

MAKING A VIRTUE OF A MANDATE

New Hampshire town maximizes the power of GIS and asset management

By Becky Stevens

Maintaining compliance with MS4 National Pollutant Discharge Elimination System (NPDES) Phase II regulations can be a challenge for any community, particularly smaller municipalities. The town of Salem, N.H., with a population of approximately 29,000, has devised a solution where the sum of two good things—GIS and asset management software—is yielding more benefits.

The town is in a multi-stage process of conducting an inventory and condition assessment of its drainage assets. When complete, Salem envisions it will have the ability to create a more proactive maintenance plan, improve communication and project coordination across departments and better manage resource allocation.

Background

Salem began its GIS implementation in 1996. Tax Maps had been digitized,

and a townwide flyover was completed to develop a digital base map. In 2003, SEA Consultants (now Kleinfelder/SEA) was hired to construct an asset management system now known as VUEWorks. One of the requirements of MS4 Phase II compliance was to map the town's drainage assets. Some of the town's infrastructure dates from the 1890s, and data about the assets was mostly on paper.

"A lot of drainage data of varying quality was provided to SEA—paper maps and sketches, as-built drawings, proposed subdivision and site plans, and GPS data. We knew that the accuracy varied from very good to not knowing if the structure on paper actually existed in the field, but we had to start somewhere," said Jim Brown, Salem's senior engineer.

"The town has over 9,000 drainage structures. We initially had trouble getting people to use the VUEWorks

program because they didn't trust the accuracy of the data that was housed in the program," said Bob Gannon, Salem's GIS coordinator.

The town of Salem has been plagued by flooding. It once was fertile farmland with a long, meandering river. As the town developed the farmland, the river and seasonal flood basins started to become channelized. Over the 100-year time frame of development, drainage structures were added to improve localized flooding issues. Unfortunately, this methodology failed to take a comprehensive approach.

Quantifying Drainage Data

After another substantial flooding event in May 2006, Gannon realized the need to quantify the drainage data set. "Ultimately, we couldn't capture everything we needed to know about our assets with just GIS," he said. "We kind of knew where the catch basins were, and we kind of knew some attribute information about the structure, but we knew nothing about the structure's condition."

Working with the Department of Public Works (DPW) in the spring of 2007, Gannon created paper maps for DPW workers assigned to clean catch basins. The maps were intended to draw feedback on whether the asset existed and was in the correct location as drawn on the map. DPW staff checked off the basin if it was in the correct location, crossed out basins that did not exist and added basins they found. Once the paper versions got back to Gannon, he made edits to the GIS data.

"Of the roughly 700 basins surveyed, the data was found to be 70% accurate—OK if you are sitting



Salem, N.H., is home to more than 9,000 drainage structures.

in an office chair, horrible if it's the middle of the night and you are looking for a nonexistent catch basin on a flooded street," Gannon said.

Using the nine individual watersheds in town, Gannon went to work creating cleaning routes based on DPW staffing and equipment capabilities. The 25.5-sq-mile town developed 51 unique cleaning routes. This allowed the data to be a more manageable size for the following year's basin cleaning program. The data was pushed into the VUEWorks program so that work orders could be created for all routes. Accompanying maps and any subsequent work needed on an individual structure could be attached and recorded directly to the asset.

In 2008, the Community Development and Engineering departments, in an effort to create a long-term broad-based drainage plan, hired professional consulting services company Stantec to capture missing data and perform a conditional

assessment on a portion of the town's drainage system. Stantec collected traditional information such as structure material, lining, diameter and structure geometry along with information on inverts and condition. Conditional information such as surface, casting, brickwork, structure, knockout condition and sump condition were graded on a one-to-five scale.

Due to weather, scheduling, traffic flows and the large scope of work, it took nearly two years to complete the assessment piece. The assessment piece was conducted with hand-held GPS field units that had the town's existing drainage information loaded on them. Fields were added to the drainage data for the invert, structure condition data and a general comments field. Upon receiving the data from Stantec, it was analyzed, map topologies adjusted and conflicts flagged. Stantec comments such as plugged inlet, infiltration or oily sheen also were flagged. The new data set was then added to VUEWorks.

An individual drainage asset now carries structural information, condition assessment and any maintenance history that has been linked via a work order. Other related digital documents, including scanned documents, can be linked to the asset in VUEWorks. The dissemination of this information reaches across a wide band of town departments.

Communication Connection

"Once we had quality data in VUEWorks, I could immediately see lots of ways to use the system to improve efficiency, communication, accountability and project coordination between departments," Gannon said. "I view it as a '911' communication system which goes all the way up to the town manager, who can view open work orders and view the status."

Work orders are broken down both by department and by asset. Each activity has a description: Hydrant maintenance activities might include paint, repair or replace. A tab indicates

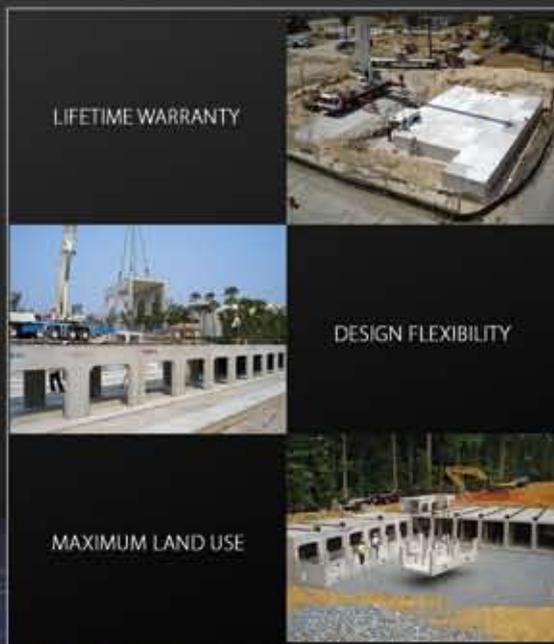
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whether a work order is a response to an emergency, a general maintenance activity or a scheduled activity. Users also can perform searches on work order activities, such as shut off or locate water ties.

“It’s important to see the asset management as a tool to get at needed information,” Brown said. “The information may not always be 100% correct, but we can update the data, make changes and improve the accuracy. It needs to be viewed as a snapshot in time as assets deteriorate, are repaired or replaced, and new assets are added. It is a continuously evolving system.”

Preventative Maintenance Payoff

Having a preventative maintenance plan is another MS4 Phase II requirement. “One of the biggest benefits of asset management is that you can see which assets need the most attention, make a plan and spend your budget accordingly. It also makes maintenance, communication about

maintenance and multi-department project coordination so much easier,” Brown said.

Twice-yearly hydrant flushing is a preventative maintenance activity made easier through coordination. Work orders can be triggered by date. A big map showing the hydrants goes on the wall, and small maps are issued for work order use.

“The Water Department will note in the original work order [that] ‘such and such hydrant is not working.’ They then create a second work order that is attached to the first work order,” Gannon said. “This provides a great historical maintenance record. Information from here is then shared with the Fire Department. That is the kind of relationship and communication you want to build between departments.”

The drainage assessment and work orders can help Salem budget, track and estimate maintenance costs. Prior to road reconstruction, Engineering Department staff can identify and cost out the number of catch basins that

should be replaced. The estimated cost per asset can be added to VUEWorks projects manager, and a projected budget can be derived. Salem currently is using a simple version of GASB 34 reporting, but eventually it may use VUEWorks to add value to repaired assets, such as pipe relining, for detailed reporting.

“The biggest hurdle with asset management is just getting started,” Brown said. “When we first started the question was, ‘Who is going to put in the data?’ The answer is, ‘We all have a piece in entering the data, and if you make it a part of your daily tasks it will become a routine process.’ We are taking the long view: We keep building, and eventually we’ll get there.” **[SWS]**

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Project Location: California
Product Used: 8’-0” DoubleTrap®
Total Water Stored: 5,486 ft³
Foundation: Stone Aggregate
Function: Water Harvesting/Detention

Project Description:

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