



The Computerworld Honors Program

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Final Copy of Case Study

LOCATION:
NY, NY, US

ORGANIZATION:
City of Cambridge in Ontario, Canada

YEAR:
2011

ORGANIZATION URL:
<http://www.cambridge.ca/>

STATUS:
Laureate

PROJECT NAME:
Smarter City

CATEGORY:
Collaboration

PROJECT OVERVIEW

The city of Cambridge in Ontario, Canada, like many other cities throughout the country and worldwide, is facing an unprecedented set of challenges as it witnesses its rapidly growing population create increased strain on its aging infrastructure. To combat the problems that come with maintaining the integrity of over 250,000 deteriorating infrastructure assets worth over \$1.2 billion – which includes damaged parking lots, crumbling roads, cracked sidewalks, backed-up sewers, faulty drain systems, burst water pipes and a wide assortment of other public works projects - city officials have adopted an innovative approach to asset management. They installed a new city wide information management system in 2008, and since then, they've been able to gather valuable information on not just the integrity of their physical assets, but also on the underlying problems that lead to failure, and the overall performance of the entire city. They've used this information to institute more preventative maintenance, plan for the future more effectively and make more informed decisions about how to run the city. The first step to turning Cambridge into Canada's first smarter city was installing Maximo asset management software from IBM. Officials installed GIS technology on bicycles that travel across some 640 km of sidewalks a year. The systems record the date, time and conditions of the sidewalks as it goes, simultaneously processing the information with analytic software and submitting work-orders organized by type and geography. Trucks equipped with the same technology carry out the same processes with the roads and also record traffic and collision records. The transportation department then uses the information gleaned to conduct safety audits that allow them to determine the need for changes in intersection design, speed limits and traffic control measures. Through the interconnection of several independent systems, officials can monitor the volume of sewage from homes and businesses against the volume of water coming from ground water or rainfall, allowing them to quickly target problem areas for drain inspection. Digital closed circuit television robot units crawl through sanitary and storm pipes to inspect structural and operational condition of pipe assets, and video and data is automatically loaded back into the system and processed for



immediate work-orders. Adopting and instituting the technology required funding from the federal government and a concerted effort from all of the city's public works team. Over the last five years, Cambridge has received \$12.7 million in gas tax money from the federal government and \$9.8 million in grants from Ontario. While a large percentage went to fix the roads, the decision was made to invest \$1 million in customized IBM Maximo infrastructure management software. The city then allocated an additional \$700,000 to set up and launch its infrastructure management office. Once employed, the project required open communication between all departments to carry out work-orders effectively. Now, with the tablet computers that many employees are equipped with, they can instantly and seamlessly submit a work order into the system, it will be prioritized and sent to the proper department for maintenance.

SOCIETAL BENEFITS

The influx of information provided by the asset management software has led to better communication and organization, better decisions about how to run the city and how to improve failing infrastructure, better long term planning – resulting in more time and money for alternative projects and a safer city.

PROJECT BENEFIT EXAMPLE

The Asset Management and Support Services division of Cambridge's Transportation and Public Works department, responsible for maintaining the integrity of the city's physical assets, benefits most from the smarter city initiative. The new city-wide information management system has completely change the way they carry out even the most basic functions of their jobs, and has achieved greater productivity, savings, enhanced citizen communications, and a more streamlined process for executing work-orders. Before installing the new information management system, ordering and prioritizing public works activities was a manual, paper-based process as issues arose. Timesheets were completed for specific activities, after the fact, often with a non-descript reference to where work was done. The work was prioritized based on the severity of the failure, the degree to which it would affect residents, type of failure that occurred and the resources available that day. Knowledge of the system and history of issues at various locations, and means to deal with issues were mostly known by individuals based on experience alone. The system often required workers to travel to and from headquarters to obtain drawings, which was a strain on employee's time and resources; this highly re-active approach created disorganization and inefficiencies at all levels. Business continuity was at extreme risk when individuals were unavailable, retired, or left the organization. Ability to defend claims was often compromised due to poor documentation on the nature of work and response needed. Once system installation occurred, a reservoir of information became available that aided better decisions about their processes, provided universal access to infrastructure information including location-specific history, and allowed employees to tie in other technologies and manage their time more efficiently. A digital order management system has replaced the paper-based system, complete with on-board computers for public works trucks that allow workers to input work-orders on the go. Submissions are automatically put into the system, prioritized and sent to select trucks, along with the appropriate route and work order information. Interconnected GIS and document management with the work management system provided direct access to drawings and system maps. In addition to saving time, the system provides priorities for action and the companies' ability to defend claims has dramatically improved with imbedded records management and recording practices. Benefits for storm management are significant as the system includes response plans and templates with options for different resources being deployed before and during storms based on the forecast. The plans set up a series of work-flow controlled work-orders that assign jobs to resources in each route on a preliminary timeline that ranges



from 24 hours to 24 days. The result has been greater organization and efficiency during times where services are needed most. "We believe a smarter city goes to work for its citizens. It measures and influences more aspects of their operations. These interconnected cities allow free flow of information from one discrete system to another, which increases the efficiency of the overall infrastructure. Finite resources are optimized." - Mike Hausser, director of asset management for the City of Cambridge.

IS THIS PROJECT AN INNOVATION, BEST PRACTICE? Yes

ADDITIONAL PROJECT INFORMATION

The implementation involved significant integration of asset information between multiple systems to provide a seamless collection of infrastructure information to field staff, operations managers, engineers, asset managers, customer service staff, finance, planning staff, by-law enforcement staff, city risk managers, specialized inspection contractors (CCTV for gravity sewers) and digital road inspection processes. Aside from the significant efficiencies, the process improvements and the capturing of legacy information that builds on future efficiencies and keeps the knowledge-based information within the corporation, one very important benefit that shouldn't be over looked is that the city's increasing ability to effectively communicate with its citizens. For example, one benefit is that the Maximo system has improved the process for road and lane closure notification and has allowed the City to implement a real time notification system to emergency services providers like fire, police and ambulance. Instead of a paper-based fax notification system that has been in place for decades, elements of Maximo information is present online for the benefit of all citizens and an automatic email notification system is in place to give as much advanced warning as possible to first responders. Consider how valuable this information can be for communications centres and mobile partners who depend on clear roadways where every second counts. As well, where most municipal online systems of road closure notification are manually inputted by the website administrators online (if they even have them online), the Cambridge system is automatic – when Maximo information changes on the status of a road, it is seamlessly integrated into the online and email alert system. For a public corporation, the providing transparency and enhanced communications is a primary goal. The smarter city technology impacts the corporation's workers, its ability to attract bright and talented individuals by offering careers using cutting edge technology, and it helps bring new opportunities to communicate better with the general public and stakeholders.