Water Utility Management Software

A Guide for Water and Wastewater Operators and Managers

Communities across the United States depend on safe and efficient wastewater and water utility management every day. Today's technology, including [Geographic Information Systems (GIS) and the Internet of Things (IoT)](#), provide essential water utility management software to help utility and plant operators do their job effectively.

Successful utility management also demands an understanding of many different realms. These include maintaining infrastructure and delivery systems, managing labor and equipment, reporting and billing, and interacting with customers.

In the past, frequent physical inspections were needed to monitor systems for problems or wait until issues, such as water main bursts, to occur, and then take necessary actions.

Field staff submitted work orders by paper, delaying critical repairs. Billing and reporting were conducted by hand. And customers received notices days to weeks later about service disruptions from water main breaks, construction, and maintenance.

Today, utility management software incorporates the latest technology, such as GIS, IoT, artificial intelligence (AI), and [Business Intelligence (BI)](). This integration enables real-time monitoring, processing, and management of many aspects of water utility and wastewater plant operations.

Cloud-based GIS data and IoT applications have transformed the way managers oversee water utility systems.

Water utility and wastewater operators must learn these new technologies and software programs to enhance operations.
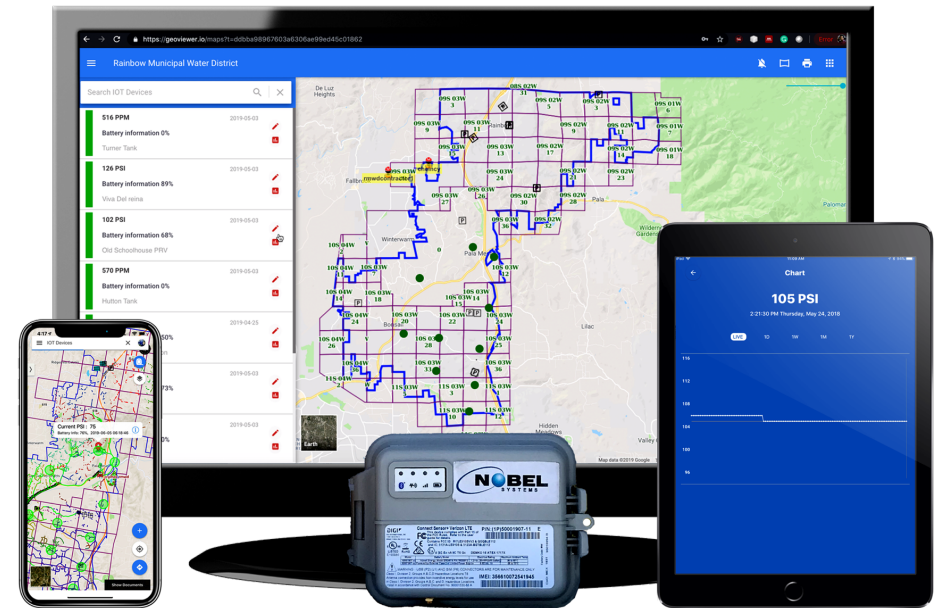
By doing so, managers can reduce costs, prevent disruptive system failure, provide safe and secure water service, communicate with customers, and save and conserve water.

This guide offers insight into the latest technologies and the newest water utility management software systems to help water and wastewater plant and utility managers better maintain operations.

What are GIS and IoT?

Geographic Information Systems and the Internet of Things are digital technological advances that impact water management in many ways.

GIS is a system that incorporates geographical information with data analytics. A GIS combines spatial data with informational data to analyze and visualize real-world situations.

GIS software can map water usage and deliver real-time data that is [essential for utility management.](#)
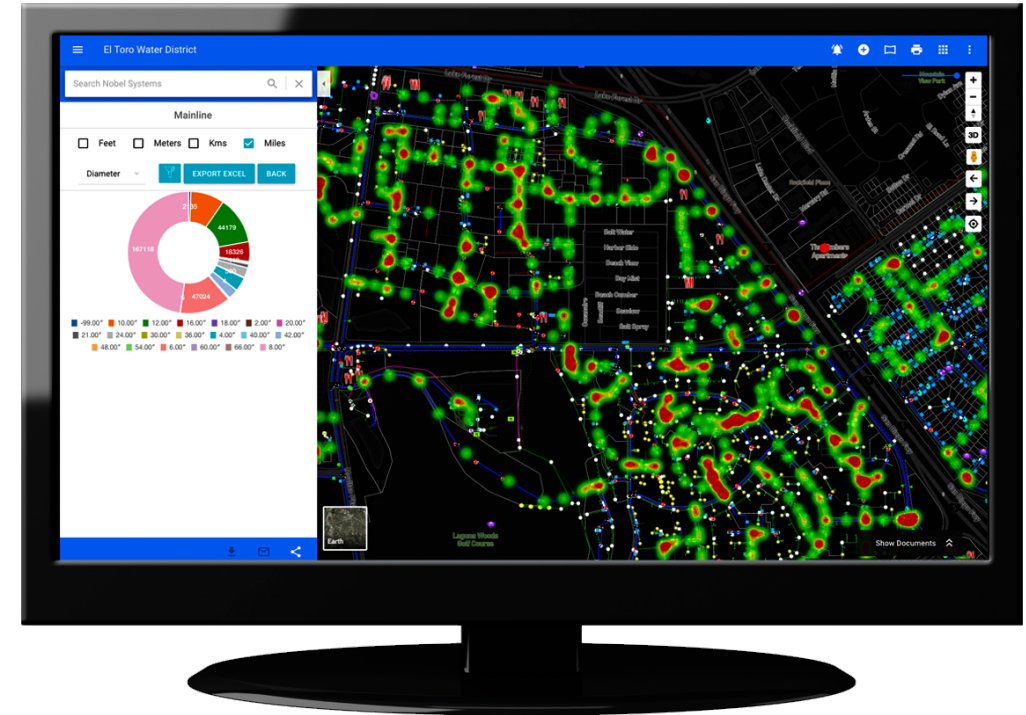
By layering historical usage data with geographical locations, GIS technology helps calculate available water, as well as the demand for water at different times of the day or week.

Using data from weather patterns and area maps, software relying on GIS technology can help predict how storms or droughts nudge water supplies.

Applications use GIS to track water usage across a system to educate staff and customers on best practices.
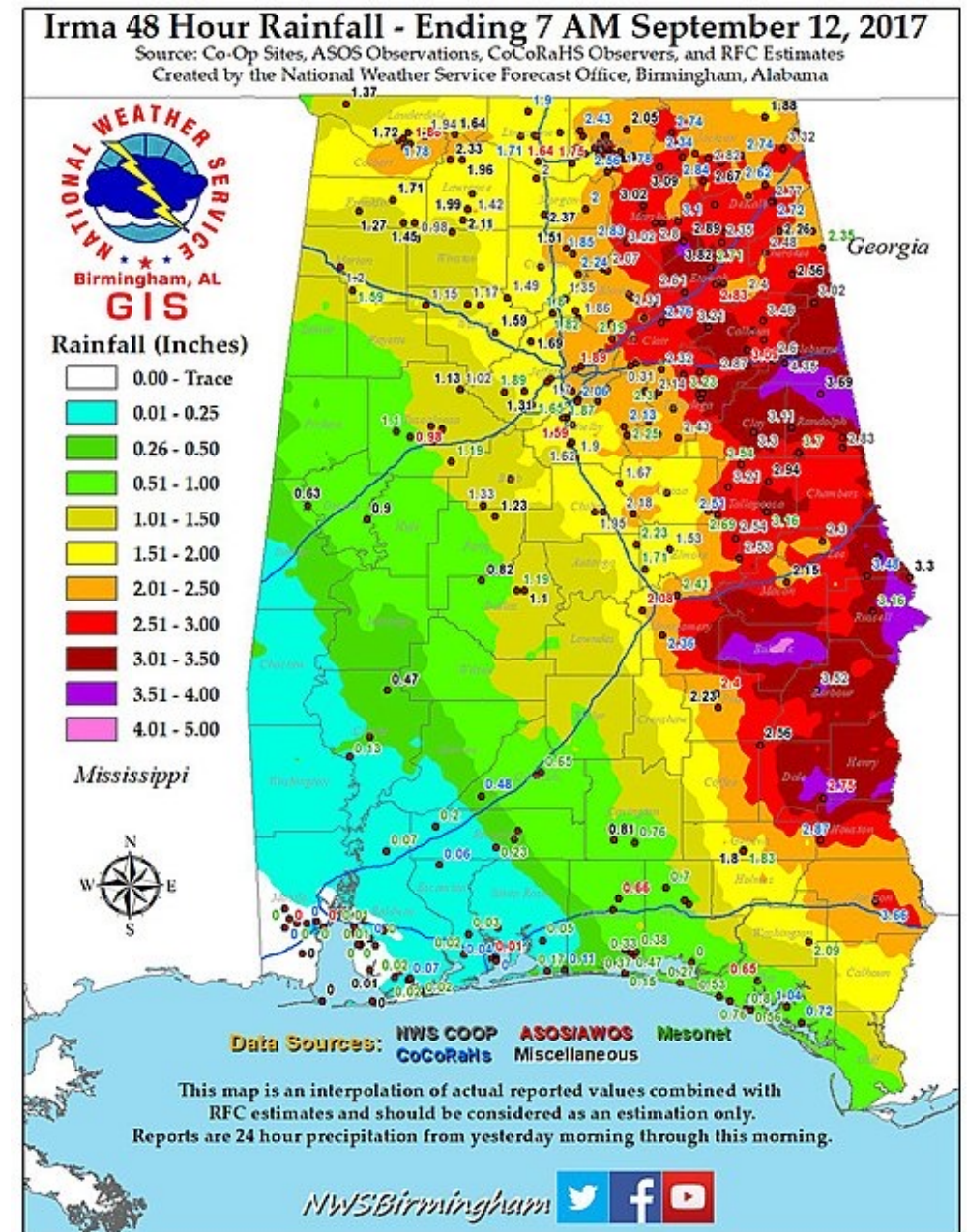

via Wikimedia Commons, National Weather Service Birmingham office

Spatial analysis and GIS maps help field staff identify, locate, and track system infrastructure to monitor for problems and plan maintenance to prevent future issues.

GIS applications also provide powerful collaboration tools, as utility managers can collaborate across regions to share data and learn from one another.

The Internet of Things involves a system of real-time digital devices and software that do not require human interaction to function and gather data.
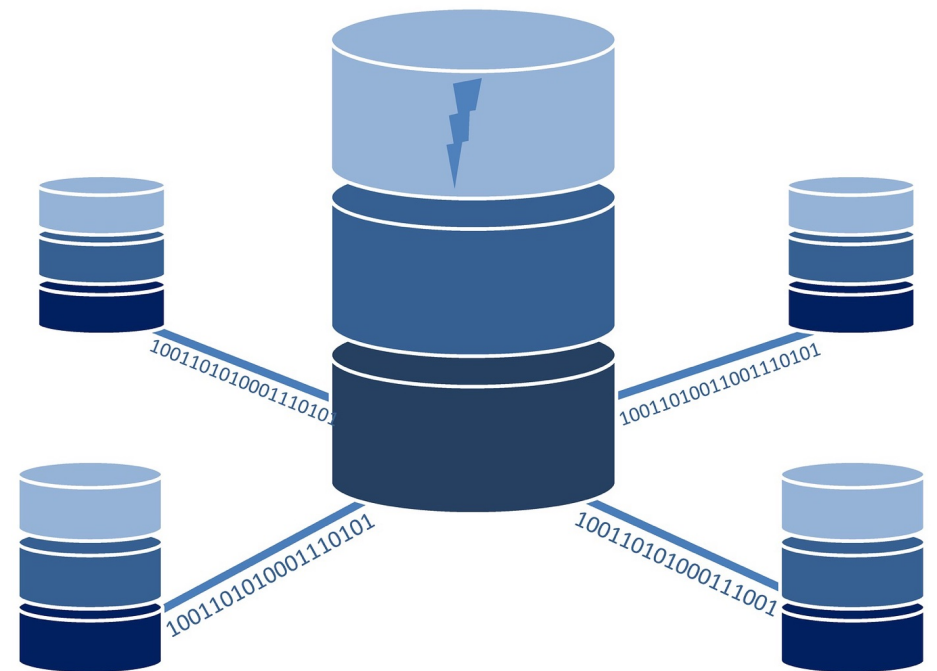
Smart meters and sensors installed in water systems track usage, water quality, water pressure levels, and shortages, then send reports to utility managers.

Both pieces of technology are potent tools for water managers. They provide an array of data that allows for real-time monitoring and maintenance, and reduces operational costs, facilitates billing and reporting, and improves customer service.

Directors of operations can also use GIS and IoT to conduct system-wide analysis, pricing, and employee deployment.

How Do GIS and IoT Technology Impact Water and Wastewater Management?

[Cloud-based GIS and IoT water utility management software provide](#) tools to better analyze a community's water usage and demand, but that's not all it.

Monitoring

As infrastructure ages, software applications incorporated with desktop and handheld digital devices help managers monitor infrastructure and systems for problematic ruptures before they happen.

Customer Relations

Smart technologies offer tools to help interact with customers and employees to raise the level of service and satisfaction from good to excellent. Staff can inform customers of any planned maintenance or water main breaks that impact service.

This amalgam of real-time utility data with spatial information helps field operators to optimize the response time with informed decisions.
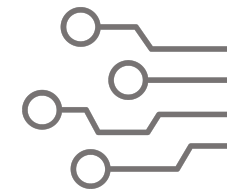
Clean Water Access

Access to clean drinking water is a high priority not just for local municipalities, but for global organizations like the [United Nations](#).

From Flint, MI, to sub-Saharan Africa, lack of clean water has caused illnesses and deaths.

With better detection methods provided by GIS and IoT, utility managers can find possible locations at risk by contaminants before they make people sick.

These tools also show detailed information on water usage, which can bolster conservation efforts in communities experiencing droughts.

There are many aspects that the latest technologies in water utility management software affect.

Maintenance and Updating Infrastructure

Conveying and treating water are the primary missions of any water utility and wastewater treatment plant.

However, aging pipes and valves can cause a host of problems.

Pipe corrosion can lead to lower water quality. Leaks, bursts, and lower water quality can all stem from aging infrastructure.

New technologies and asset management software systems can prevent some of these issues.

Technological solutions help make water utility and wastewater maintenance more manageable and less costly. By gathering critical data and getting it to the right people, software and smart sensors are transforming the ways we monitor operational systems.
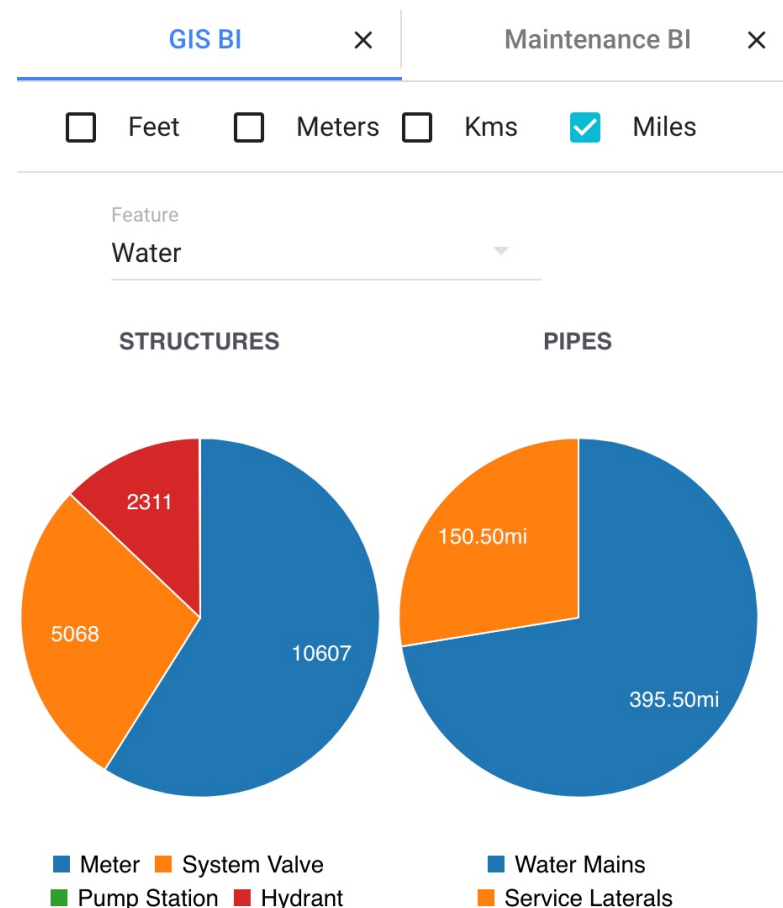
Predictive modeling is one way to prevent problems before they start.

AI and machine learning combine to map water infrastructure and plant systems, adding markers for weather and soil conditions, heavy usage, or historical issues.

Historical GIS and real-time field data are processed using the latest logistic machine learning algorithms to create an efficient model.

Modeling provides information on necessary preventative repairs before an issue occurs.

Using smart water monitoring software, utility managers can deploy smart sensors in pipes or on valves. These sensors help monitor the flow of water as well as water quality, sending alerts to a linked digital system.

These real-time sensors also save money on human resources by monitoring a system twenty-four hours a day, seven days a week, with no human interference needed.

Smart digital devices incorporating asset management software also helps monitor water pressure and leaks. These IoT gauges can control water pressure, alternating on and off during peak and low usage times.
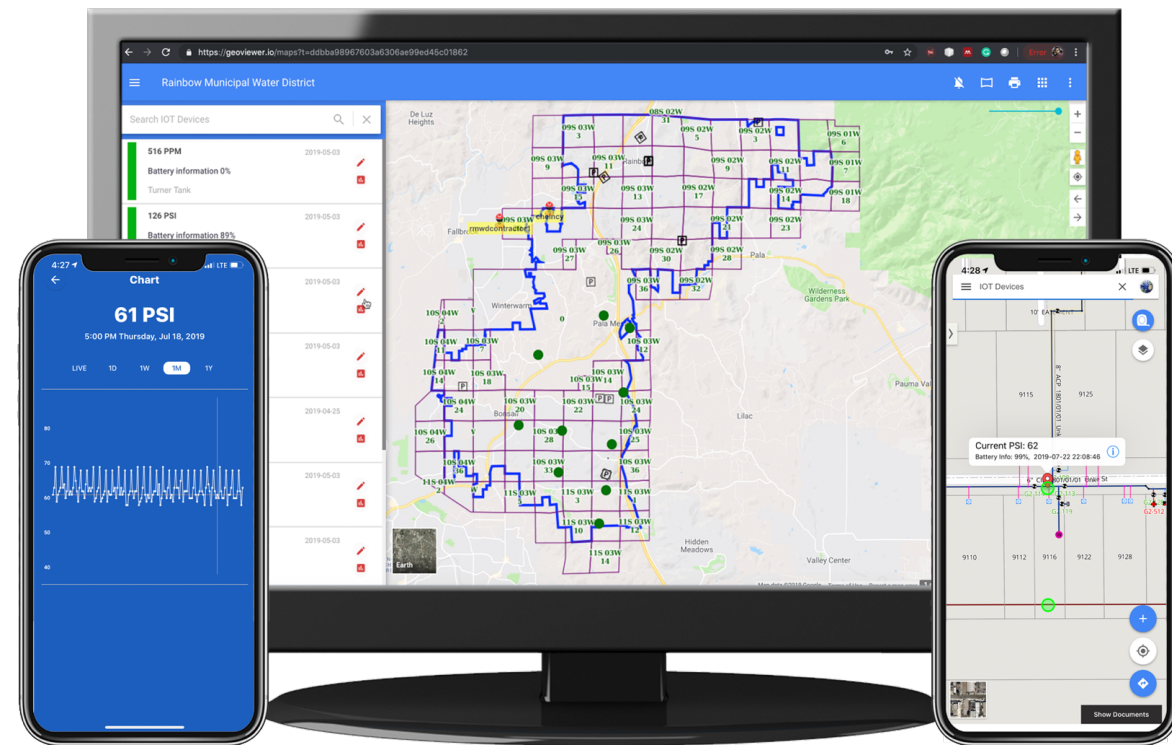
All of these data-driven technologies are revolutionizing the way utility managers monitor, maintain and repair current infrastructure.

Billing and Customer Relations

The reality is that we live in an information age. Consumers want as much information as possible so they can make information-supported decisions.

This desire for data also applies to water utility customers. Water users want to know about water quality, pricing, billing information, and any current or potential problems or disruptions.

GIS and IoT technology allows utility and treatment plant managers to share real-time data with customers.

Tools that incorporate cloud-based data and smart technology provide information to the community quickly, providing greater transparency and therefore building trust.

An example of such technology is Nobel Systems' [GeoViewer Billing Module](#).

Staff can create service requests and customize bills directly from the field by using the mobile application.

The cloud-based utility management software also enables staff to record payments directly on the GeoViewer Billing mobile or desktop application.

Using IoT, GeoViewer syncs information in real-time between the field and the office.

This technology, deployed in the hands of customer relationship managers, is also a powerful tool for better service.

The "faces of the organization" who interact with customers daily also need access to data that makes them knowledgeable and capable.
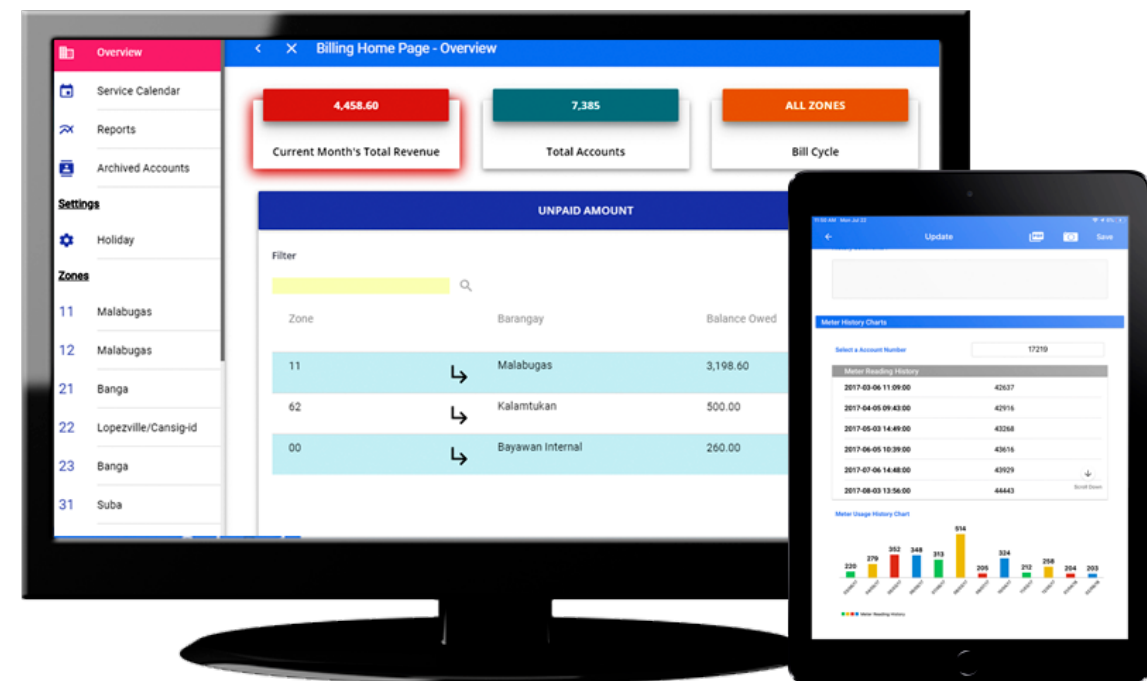

GeoViewer Billing

Other tools that incorporate GIS and IoT technology enable community members to obtain and submit real-time data and information from front-facing, downloadable applications.

The City of Huntington Park uses GeoViewer Citizen software that allows the public to report issues such as potholes, graffiti, missed trash pickups, and more.

Once a report is submitted, a work order is automatically created. City staff can review and respond to issues using the application and notify users when a problem is resolved.
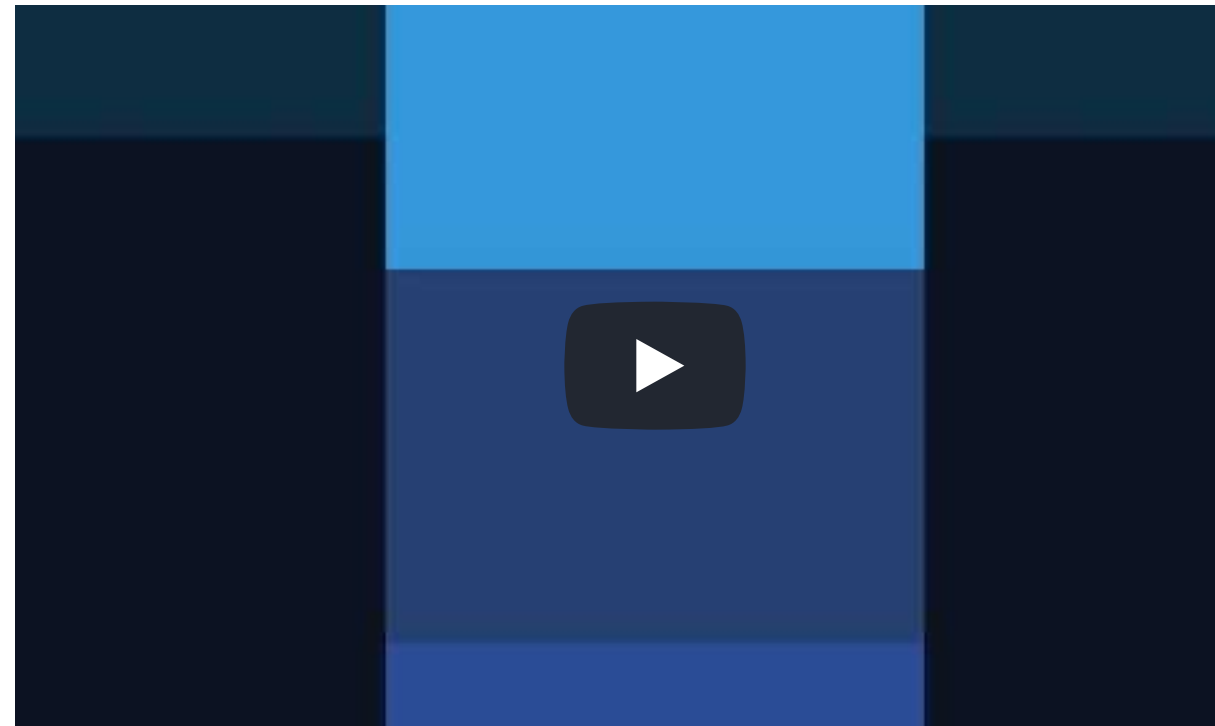
Watch how GeoViewer Citizen works.

Finally, smart technology and better online presence allow customers to access their information when they want. Having access to smart maps online engages customers and makes a utility a better community partner.

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Utility Operations and Management

In addition to maintaining the public's access to clean water, utility managers face many other challenges, including operational, budgeting, and human resources tasks.

Utility and treatment plant employees range from administrative to technical to engineering realms, and operators must manage them all.

GIS / IoT technology can help cut costs while also providing powerful employee development tools.

Business intelligence tools help managers anticipate issues before they become disasters, giving extra planning and analytical tools that are crucial to today's utility management.
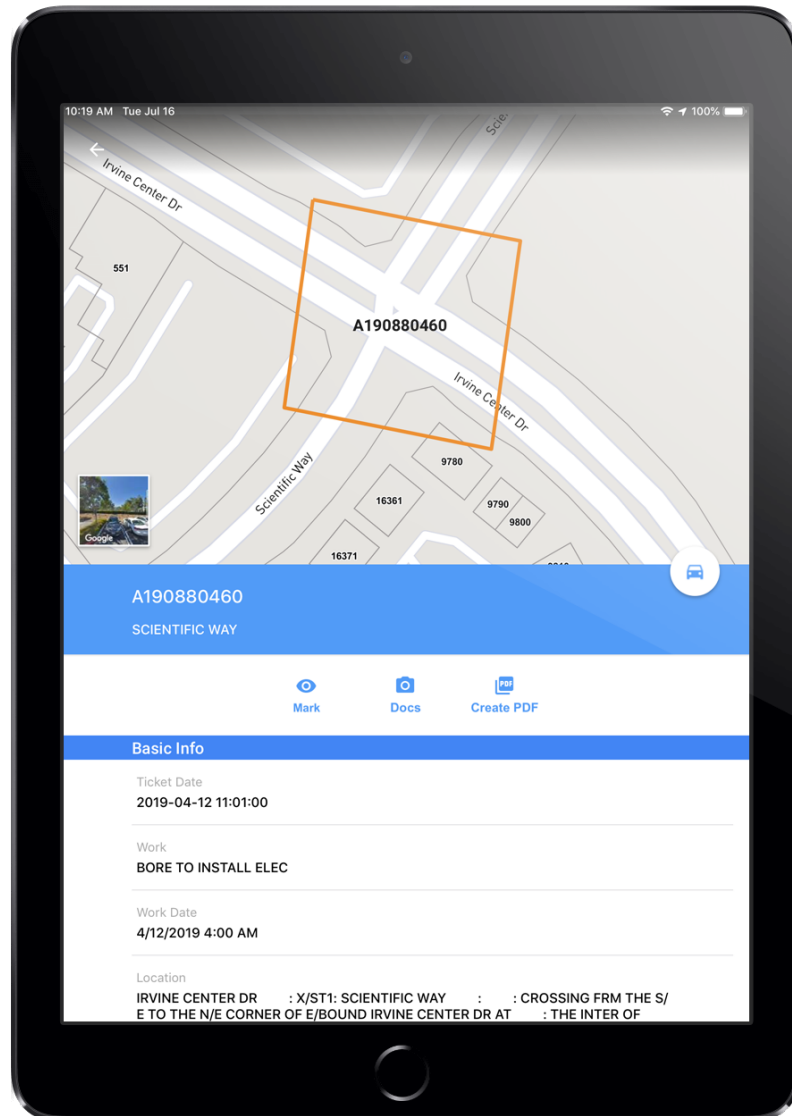
[Digital tools can simplify the process](#) of tracking reported issues and sending out crews. By centralizing data, these tools help managers avoid costly mistakes of sending too many workers — or not enough — to fix problems.

These applications also help field staff document work and instantly update managers on completed tasks.

GIS and BI are vital to successful water utility and wastewater management today

Water Monitoring and Management

Communities around the world face more frequent and persistent droughts year after year. At the same time, the demand for clean water is expected to increase one-third by 2050. Smart solutions must be employed to face these issues.

IoT platforms provide monitoring, conservation, and diversion facilities to address some of these problems.

Smart water monitoring systems help predict where issues may form, including leaks, drastic pressure changes, or spikes, while also indicating where water and energy can be conserved during low-demand times.

Another boon from IoT is its ability to integrate stakeholders into the process better.

Water utilities do not exist in a vacuum; they rely on effective partnerships between local governments and energy and land resource managers. IoT shows us a way to democratize information and smooth over potential conflicts between all levels of private and public organizations and government.

To ameliorate water shortages, all community members must get involved. Technology can help bring all parties to the table and obtain solutions to this serious issue.

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Security Issues

Another severe problem facing utility managers today is security. Threats now come in multiple forms. Physical plants may be targets of attacks, and business and customer data are also vulnerable to hackers.

As information moves into the cloud, managers must pay attention to digital security. Cloud computing can provide fast and reliable tools, but it can also be a weakness exploited by cybercriminals.

Thankfully, the means to protect data are becoming more powerful to meet and vanquish these threats.

Utility managers can use GIS and IoT to monitor the safety of physical inventory. These tools provide alerts when any unforeseen changes take place in the system, allowing a quick response time.

Unfortunately, threats come from more than just humans.

Unfortunately, threats come from more than just humans. Natural disasters also threaten the health of utility systems. Forest fires in California and flooding in the southern United States have wreaked havoc on utilities.

GIS is particularly suited to address these issues. The ability to map historical data to create predictive maps allows managers to plan for staffing and materials.

Having emergency plans in place will help mitigate the effects of these disasters on our communities.

Creating an ERP, Santa Fe Wastewater Treatment Plant

What's Next for Water Utility Management?

Ultimately, the goal of water utility and wastewater treatment plant managers and operators remain the same—to maintain the community's access to clean, safe water.

This job is of utmost importance for cities and towns across the nation.

As technology grows more powerful and smarter, managers will have better tools at their disposal.

However, this means utility managers and operators need to stay on top of new technologies and GIS / IoT asset management software systems to understand how best to use these critically essential tools.

Some ways to do this are to create digital enhancement plans and committees to steer their implementation.

Case studies will continue to assist as ways to make smart technology and tools even better.
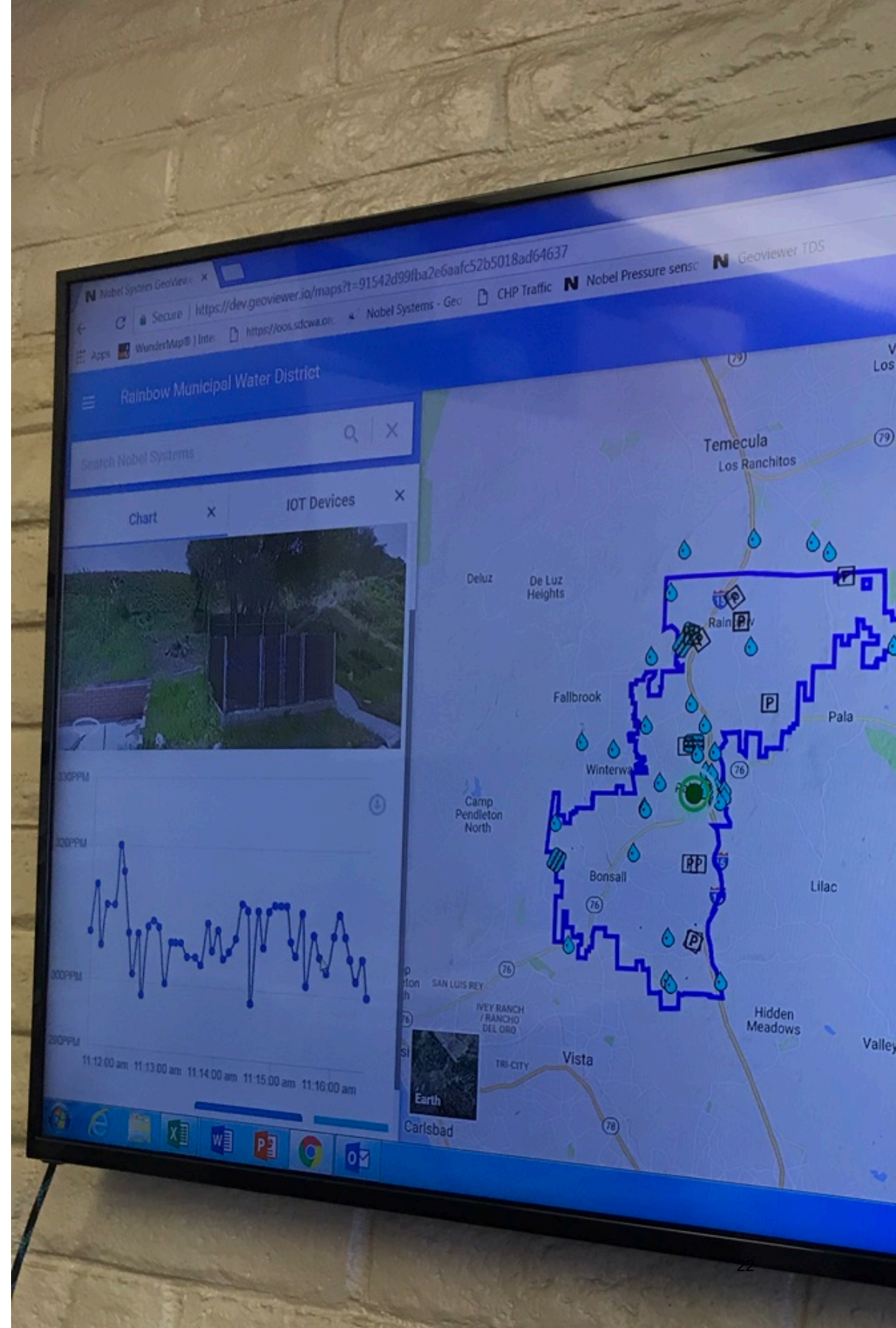
We Can Help

Nobel Systems has decades of experience in Geospatial Services, Software Engineering, Cloud Technology (SaaS), and Software Integration.

We develop software and digital tools for water utility and wastewater management.

We are here to consult with your utility decision-makers on ways to improve your access to information and utility management software.

Don't wait for a problem to occur. Contact us today to get your plans in place.
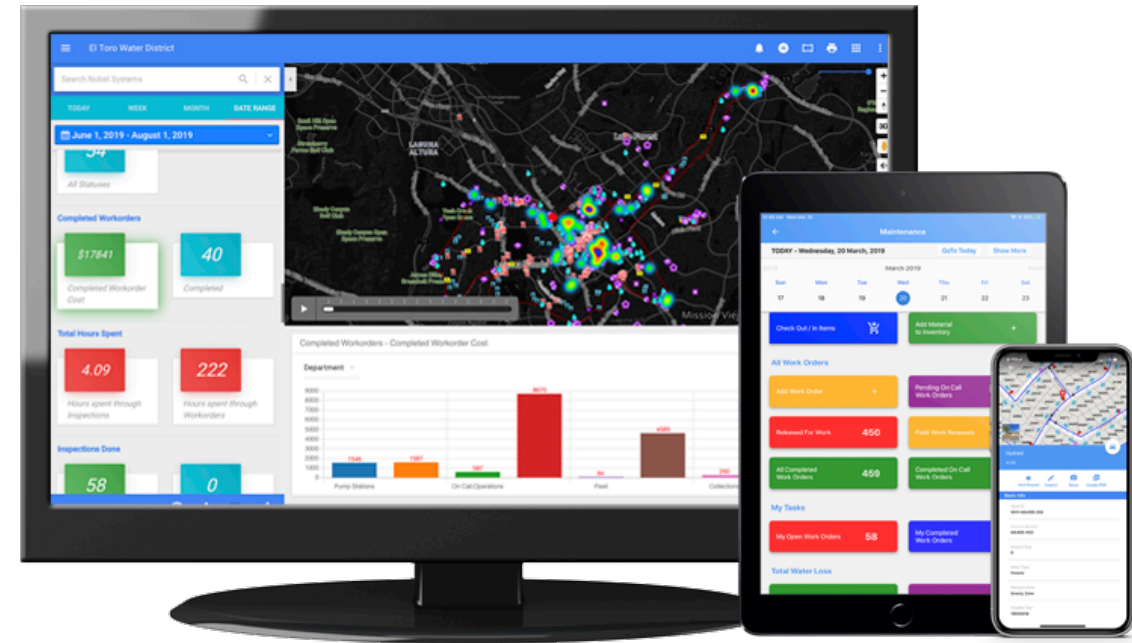
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