Creating a seamless geodatabase for water infrastructure on the Potchefstroom campus.

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ABSTRACT

The Potchefstroom Campus of the North West University contains old water pipelines that are not well documented. Many of the newer water pipelines are not well documented either. A central data storage system that could contain the information with ease of access to update and retrieve information of these waterlines is lacking. There is a need to find a way that existing potable water network data could be represented and stored with GIS. The solution would contribute to the management of the water system on Campus.

The aim of this study is to create a seamless geodatabase as a pilot project for the potable water infrastructure at the Potchefstroom Campus of the North West University. The pilot project focuses on buildings E4 and E6. ArcGIS 10 was selected to serve as the key software system that would be applied as a medium to solve and represent the problem. ArcGIS geodatabase serves as a container to store spatial data with. Data with regard to the potable water system was collected from various sources of which available electronic and hard copy CAD data was the general format.

A file geodatabase was created in ArcCatalog with a standard co-ordinate system as reference to the data. ArcMap was applied for 2D editing and georeferencing of the CAD drawings which were followed by a composition of attribute data for the created features. The end result was represented in ArcScene for 3D visualization and 3D analysis. It also provided ease of access to the attribute information and relationships and the capability to perform the shortest route analysis.

Keywords: GIS, geodatabase, water infrastructure, 3D, network

OPSOMMING

Die Potchefstroom Kampus van die Noord-Wes Universiteit bevat ou water pype wat nie goed gedokumenteer is nie. Baie van die nuwer pyplyne word ook nie goed gedokumenteer nie. ‘n Sentrale sisteem wat kan dien as ‘n stoorplek vir die data ontbreek tans. Hierdie data sisteem sal ook gemaklike toegang tot die data moet bied van waar dit opgedateer kan word. Daar is tans ‘n behoefte om ‘n manier te vind waarmee die bestaande water netwerk data voorgestel en gestoor kan word. Die oplossing sal dus bydra tot die bestuur van die water sisteem op die Potchefstroom Kampus van die Noord-Wes Universiteit.

Die doel van die studie is om ‘n geintegreerde geografiese databasis op te stel vir die drinkwater infrastruktuur op die Potchefstrom Kampus van die Noord Wes Universiteit. Die proefstudie fokus op geboue E4 en E6. ArcGIS 10 was gekies as die primêre sagteware sisteem wat aangewend kan word as medium om die problem voor te stel en op te los. ArcGIS se geografiese databasis dien as ‘n houer waarin ruimtelike data in gestoor word. Data met betrekking tot drinkwater was ingesamel deur verskeie bronne te raadpleeg. Elektroniese en hardekopie CAD data was die algemene formaat vir die data.

‘n Leêr geodatabasis was geskep in *ArcCatalog* met ‘n standard koordinaat sisteem as verwysing vir die data in die geodatabasis. *ArcMap* is aangewend vir die 2D wysiging en die geografiese verwysing van die CAD tekeninge waarna ‘n samestelling van die beskrywende data vir die komponente geskep is. Die eindresultaat van die datamodel en die data binne die geografiese databasis was om ‘n 3D voorstelling in *ArcScene* voor te stel. Daardie voorstelling sal dus aangewend word vir 3D visualisering en die 3D analises van die data. Dit sal ook gemaklike toegang tot die beskrywende inligting en die verhoudings van die data bied. Verder sal die vermoë om ‘n kortste roete analise uit te voer ook voorsien word.

Kernwoorde: GIS, geodatbase, water infrastruktuur, 3D, netwerk

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