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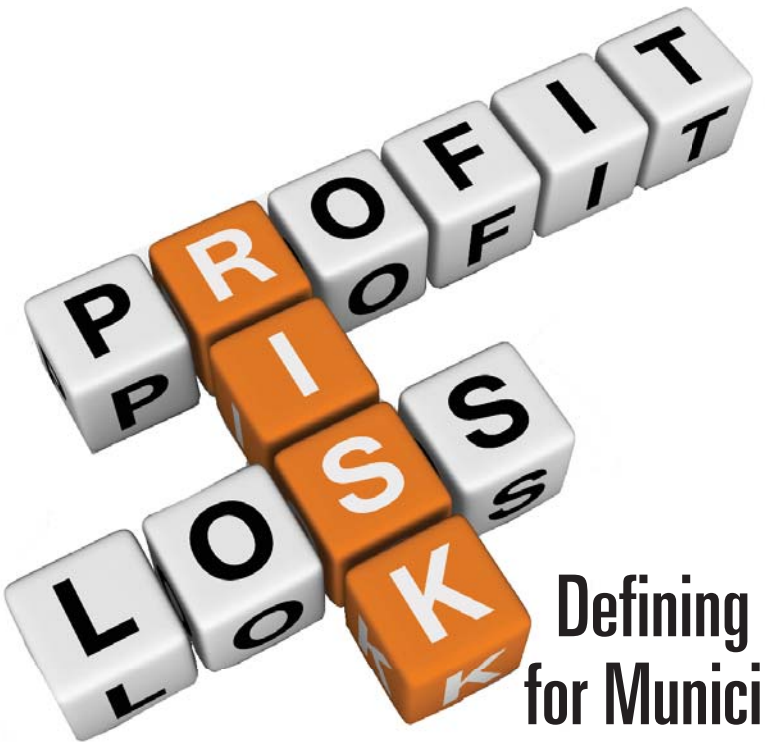

Defining Public Asset Management for Municipal Water Utilities

The concept of asset management has many forms, but for utilities the focus is mainly on infrastructure asset management. However, with 85% of US water utilities owned or controlled by governments and municipalities, asset management falls under the larger umbrella of public asset management. In general, public asset management incorporates the management of all things that are of value to a jurisdiction, its mission and purpose, and citizen's expectations. Geographic information system– (GIS-) centric public asset management has a foundation that standardizes data and allows interoperability, providing users the capability to reuse, coordinate, and share information in an efficient and effective manner. A GIS platform combined with the overall public asset management umbrella of both hard (physical) assets and soft assets helps remove the traditional silos of structured municipal functions.

THE SOFT ASSETS IN LAND-FOCUSED PUBLIC ASSET MANAGEMENT

One definition of "public asset management" was coined and defined by Brian Haslam, president and chief executive officer of a leading GIS-centric computerized maintenance and management system (CMMS) company. Haslam (2010) explains, "In this era of GIS technological revolution, municipalities and their utilities are beginning to implement systems which combine both infrastructure 'physical' assets with other land-focused 'soft' assets that have real economic and social value." Land-focused assets—including real estate under this definition—also consist of all data and work activities associated with municipal processes such as permitting, licensing, enforcement, facility and services management, and information flow. Haslam continues:

> Local governments provide a number of services in conjunction with properties and facilities with both planning and enforcement responsibilities. The land-based, location focused activities have been very difficult to manage and coordinate with other business processes, but are all critical when making important financial and resource allocation decisions. While the utility may only be focused on above-ground and under-ground enterprise owned assets, local governments monitor and manage other important public assets such as permits, licenses, code enforcement, right-of-

way, and other land-focused management processes which may directly influence the operation and planning of the utility. As an example, a proposed new subdivision may affect water pressure requiring a water system upgrade, a parcel land use designation may raise water quality or conservation concerns or a proposed restaurant may affect the wastewater system requiring additional monitoring and maintenance activities. The whole of government is affected through these types of interdependent activities dealing with risk and resource management.

GIS AS THE OVERALL PLATFORM

Local governments have traditionally used GIS to produce and analyze maps only, but with increasing GIS knowledge and skills, this important technology investment is being applied to managing public assets as well. GIS is an ideal platform for local governments to design and create an integrated public asset management system using spatial relationships as a way to manage, coordinate, and analyze all public assets and work activities. GIS-centric public asset management is a system design approach for managing public assets that leverages the investment local government continues to make in GIS and provides a common framework for sharing useful data from disparate systems. The challenge facing local government is that the boundary between infrastructure asset management and land-focused asset management is blurring. GIS capabilities that analyze the spatial relationships among public assets provide important insights for prioritization of monitoring, maintenance, and decision-making for both infrastructure and land-focused assets (Haslam, 2011).

OPEN STANDARDS ASSET REPOSITORY

Managing assets requires geographic location, interconnectivity, graphic representation, and proximity information. GIS is a mission-critical tool, and its powerful geodatabase makes it the best place for cataloging and maintaining an inventory of all assets. Many municipalities and utilities have adopted a GIS geodatabase as their asset registry in which all assets and their associated data are captured in a hierarchical format of features and related objects. A common, open-standards central repository is a key element to the efficiencies gained within the context of public asset management, allowing multiple applications to access the data simultaneously.

Many municipalities use asset management systems to store and manage information and to support tactical and strategic decisions regarding the operation, maintenance,

rehabilitation, and replacement of their infrastructure. Implementation of efficient and cost-effective management strategies largely depends on the ability of these systems to share and exchange asset life cycle information. Municipal asset data are typically characterized by their long life cycle, sheer size, complexity, inter-dependencies, and dynamic nature. The primary function of a municipal asset management system is to maintain the accuracy, consistency, and integrity of the asset data. Many municipalities have made significant investment in implementing software systems to address the increasing complexity of storing and maintaining the data associated with their infrastructure assets. Experience shows that the use of proprietary data models and formats has created many obstacles to improving the availability, quality, and reusability of data (Halfawy et al, 2006).

CITIZEN SERVICE REQUESTS AS A SOFT ASSET

The definition of public assets also extends to customer service or citizen service requests. Most public requests are land-based or asset-related requests that require prompt attention, including resources allocated, work orders generated, and the action tracked and reported.

The city of St. Louis, Mo., is using a GIS-centric management solution for online citizen service requests that has substantially improved work flow and communication to track all citizen service requests. Most requests begin at the Citizen Service Bureau (CSB), with the majority routed to refuse, traffic, forestry, building, animal care and control, the streets department, or graffiti removal. St. Louis was able to create a citizen webpage that mirrors the question-and-answer selections used by the CSB. Once submitted, citizen requests are immediately inserted into the CMMS, which provides the citizen with a request reference number. Before this technological advancement was in place, dispatchers logged all service calls on handwritten sheets, and staff had no way of knowing whether they were logging a request to which a dispatcher had already responded. The new system eliminated the paper process and any unnecessary and duplicate dispatches, saving the city time and money. Similarly, St. Louis's Forestry Division maintained three separate databases for tracking tree, weed, and debris violations. Requests were printed out from the CSB's system and reentered into the forestry database. Now they work entirely within a single system, and the CSB can answer citizen followup calls without having to call someone in the Forestry Division for an update (GISCafé, 2011).

A GIS-centric public asset management system has the ability to provide such details as staff performance and activity costs. These types of processes capture the full cost of governmental activities and the level of customer service. Level-of-service is not only important for asset replacement decision-making but for all services tied to rates and fees. Public requests for services have costs, and many times these costs run across several governmental functions. For example, a request to respond to a code enforcement violation would generate a work order and may require a special permit or inspection with a resulting charge-back to the violator. The cost of these activities should be both tracked and communicated during service-level and budgetary discussions with decision-makers. Likewise, the improved process flow or chain of events among traditionally separate divisions and departments helps reduce costs while increasing the ability to respond to citizens more efficiently.

CROWDSOURCING FOR UTILITIES

Crowdsourcing and other types of citizen-reporting technological advancements can also help reduce costs or at least mitigate reduced service levels resulting from staffing shortages. A photograph or video from a citizen's cell phone could be used to report a water leak. However, this type of reporting could also change the way in which governments will need to collect and manage spatial data and necessitate improvements to customer service interactions.

In the city of New Haven, Conn., this social platform for exchanging information with local governments is helping the city respond to a larger number

of resident concerns with fewer work hours. The idea is to encourage active citizenship by enabling people to report municipality issues via their smart phones. The integration allows citizens to enter service requests from their personal mobile devices directly to the city. In addition, citizens with an iPhone can take a photo of an issue, locate the issue in the GIS, attach the photo to the map location, and submit it as a service request (*Directions Magazine,* 2011).

The continued progress of advanced metering infrastructure combined with this powerful GIS-centric platform will offer similar if not enhanced communications functionality. This will allow water utilities to better identify peak demand issues, predictive maintenance activities, and revenue loss, not unlike the electric industry (Pecardi, 2007).

BUILDING PUBLIC TRUST THROUGH PUBLIC ASSET MANAGEMENT

The very nature of citizen trust in its government is at stake. Although this statement may sound alarmist and a water utility may take the stance of "we're different," the fact remains that the future prospects of additional rate increases hang in the balance. Public trust in government has been declining for years, and the current economic recession has proved that members of the public view utility rate increases as the same thing as new taxes. After all, the net result to their wallets is the same. The demands for transparency and accountability are cries for evidence that government is not wasting taxpayer or ratepayer dollars. For municipalities, this is a challenge to their fiduciary trust. Mutual trust occurs between entities and individuals who repeatedly interact with one another. Municipal utilities have a higher degree of risk in this area because they are in constant contact with the public through their monthly utility bills. This high frequency of customer contact requires utilities to be diligent in their educational and outreach programs. Utilities should view their outreach efforts as part of their ongoing rate increase process. Citizens may react favorably when governments use new technologies to disclose information. However, building trust versus maintaining trust requires more than one-way communication. Public asset management as defined in this article works to develop process-based trust that is garnered with expectations of reciprocity. "The increased effort of government to interact with citizens and increased information disclosure by government to citizens can enhance the level of exchange between citizens and government and thereby increase process-based trust" (Welch & Hinnant, 2003).

GLOBAL STANDARDIZATION EFFORTS FOR ASSET MANAGEMENT

Global efforts have been ongoing to use standardization as a means to break down departmental divisions. In 2004, the British Standards Institute (BSI), in collaboration with the Institute of Asset Management, released Publicly Available Specification (PAS) 55, parts 1 and 2. PAS 55 was considered the first internationally recognized specification for asset management. Part 1 of PAS 55 specifies the asset management system requirements for managing physical assets and asset systems during their life cycles. The management of physical assets is inextricably linked to the management of other asset types. These other asset types are considered within the asset management system insofar as they have a direct impact on the management of physical assets. For example, the optimal life-cycle management of physical assets is heavily dependent on information and knowledge, human assets, and financial resources, and often has a significant effect on reputation and customer satisfaction.

The British efforts to apply the specifications outlined in PAS 55 were designed to help utilities demonstrate a high level of professionalism in whole life-cycle management of their physical assets; establish an asset management system to optimally and sustainably manage physical assets; implement, maintain, and improve an asset management system; comply with asset management policy and strategy; demonstrate compliance to others; seek certification/registration of their asset management system by an external organization; and make a self-determination and self-declaration of compliance with this PAS. In 2008, PAS 55 was updated, and the groundwork was laid to move this specification into a standard. In June 2010, a New Work Item Proposal on Asset Management was reviewed at an International Organization for Standardization (ISO) preliminary meeting, which approved the formation of Planning Committee 251. This committee will be charged with developing an ISO standard on asset management using BSI PAS 55:2008 as a starting place.

Because there is currently no standard on asset management and the approach of this committee is to develop a standard that is more business-centric than asset-centric, the new standard will not only pertain to physical assets but also to all other organizational assets. It will explain what to do, not how to do it, and allow organizations to self-declare conformity (Poland, 2010). PAS 55 covers every organization—whether private or public—in any sector in the United Kingdom. It is already being used in utilities and public services and other industries such as transportation, manufacturing, mining, oil and gas, defense, pharmaceuticals, and engineering.

In the United States, the definition of asset management will continue to be shaped by the tools each utility selects as a means to improve asset performance and reduce costs. The goal for sustainable infrastructure is an overall plan that includes asset management

planning, which in turn requires a financial plan, a service delivery plan, and integration with community planning. Public asset management strives to combine all land-focused assets and functions to effectively manage the social and environmental goals of the community. As capital-intensive enterprise funds, municipal utilities will need to continue to lead their general city management counterparts into an era of sustainability and infrastructure asset management.

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