regarding types of projects implemented at a particular location, ownership information and information about the READS and Trans 233 data entries (These are WisDOT requirements and guidelines for decision

making on access and driveway applications) etc. The roadway repository includes data about adjoining state highways and their attributes. Access is also provided to detailed engineering drawings of locations selected in HAMS. Drainage information can also be analyzed in GIS to make decisions about drainage characteristics of a particular location. All these analyses are conducted within HAMS. Figure 1 shows a typical HAMS interface with various data available for access. Figure 2 shows how engineering related data is seen in HAMS. A typical step by step process would involve the identification of the location and review and analysis of all the data explained above before making a decision. HAMS combines the capabilities of all these components into one spatially driven Web interface so that the interaction of the user with the system is simple and straightforward.

Benefits

As mentioned earlier, the total cost of developing the application was approximately \$1,500,000. I was lucky to be provided with a cost-benefit analysis of the HAMS system completed just a couple of weeks ago by WisDOT. The maintenance cost of the system is around \$ 295,000 per year. The amount of time required for the review of access and driveway permit applications was around 5 days before the implementation of HAMS. That time has now been reduced to just 4 hours per review. Therefore, the estimated cost per review has dropped from \$2,000 to \$400 only. It is estimated that this would result in savings of approximately \$364,800 per year. Moreover another important issue WisDOT facing WisDOT was of litigation due to denied accesses and inconsistent results. The average number of litigations per year is around 4 with each costing WisDOT between \$2 million and \$5 million. Even if HAMS results in reduction of a single litigation per year, the total monetary benefits of the system exceeds \$ 4 million. This is a huge benefit in terms of cost savings.

Along with monetary benefits, there are a number of intangible benefits associated with the implementation of HAMS. It provides a consistency in results thereby reducing the liability for WisDOT. The turnaround time for driveway or access permit decisions has been reduced substantially proving better customer services to public and business. HAMS provides an automated service and ease of integration of data with other systems. The decisions made are more accurate and precise. The data is better organized and represented in a more effective manner for ease of understanding. The incorporation of the database in a GIS format presents additional opportunities for use of data in additional ways in the future.

Issues

Some of the data have already been included in HAMS GIS database while other options such as keyword usage etc. are still being implemented. Moreover the application at this point does not cover the entire state of Wisconsin. It is hoped that that would happen soon. I would like mention the immense help provided by Anurag Mehta and Curtis Pulford at the WisDOT with this assignment.

Figure 1: A typical view of the types of data available in HAMS and how they are accessed

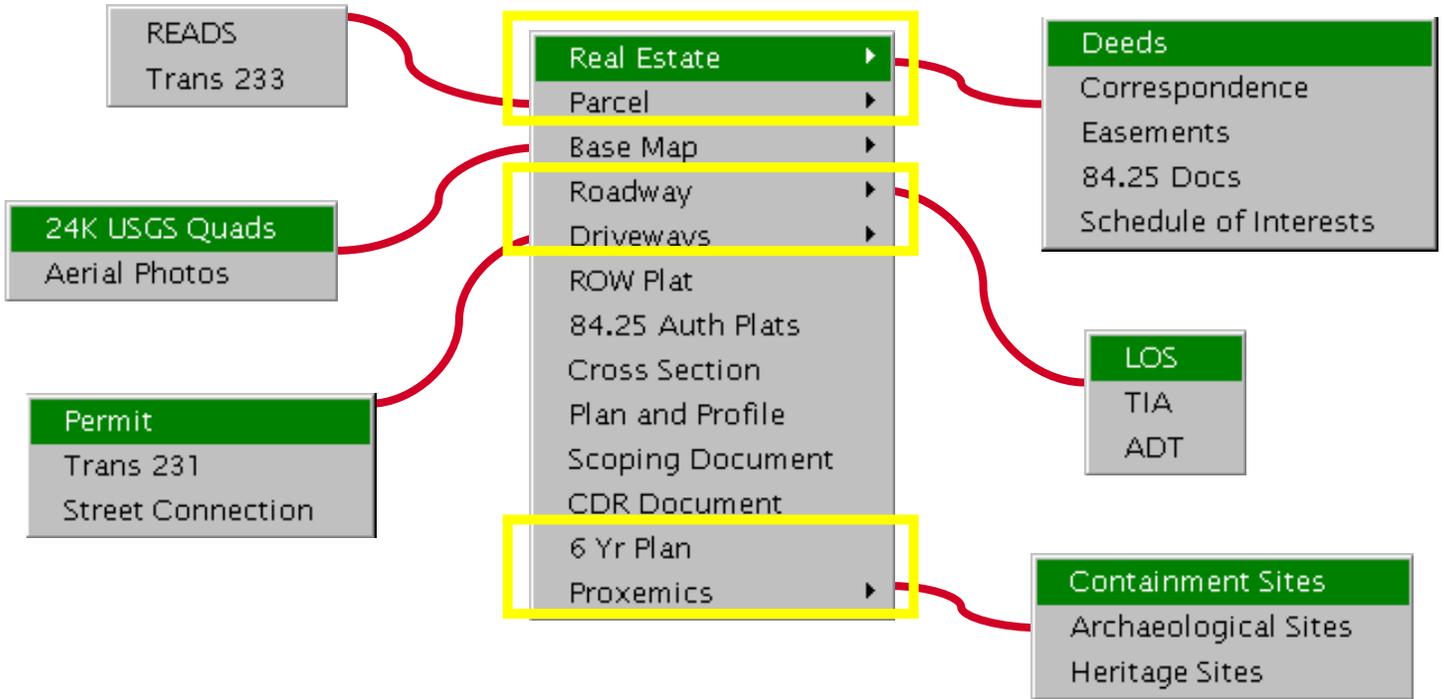


Figure 2: An overview of detailed engineering drawings overlaid on aerial photograph

