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Is Your Utility Prepared For A Natural Disaster?

Source: Trimble Water

Recent natural disasters and emergency events that impact utility operations run the gamut from windy, rainy, and frigid weather to wildfires, hurricanes, and earthquakes. Fortunately, an often-underutilized aspect of “smart water” technology extending far beyond automated meter reading and billing holds promise for community-wide resilience in the face of such disruptive events.



‘Houston, We Have A Problem’

While that movie-version of the original phrase uttered during the Apollo 13 mission is well recognized as a universal expression of a newly discovered concern, it was literally the case when Hurricane Harvey pounded parts of Texas with more than 4 feet of rain in August 2017 (Figure 1). Fortunately, battery-powered wireless sewer water-level measurement devices operating as part of wastewater utility systems there continued reporting vital information despite the power outages and flooding from that storm. Although those devices were not specifically designed as part of emergency-response infrastructure, utility operators familiar with their locations and capabilities devised new ways to use them as a resource for monitoring field conditions during the flood.



Photo courtesy of Trimble Water

Figure 1. Battery-powered remote rainfall gauge monitoring provides quicker insights on potential storm impacts in rapidly changing conditions, even in the event of widespread power outages.

Today, the benefits of being able to monitor sewer level and flow data extend beyond stormwater, sanitary sewer, and combined sewer operations to include the community as a whole. This makes data collection and analysis as important a factor in the management of public health and safety during natural disasters as it is in normal utility operations.

Here are three top-tier concepts to address regarding local infrastructure resilience, to evaluate its ability to support both utility operations and the greater public good in the event of a natural disaster.

1. Evaluate Your Resilience Plan

The first question to ask is whether your utility or community has a coordinated Resilience Master Plan for public health and safety in the event of a natural disaster or other emergency. If so, what role does your utility play in that plan? And to what extent are technologies such as wireless monitoring incorporated? Collaborative influences in such plans can range from utilities, to public health and safety officials, to mayors, council members, and outside consultants who advise utilities and municipalities.

- **If your utility or community does not currently have a resilience plan**, perhaps it is time to share this article and its companion article on how to prepare for your next natural disaster with top utility and community influencers who stand to benefit from an effort to prepare one.

- **If there is a resilience plan**, how up to date is it relative to new infrastructure or organizational changes made since it was originally developed? Does it incorporate the latest technologies, such as wireless monitoring? Also, how often are resilience drills run to identify gaps in planning for all the eventualities that can occur in a real emergency?

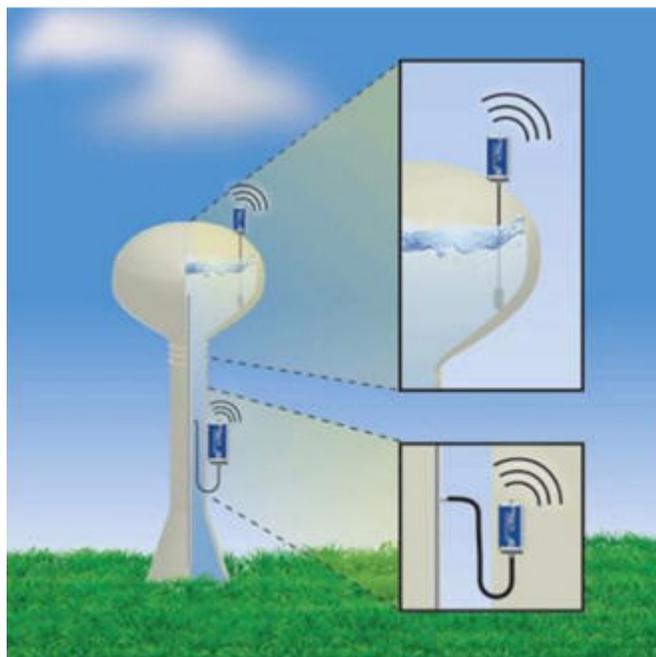
Once you know what data is available, to which people, and for which purposes, it is time to evaluate how well prepared your existing technology systems are to answer the key questions most likely to arise in severe weather events or other natural disasters. Any resilience plan review should address potential sources for the types of data needed as well as their ability to deliver that data under emergency circumstances.

2. Identify Potential Blind Spots

An important factor in utility resilience is maintaining visibility into the performance of hundreds of miles of distribution and collection pipelines connecting customers and treatment facilities. Start by defining the data collection resources you have, where they are located, what type(s) of data they can collect as a byproduct of utility system operations, and which previously identified collaborator needs that data during emergency conditions.

Once you know the readily available types of data you have, evaluate the availability and visibility of that data under storm or emergency conditions vs. normal conditions. Will the flow of data continue uninterrupted in the event of power outages or infrastructure damage caused by heavy winds, rains, fire, or flooding?

Use those answers to establish a baseline of data resources so you can start targeting gaps in your information infrastructure that need to be filled. For example, are you collecting flow data only, or are you documenting water levels and pressures as well (Figure 2)?



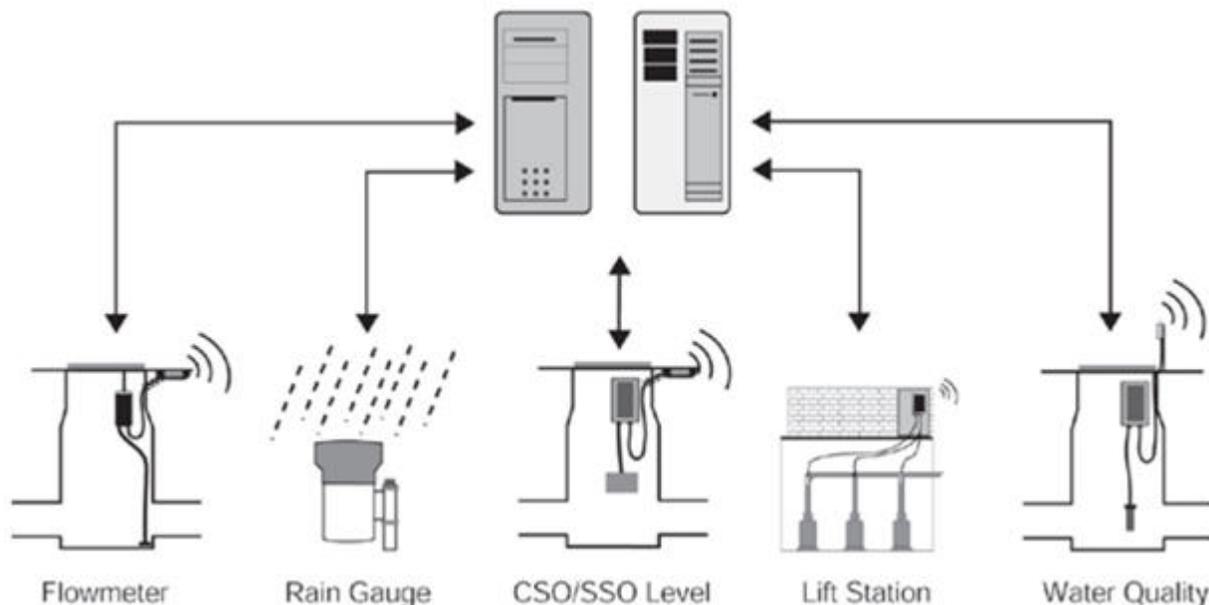
Graphic courtesy of Trimble Water

Figure 2. Remotely monitoring water tank storage by depth or water pressure provides the insights needed to manage precious resources during emergency situations.

3. Determine What You Expect In An Emergency

After identifying potential gaps in coverage between currently accessible information and the types of information needed to protect customer and community interests under worst-case scenarios, determine your expectations for a new resilience plan.

Battery-powered wireless Industrial Internet of Things (IIoT) devices offer a variety of remote monitoring capabilities that can fill information gaps in traditional and nontraditional ways. In addition to being good everyday solutions for unstaffed, remote locations, they maintain the ability to report critical field data despite power losses or restricted access during emergency conditions (Figure 3). Here are examples of how they have worked to combat storm-related combined sewer overflows, event and incident management, and timely compliance.



Graphic courtesy of Trimble Water

Figure 3. The ability to measure, record, and integrate data across a variety of battery-powered remote sensing/recording units provides timely data for identifying potential problems quickly and managing utility operations more efficiently.

Agree upon performance baselines before emergency events occur. Brainstorm with utility and community personnel on how to satisfy those baselines under extremely stressful conditions that impact water and wastewater operations, piping infrastructure, employee teams, and overall utility

and community resources. Group discussions among concerned parties during planning sessions often reveal more opportunities to be creative and innovative in using data to stay on top of exceptional events.

Finally, pinpoint priorities for keeping utility operations in service during extreme events and for getting them back to normal as soon as practical after the worst has passed. For example:

- Where are we missing the data or resources needed to operate throughout an extreme event?
- How can we identify which problems maintenance and repair crews should attack first?
- How can we identify when and where it is safe for work crews to go?

A more detailed checklist of concerns is addressed in this companion article on how to prepare for your next natural disaster