

Esri News

for State & Local Government

Spring 2020

In Baton Rouge, Dashboards Give Citizen Service Calls Perspective

As one of the fastest-growing metropolitan regions in the United States, Baton Rouge, Louisiana, has been described as a midsize city with big-city problems. The Louisiana capital faces significant challenges including traffic, violent crime, and severe weather events.

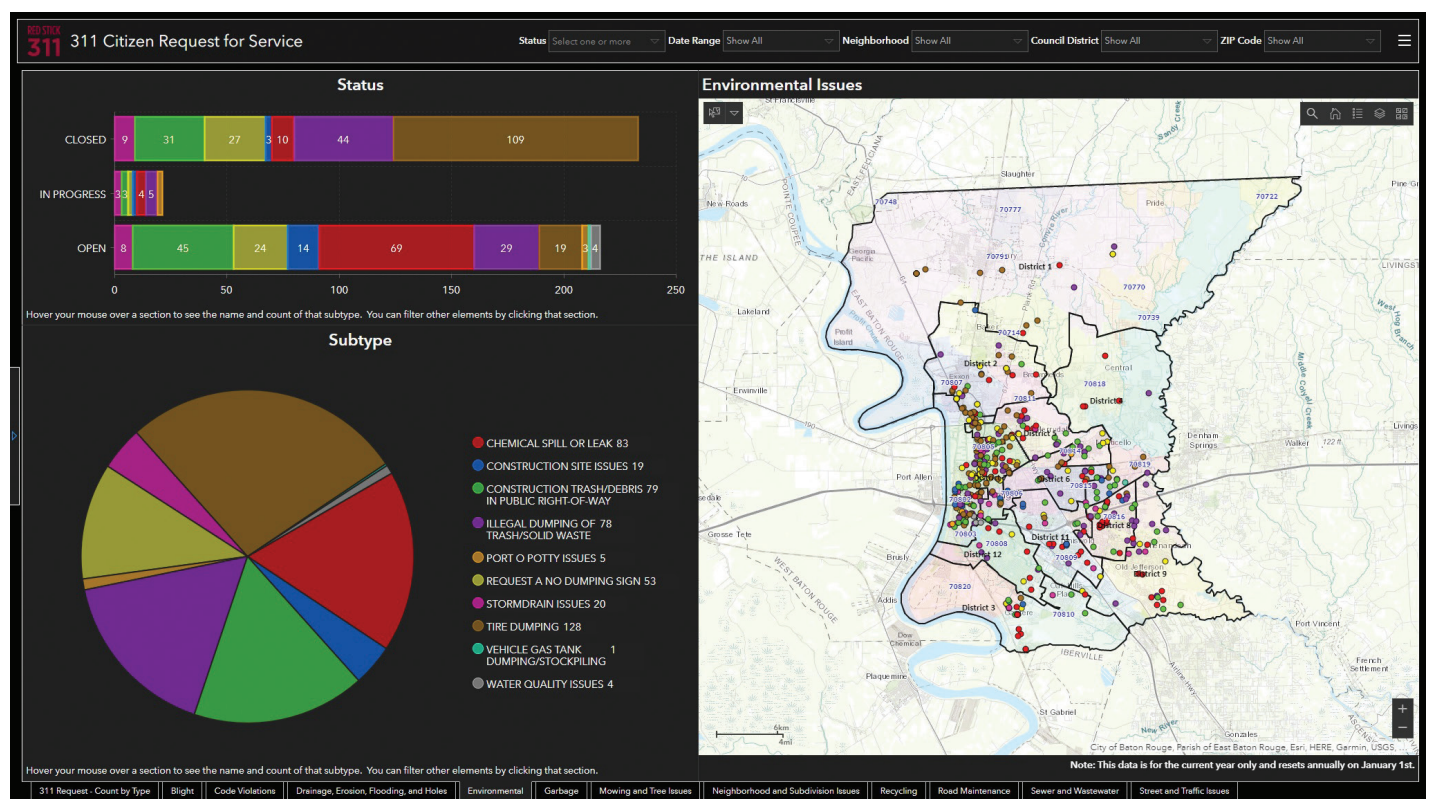
The information services (IS) department at the City of Baton Rouge-Parish of East Baton Rouge delivers IT services and technology to create a more effective and responsive government for the city's expanding population. Recently, the IS department helped city officials take on a significant challenge: improving how service requests from citizens are handled.

"Our vision for our GIS program is to extend GIS and its capabilities to benefit not only our local government but also our entire community," said Warren Kron, the GIS manager for the City-Parish IS department.

Envisioning a Better Way to View and Share Data

The GIS team within the IS department consists of nine GIS staff members who support all City-Parish agencies with a variety of requests, from administering surveys and performing data analysis to making custom maps. With an increasing number of citizen service requests coming in, city officials asked the GIS

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↑ Data can be filtered by type of 311 request, neighborhood, request status, data range, council district, and ZIP code.

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Innovating with Data

By Brent Jones, PE, PLS, Global Manager, Land Records/Cadastre, Esri



We live in a data-crowded world. In his book *Information Anxiety*, Richard Saul Wurman has claimed that “[a] weekday edition of the *New York Times* contains more information than the average person was likely to come across in a lifetime in 17th-century England.” A quick check of the hard drive on my work computer shows

that I have about 100 gigabytes of my own data. I’m not sure what all of it is or how many files are duplicates and junk, but that’s what the Properties tab says. We have access to terabytes and petabytes of data to do our work.

What do we do with all this data? Plowing through it can take an inordinate amount of time. How do we make balanced, data-based decisions quickly?

One thing can help us: Location. It is commonly held that 80–90 percent of data has a geographic component or location. We often think of innovation as a new gadget, tool, or application, but innovation comes in many forms. There is incredible value in innovating with new thinking, analysis, and visualization using existing geographic information system (GIS) tools that you may have overlooked.

Powered by services and easy to configure, Operations Dashboard for ArcGIS is an often-underutilized GIS tool. Dashboards gather and distill data quickly into charts, graphs, and maps that enable rapid visualization and analysis of disparate data and deliver information at a glance. Emergency responders use dashboards extensively to combine data from different organizations in real time and inform their decisions. Not only can dashboards help make rapid decisions, they can also add new information for more complex decisions and monitor ongoing work in your organization. In either case, dashboards let you react more intelligently to changing circumstances.

ArcGIS Insights delivers more in-depth analysis, leveraging your spatial data and enterprise data in one app. You can study your data visually and use location, maps, and analytics in near limitless ways to extract information from your data. For example, maybe you want to understand the change of

cost per square foot of property based on its distance from a city park. Also powered by services, Insights is easily configured to meet specific analytical and visualization requirements to uncover trends, patterns, data issues, outliers, and much more. Insights—along with Operations Dashboard—incorporates the analytical capabilities of ArcGIS.

We’re swimming in a sea of data. Most of that data has a location or geographic element that often goes unused. We’re not all GIS experts, but because both Operations Dashboard and Insights are designed for the non-GIS user, these tools can unlock the information in data by leveraging analytics and visualization that deliver new insights and produce better decisions, enabling smarter communities. Giving managers and many others in your organization access to these powerful tools enables innovation. Successful organizations are known for innovation in its many forms.

Let’s Innovate!

Let’s look at our data in different ways using GIS tools that help us make better decisions faster.

With GIS, we can quickly see what our data is trying to tell us. We can See What Others Can’t.

To read more of Brent Jones’s blogs on innovation and land administration, visit go.esri.com/BrentPosts.

About the Author

Brent Jones oversees Esri’s worldwide strategic planning, business development, and marketing activities for land records, cadastre, surveying, and land administration. As a recognized innovator, Jones specializes in modernizing existing land administration systems and designing new GIS-based cadastral management systems for small and large governments globally. He is a past member of the URISA board of directors; past president of the Geospatial Information and Technology Association; and a current member of the United Nations Committee of Experts on Global Geospatial Information Management, sitting on the Expert Group on Land Administration and Management.

From Worksheets to Smartphones: Bringing Stormwater Management Up to Speed

By Sarah Hunn, Deputy Director, and Tamara Freihat, GIS Analyst, DuPage County Stormwater Management

Located just west of Chicago, DuPage County is the second largest county in Illinois. Since 1950, DuPage County experienced a 500 percent increase in population, with agricultural land being replaced by suburban sprawl. As a result of this rapid urbanization, DuPage became subject to both local and riverine flooding.

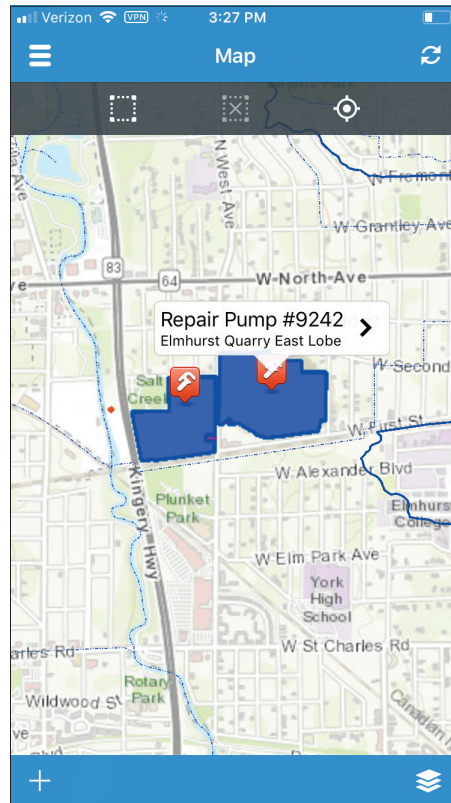
In response to a devastating flood in 1987, the Illinois legislature granted DuPage County the authority to create a regional stormwater management program. The mission of DuPage County's Stormwater Management Department (SWM) is to mitigate the effects of urbanization on flooding as well as protect for future impacts.

Challenge

SWM owns, operates, and maintains 17 flood control facilities, 17 drainage facilities, and nearly 200 lots. SWM also monitors more than 300 natural area sites annually. For many years, SWM relied on weekly written flood control facility inspections, as well as verbal and electronic work orders, to maintain assets. As a result, some items were falling through the cracks—both figuratively and literally.

In 2015, SWM and DuPage County's GIS Department implemented Esri Citizen Problem Reporter, a configuration of the Crowdsense Reporter application that allows the public to report nonemergency problems from a smartphone, tablet, or computer.

Residents now use Citizen Problem Reporter to submit nonemergency waterway issues—such as illegal dumping, stream blockage, stream erosion, and other water quality problems. The app helps staff quickly identify and address issues, leading to faster and more efficient responses.



↑ This mobile view of a work order shows that a repair is needed at a pump at the Elmhurst Quarry Flood Control Facility.

SWM also needed a system to handle all the assets the public could not see.

"We needed to connect all of our divisions, staff, and assets," said Anthony Charlton, director of the Stormwater Management Department. "So we started looking for a technology that could help us improve asset management, track projects and productivity, perform cost analysis, minimize risk, and be better prepared for emergency events."

Solution

In February 2018, SWM began the implementation of the Cityworks GIS-centric asset management system. SWM built an accurate inventory of all its assets, which were then mapped and stored into an

ArcGIS database. Cityworks professional services staff configured custom templates that included work orders, service requests, and inspections collected during their analysis of SWM's workflows and day-to-day activities. In April, SWM went live with Cityworks.

Result

Data mobility is one of the biggest benefits of the new system. The Cityworks mobile native app allows SWM field personnel to conduct routine maintenance inspections without the need for paperwork. While on-site, personnel can access and update their tasks, generate work orders, and add attachments in real time. The interactive map interface empowers field crews to improve their efficiency by selecting work activities in the same geographic area.

SWM is working with DuPage County's GIS Department to integrate the Esri Citizen Problem Reporter app with Cityworks, allowing for a seamless transfer of data and attachments from incoming resident reports. This integration will help streamline the workflow from initial service request to associated fieldwork and final decision-making. Whether it comes from a citizen report or an automated maintenance reminder, Cityworks and ArcGIS will be the one-stop shop for SWM.

Power | Water | Wastewater | Streets | Buildings | Traffic | Safety | Emergency | Airports | Business Services

SMART RESPONSIVE RESILIENT SAFE



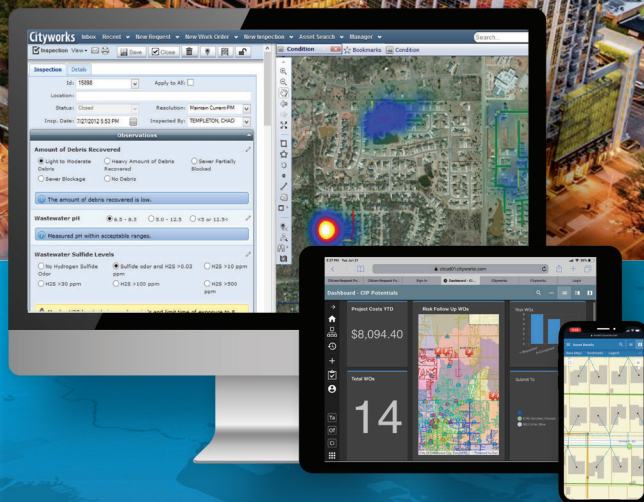
EMPOWERING GIS INTELLIGENCE

In an "always on" world, local municipalities and utilities are leading a digital transformation by implementing GIS as a smarter foundation to managing their infrastructure and business services.

Built exclusively on the Esri® ArcGIS® platform, the Cityworks enterprise asset management platform helps communities successfully improve management of their public assets and business services—improving civic engagement and economic development.

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team for a better way to manage and view the large amount of associated data.

The GIS team worked with programmers to spatially enable the 311 call data, which includes resident-reported issues such as potholes, grass that's too tall, and missed solid waste pickups. But the real challenge involved developing a comprehensive solution that would simplify how city officials displayed the data in a desktop app to communicate this information in public meetings.

Moreover, the GIS team wanted to come up with a better way to relay any associated open data to the public. The City of Baton Rouge has executed a strong open data initiative to increase transparency: the IS department has published hundreds of datasets for the public. The GIS team wanted to enhance the open data user experience by providing location-based information along with easy-to-use filtering tools to help residents answer their own questions when possible.

“Most citizens or policy makers may not be familiar with GIS data. The 311 dashboard provides a broad overview but then allows users to easily filter the data to see what is meaningful and relevant to them. It’s an easy system for users whose GIS knowledge varies widely.”

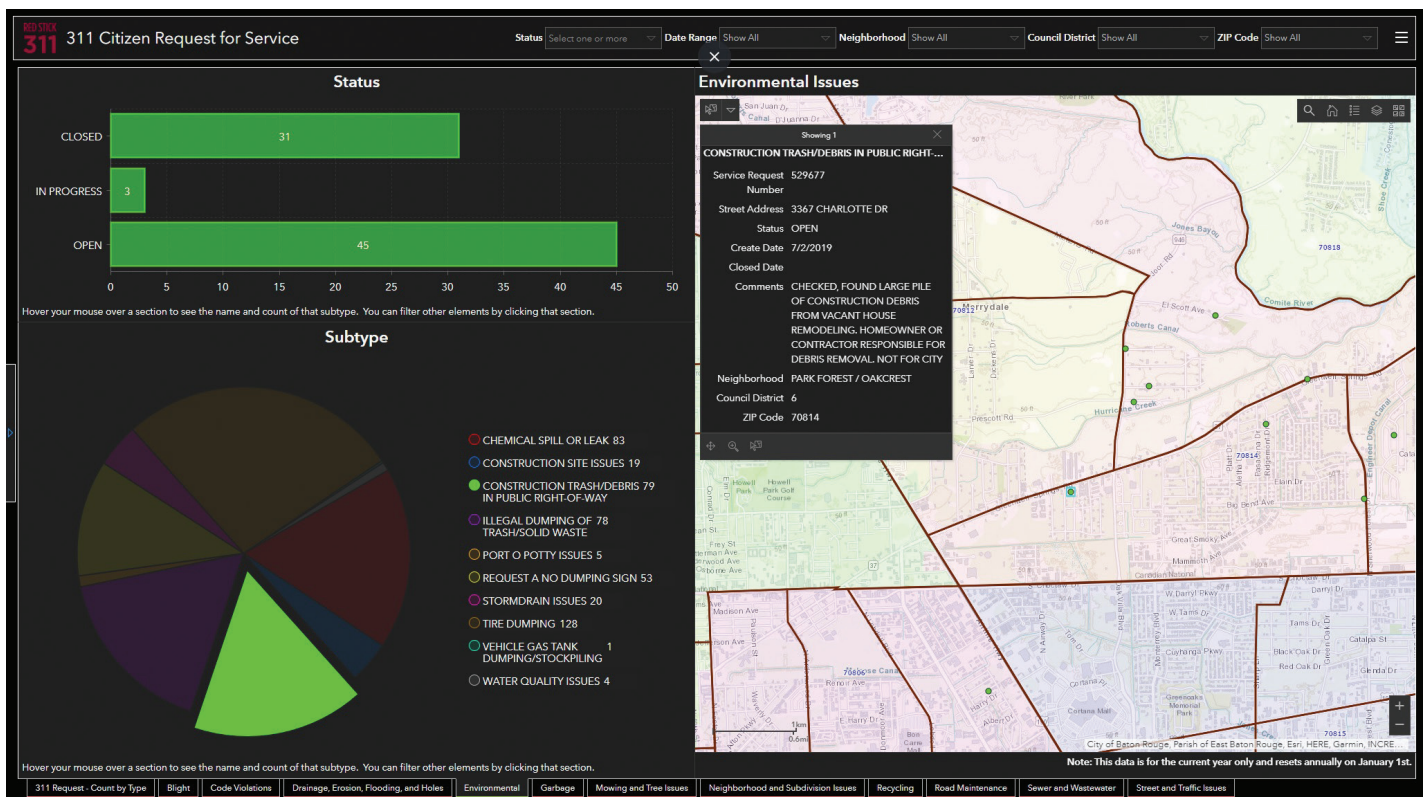
Brandon Jumonville,

Senior GIS Analyst, City of Baton Rouge-Parish of East Baton Rouge

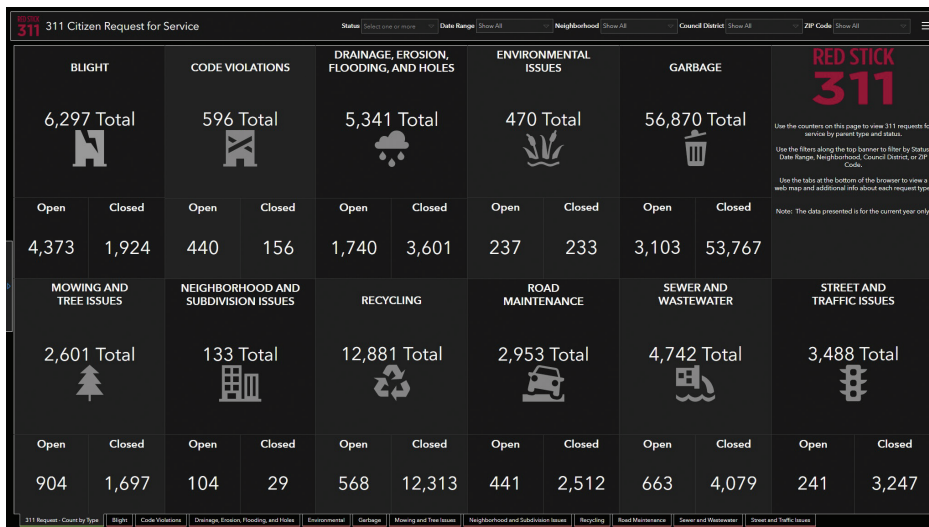
Dressing Up a Database and Making It Interactive

After examining other data management solutions, the GIS team decided to create a dashboard using Operations Dashboard for ArcGIS. The IS department initially began using the tool for emergency operations and response but pretty quickly recognized its potential to support other business workflows, such as 311 data visualization and analysis. It would allow the GIS team to aggregate numerous datasets and display the information in a single, dynamic dashboard.

The 311 dataset provided by the IS department comprises all service requests received from the City-Parish 311 call center, including ones made over the phone, online, and through the 311 mobile app. Reports to 311 are recorded in a database and then transferred to the IS department’s enterprise GIS database for analysis. The GIS team took this tabular data, spatially enabled it, and created a 311 dashboard that now presents the information in an easy-to-read format that combines interactive maps, pie charts, and bar graphs.



↑ When users select a pie slice related to a particular subtype, the parent category’s map updates.



↑ Upon launching the 311 dashboard, users see a count of all open, in progress, and closed tickets organized by parent category, such as blight, code violations, and drainage.

When users open the 311 dashboard, the initial view displays a count of all open, in progress, and closed tickets by parent category, such as blight, drainage, and transportation. Users can then apply filters to view data by neighborhood, type of 311 request, request status, date range, council district, or ZIP code. When users select a pie slice related to a particular subtype, the parent category's map updates. Selecting an individual service request provides users with detailed information related to the reported issue.

"Our dashboards are powerful, but they're driven by the hard work of [the] information services [department], who [take in] and manage data," said Brandon Jumonville, senior GIS analyst with the IS department. "The meaningful data in Operations Dashboard for ArcGIS will help inform decisions and inform the public."

Seeing the Whole City, Then Relevant Areas

From increased transparency to improved communication, the GIS team and IS department as a whole have seen significant benefits from using Operations Dashboard. Jumonville said that the ability to graphically and visually provide information to stakeholders and the public has made a more meaningful impact, as it is much easier for people to understand the 311 information and

what's occurring in their city. Previously, data was only available in tabular format.

"Operations Dashboard for ArcGIS gives us the power to extract data, process it, and communicate it in a way that's easy to understand," he said. "We now have the opportunity to get the information out across a wide variety of disciplines and organizations."

"Operations Dashboard for ArcGIS lets us take our open data and present it in a new, more useful way for city officials, law enforcement, and the public," added Kron.

The filtering capability in the 311 dashboard has improved the user experience, allowing users to view only the information they want. And with the maps, users can simply find and select service requests around a particular area to view associated information without having to search thousands of records in a table.

"I think that's the power the dashboard provides. Most citizens or policy makers may not be familiar with GIS data," said Jumonville. "The 311 dashboard provides a broad overview but then allows users to easily filter the data to see what is meaningful and relevant to them. It's an easy system for users whose GIS knowledge varies widely."

Another benefit of the 311 dashboard is that there are enough basic analytical tools for users to employ to answer spatial questions on their own without

having to request the GIS team to analyze the data.

"Operations Dashboard has rapidly evolved from when we initially started using it. We have basically automated the work of an analyst using this tool," said Kron. "It's made it easier for our GIS analysts to configure our data in a user-friendly format."

Uses for Operations Dashboard Get Expanded

Citizens have responded positively to the platform as well. According to Kron, when the IS department presented the dashboard to neighborhood groups, city residents were amazed that so much information was available to them for free.

"[It's been a] win-win for us and the public," said Kron. The dashboard has helped the local government increase transparency and build public trust.

Neighborhood associations are now using the 311 dashboard to provide details on what's happening in their neighborhoods, and local universities are employing the open data for research. Other organizations are creating additional dashboards with the data, too, including several for the Public Safety Common Operational Platform, also known as PSCOP. This secure ArcGIS Online platform gives law enforcement personnel access to near real-time data and helps them identify crime trends and patterns as well as keep better track of officers in the field.

Overall, the promising uses of Operations Dashboard for Baton Rouge are expanding rapidly.

"Operations Dashboard for ArcGIS has given our city access to information, increased data sharing and transparency in our operations, and provided different toolsets for people that never had [them] before," said Kron. "We are excited for all the possibilities moving forward."

For more information on how to replicate City of Baton Rouge's workflow to track citizen service call requests, visit go.esri.com/BR-OpsDash.

Colorado Department of Transportation— Esri System of Engagement

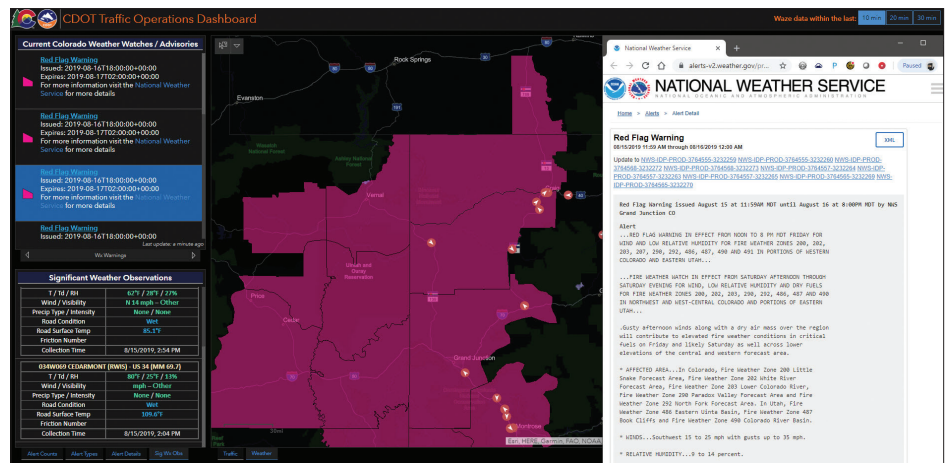
The Colorado Department of Transportation (CDOT) is charged with maintaining road infrastructure and—most importantly—improving safety and the journey experience of travelers. CDOT’s vision to enhance the quality of life and the environment by creating an integrated transportation network is key. However, like other state Departments of Transportation (DOTs), it also has to contend with budgetary constraints and the expectation that more be achieved with less.

In 2017, CDOT officials took steps to address this apparent conflict. Realizing that knowledge truly is power, as well as a potentially significant money saver, they took a considered look at how the assets within their purview could be made to work smarter rather than just harder.

A new position, chief data officer (CDO), was established. In standing up a CDO, CDOT sought to give a strong, sustainable foundation to its future data needs. As almost everything about transportation is related to location, GIS specialist Esri was chosen as the close working partner to create a new system of engagement (SoE).

Location Intelligence Led

The Esri ArcGIS solution underpinning CDOT’s data effort enables several things. ArcGIS facilitates seamlessly bringing in information from many sources and providers into a single place. The resultant, tightly integrated and extremely rich information source can then be accessed and viewed simply and quickly via common browsers and



↑ By using Esri’s ArcGIS, CDOT is able to draw on information from a variety of external sources as well as its own sensor networks.

applications, offering unprecedented levels of detail.

Individuals with the appropriate permissions can draw on, use, add to, or otherwise influence information from across their organization, not just data generated or owned by their own departments. The consequent removal of institutional barriers results in performance improvements across the board.

“Historically, many of our field personnel’s investment recommendations were based on anecdotal evidence—their ‘feel’ for what was going on. Now, decisions are much more intelligence led. As an example, because we can overlay detailed information on specific weather events and actions that were taken, we know precisely where snowplows have salted the roads. We can gain a far better idea of the likely locations of pavement deterioration caused by chemical processes and where we might need to intervene. We’re shifting to a

more proactive stance in infrastructure management and advancing operational excellence,” says Joshua Laipply, CDOT chief engineer.

Aside from improving processes from an asset management perspective, CDOT is also working to bring in sensory elements that will improve its real-time and predictive traffic and incident management performance. This includes drawing on information gathered and shared by first responders, tow trucks, the automatic vehicle location systems on winter maintenance vehicles, and so on. Data availability will increase exponentially once connected and autonomous vehicles (CAVs) become more prevalent.

A New Perspective

“The new Esri SoE is a highly effective way of working,” says Barbara Cohn, CDOT chief data officer, senior consultant. She sees the ability to so readily prove and

support good business use cases as critical to CDOT's continuing development and success.

Cohn notes especially the ability to draw on information from disparate sources, including those from outside the organization. To complement its traffic management operations, CDOT worked with Esri to access streams from private sector providers such as Waze and HERE. By working with Esri, it is also possible to look further into the future—overlaying mapping information for new property developments, freight movements, demographics, and more enables their effects on traffic patterns to be predicted and effectively managed.

"By using the common language of geography, we're really getting down to the 'what, how, and where.' And because we're continually enhancing content and bringing in additional data, we're enjoying unprecedented accuracy," says Cohn.

In terms of avalanches, 2018 was a record year. Portions of the state's highways and roads are in the direct pathway of avalanche-prone areas, so monitoring these locations is critical to keeping commuters on the move and safe.

"We needed a way to track which avalanche paths were most likely to cause disruption. We also needed to know where to plant and, if necessary, recover explosives," Laipply explains. "By using the app, our field operatives no longer have to carry with them 10 years of handwritten notes. Via a smart device, they have all that information at their fingertips and know exactly where to plant or aim explosives or search for expended ordnance. Our reactions to events are far faster and more effective."

"A big plus of the SoE is that it's fast—we can have an initial version of an app ready in just a couple of weeks, or we can scrap failed ideas without significant cost. That means there's no reason why we can't create 40, 60, or even 80 apps to help people do their jobs," says Cohn.

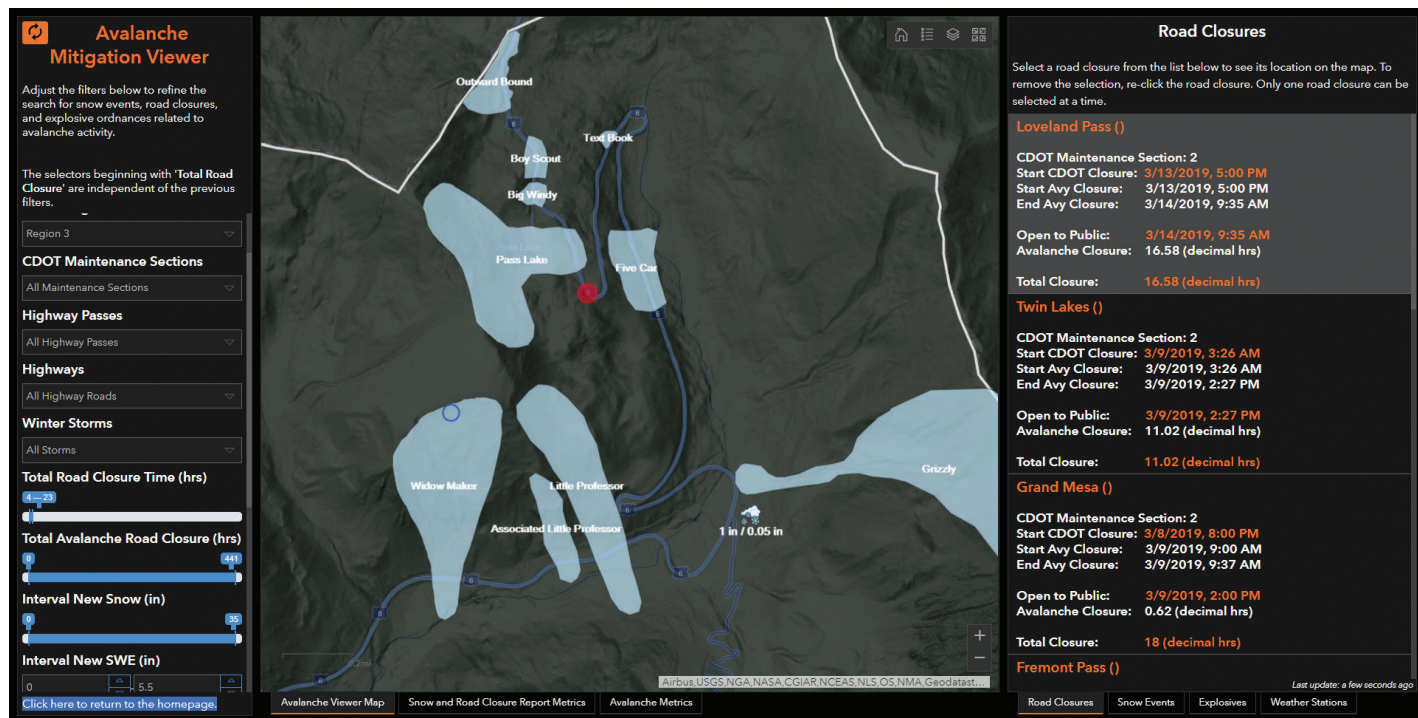
"That's what's getting people very excited," continues Cohn. "The technology is reusable, and the apps are configurable with little or no custom code. Because we can fail fast and fail small, people at all levels are becoming more creative. By democratizing data, we're getting to that 'boots on the ground' knowledge that is so important."

Roads: The Next Generation

In addition to being able to make best-value investment decisions, CDOT is enjoying an uplift in its real-time traffic management operations. Also, with these short-term, more tactical improvements to performance, there is the potential to make some rather profound longer-term gains.

"As we get more data from new sources, deploy more sensors, and gain more information from CAVs, we're going to be able to change how we design roads," Laipply states. "At present, the design is based on books, empirical formulae, and graphs—the right radius, right camber, and so on. Next, we'll take on data direct from CAVs such as pavement conditions and lane departures. We'll be able to design specific to locations and improve performance and safety."

To learn more about the system of engagement, visit go.esri.com/SoE-for-DOTs.



↑ CDOT's Avalanche Mitigation Viewer app carries a decade of information on extreme weather events and their effects on the state's road network.

Transit

Imagery

Climate Change

3D

Modeling

Human-Centered Design

Broadband

Multimodal

Economic Growth

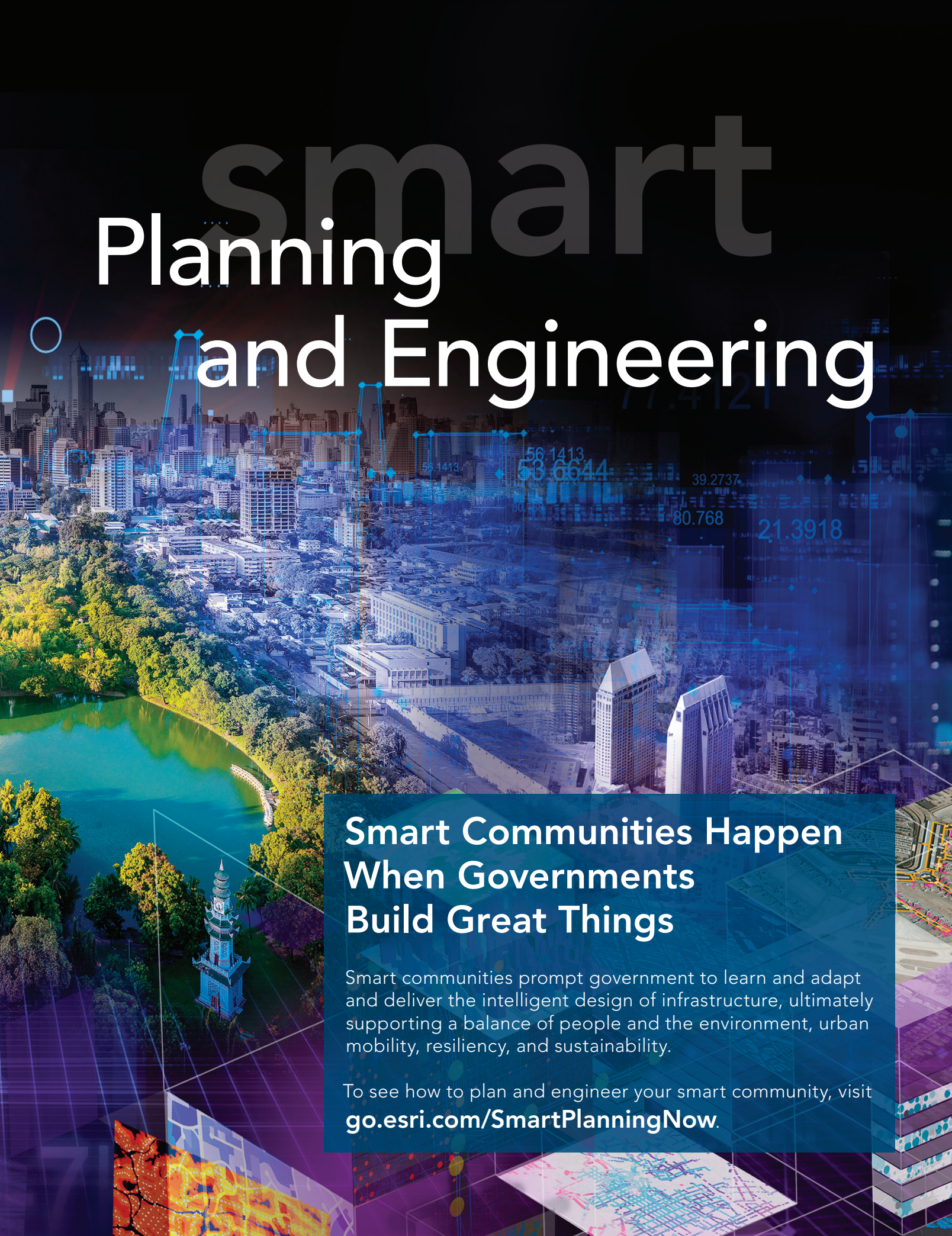
Natural Environment

Sustainability

Green Infrastructure

Infrastructure as a Sensor





smart Planning and Engineering

Smart Communities Happen When Governments Build Great Things

Smart communities prompt government to learn and adapt and deliver the intelligent design of infrastructure, ultimately supporting a balance of people and the environment, urban mobility, resiliency, and sustainability.

To see how to plan and engineer your smart community, visit
go.esri.com/SmartPlanningNow.

A GIS-Centric Elections Management Process

The King County Department of Elections conducts all elections by paper ballot, which a voter either mails or deposits into one of nearly 70 drop boxes that are distributed throughout the county. For its secure tracking of drop-box collections, King County Elections transitioned in spring 2019 to an all-digital workflow using mostly Esri GIS products. The all-digital aspect is notable, in part, because this is not yet common practice among elections agencies.

The tracking process starts with dispatchers assigning work orders to more than 20 teams of drivers using the Workforce for ArcGIS app. The work orders for the teams are bulk uploaded from a comma-separated value (CSV) file every morning during an election period. The drivers then follow designated routes to collect boxes of ballots, with each work order due to be completed by a specified time. Work orders also can be created manually by dispatchers as needed.

The Workforce process is integrated with Survey123 for ArcGIS, which enables data input by the driver teams. For each work order, the driver team enters information into a survey form using the Survey123 app. The work orders are configured to open different survey forms depending on various election circumstances and the nature of the particular work order, such as the following:

- The opening voting day of the election period
- Daily pickups during the election period
- Daily mailed ballot pickup
- Election night (when the voting deadline occurs)
- Postelection inspection (a final check for ballots and creation of a visual and text record of any maintenance issues that need to be addressed)

In addition, each survey form has built-in validation to decrease user errors.

Bar code reading is enabled so that the teams do not have to type “ballot drop box” and transport bin serial numbers, further reducing opportunities for errors. Finally, electronic signatures from the drivers are required before the survey form can be submitted.

Election office staff employ Operations Dashboard for ArcGIS for viewing and monitoring the status of assignments, using real-time data for each driver team. These dashboards provide a

comprehensive, live view of how the ballot collection is progressing. Charts, gauges, and maps deliver powerful visualizations and an approximate count of the ballots collected. Location tracking helps show where each team is at a given time.

A simple application was configured with Esri’s Web AppBuilder for ArcGIS Developer Edition to enable King County Elections staff to examine all the spatial datasets for the project in a familiar web map environment.



↑ A voter delivers his ballot.

“The Workforce/Survey123 app has saved King County Elections an incredible amount of time and money as our ballot drop box program has grown. With now nearly 70 locations to get to every day, the app makes it possible to nimbly coordinate our large team of drivers and ensure that ballots get back to us on time, every time.”

Halei Watkins,
Communications Officer, King County Elections

This transition to an all-digital workflow relied on a series of Esri products, which fits into the overall commitment of King County GIS to the Esri platform. For future elections, the county expects to add one more Esri product to the workflow, Navigator for ArcGIS, to route drivers through multiple locations in an optimal manner.

“The [King County] Elections drop box project has been very well received by our client,” says Harkeerat Kang, GIS specialist master at King County. “King County Elections staff especially like the real-time tracking capability and workflow efficiency. Being able to track and locate driver teams throughout the day and adjust assignments as conditions change is a major enhancement to their process. The interactive dashboards

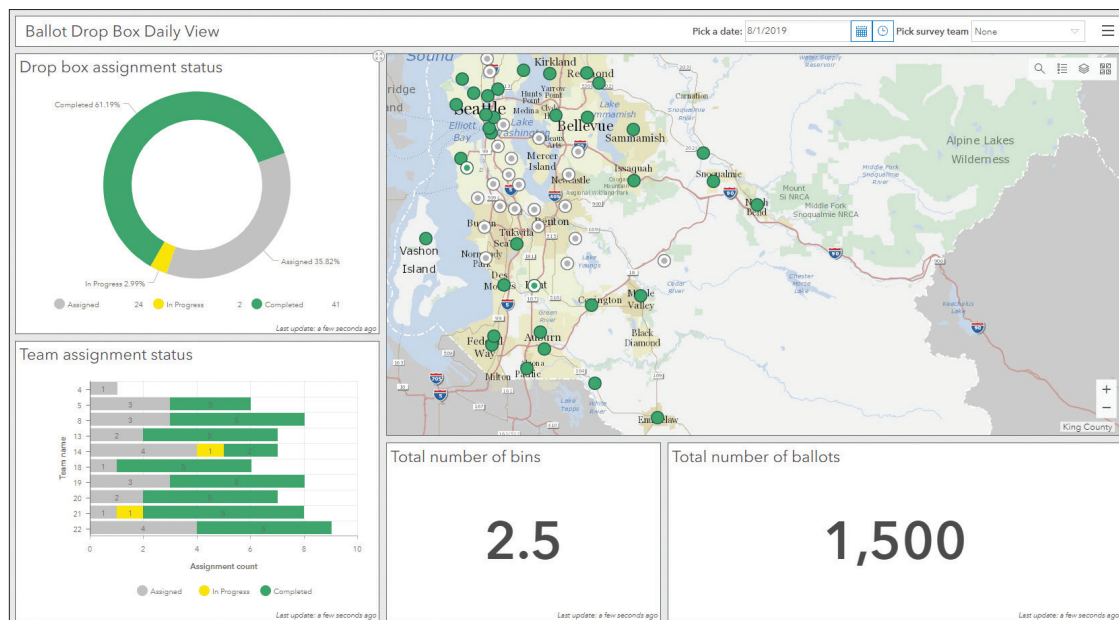
provide another dimension and really help everyone function as a cohesive team.”

After a period of testing and review in early 2019, the all-digital tracking process was implemented for the April 2019 special election and the August primary election. The advantages over the previous paper-based tracking system are numerous. First, from an archiving standpoint, digital forms and signatures mean that hard-copy forms no longer fill filing cabinets. Real-time tracking of the ballot collections process helps King County Elections dispatchers and managers make timely decisions. And finally, data entry error rates have been reduced. In short, the new, paper-free tracking process has helped King County Elections carry out a key part of its mission, ballot


↑ Left: Daily Drop Box Pick-Up, a Survey123 for ArcGIS survey, is one of five surveys used for the project to track the details per drop box pickup. Right: A work order list in the Workforce app shows assignments due for the day for one of the driver team members.

drop box collections, more efficiently. To read more on how King County is leveraging GIS to build and maintain a smart community, visit gisandyou.org.

For more information on how to replicate King County’s election management workflow, visit go.esri.com/kingcounty-elections.



← A King County Elections dashboard is used for viewing the progress of daily assignments by each driver team, showing the number of ballots collected for the day. The dashboard is set to refresh every five minutes.



Michigan Moves Statewide Aerial Imagery to the Cloud

In the latest Digital States Survey, conducted by the Center for Digital Government, Michigan landed a top-five showing, thanks, in part, to its innovative imagery strategy. The Michigan Imagery Solution (MIS) is a cloud-hosted repository of imagery that's fed by the Michigan Statewide Authoritative Imagery & LiDAR (MiSAIL) program, which captures fresh imagery and elevation data for the state on a five-year revolving basis.

An important aspect of MiSAIL is that the state and counties participating in it share the imagery acquisition fees. This has saved Michigan \$3 million, which contributed to it receiving the survey's prestigious A grade. But while this figure is a compelling return on investment, it's not the whole story. It doesn't include the time and money the state saves on server maintenance. It doesn't reveal the added insights gained from having up-to-date imagery or the time saved by streaming imagery as a service rather than having to find the latest image on a server. It's also hard to put a dollar figure on how beneficial the new levels of cross-governmental collaboration are.

"We have a strong history of a statewide approach to geospatial data sharing in Michigan, going back to the Michigan Geographic Framework we released in 2001," said Everett Root, outreach specialist at the State of Michigan's Office of Technology Partnerships. "The idea has always been to make more data open and shared across the state."

"Sharing imagery costs with counties started in 2005 with some of the better-resourced counties [that have] higher populations," Root said. "In 2009, when many of the same counties were getting ready to fly again, we found that we only had imagery for 40 of our 83 counties. Rather than just refresh imagery with past partners, we set up a statewide imagery program designed to collect imagery for 20 percent of the state each year."

Constant Collection Despite— and Because of—Clouds

Every spring, Michigan's contracted imagery provider collects imagery for the year's quota of counties. The state specifies that imagery must be collected when deciduous trees are free of leaves, the ground is free of snow cover, lakes are free of ice, rivers and streams are within their normal banks, and the ground is unobscured by fog.

"These are the usual imagery capture standards, but in Michigan, there aren't many days in the year when all of this happens," said Root. "We'll start with some snow and ice on the ground if we have to."

"The Great Lakes can also be challenging," added Root. "We can be in the air by 10:00 a.m., and by noon, clouds start rolling in off the lake, and we're done for the day."

Although these kinds of vaporous clouds can make imagery collection difficult, the state still amasses a lot of imagery, which is where its technological cloud comes in.

"We had Michigan State University hosting our aerial photography since 2011, but that was just one server that needed memory and software upgrades, and we had just one failover server without any load balancing," explained Root.

Having to incorporate data from 2005 meant that the data volume became overwhelming pretty quickly. To make data storage and sharing efficient, Michigan's Department of Technology, Management, and Budget (DTMB) instituted a cloud-first provision in the Michigan Digital Strategy.

"The cloud made good sense for the sheer amount of data [the state was collecting]," said Mark Holmes, the geospatial services manager for DTMB.

"The move to Esri Managed Cloud Services provided an opportunity to apply best practices—managing users, setting

up accounts, and providing streaming services for access in a cloud-based way,” continued Root.

The MIS was one of the first projects to use Esri Managed Cloud Services to host and serve imagery and lidar data, porting more than 25 terabytes of imagery at the start in 2016. That data volume has now more than doubled.

Bartering Imagery for GIS Data

As part of the imagery acquisition program MiSAIL, the state launched an innovative initiative in 2017 to exchange its 12-inch-resolution imagery for authoritative GIS data from counties and local governments—without funds changing hands.

“A lot of counties jumped right on that offer, and we’ve been working on creating partnerships, getting agreements in place, and transferring data,” said Root.

Bringing in local, authoritative GIS data to inform programs across all divisions at the state level benefits both state and local objectives. Counties provide property boundaries, associated assessment data, address points, and road centerline data, and in exchange, they receive fresh imagery from the state.

“Some counties have never had aerial imagery before, and we gain local, authoritative GIS data,” Root said. “Everyone benefits.”

DTMB’s online imagery streaming service provides an added incentive from the state. When a county signs up to partner in the exchange program, in addition to receiving the latest imagery in an offline format that it can import into its own GIS, the county receives accounts for the image service. The image service allows it to stream all the imagery the state has, beyond just the latest. And the imagery tiles are served in three visible bands as well as near-infrared.

Many people—including archivists, archaeologists, and environmental engineers—are excited about the ability to see how land use has changed for specific sites over the decades.

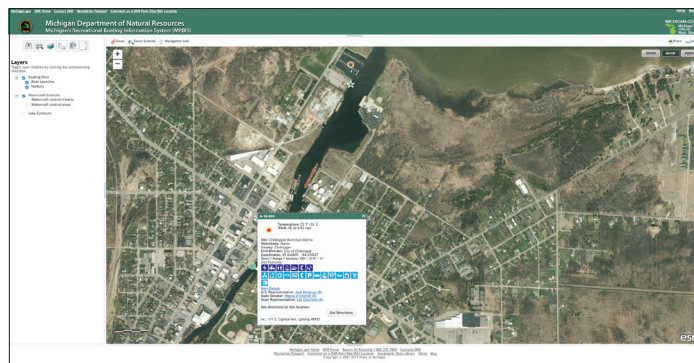
Data Users, and Uses, Keep Increasing

Streaming imagery can be delivered to both desktop and configured apps users. State and local government departments have built a large variety of apps to take advantage of the imagery input.

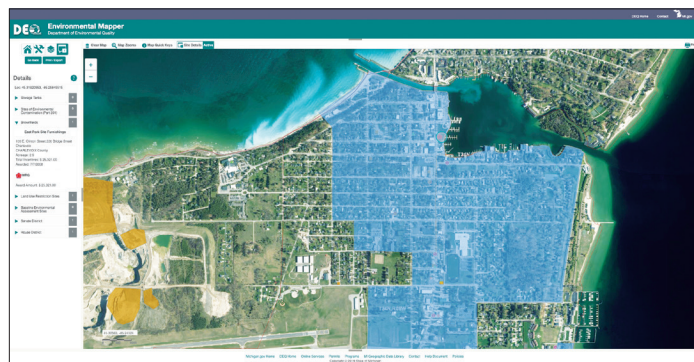
In addition, many departments throughout the state have employed the imagery to meet specific mandates.

The Michigan Department of Transportation (MDOT) pioneered much of the state’s data sharing based on its need for imagery to verify a road’s existence and capture new roads. In fact, it was MDOT that kicked off the initial cost-sharing initiative with counties.

The Michigan Department of Environment, Great Lakes, and Energy (EGLE) administers a program that promotes shoreline protection to reduce erosion. Imagery provides a view of past outcomes to help EGLE recommend proper practices that minimize the effects of waves and ice on shoreline loss.



↑ The Michigan Department of Natural Resources uses imagery for forest inventories, helping hunters find public hunting land, showing boating access sites (as this map does), and more.



↑ The Environmental Mapper, from the Michigan Department of Environment, Great Lakes, and Energy, shows various types of land use throughout Michigan, including places that are subject to specific ordinances (in blue) and development restrictions (in brown), as well as brownfield areas that are under redevelopment (highlighted).

The Michigan Department of Natural Resources (MDNR) uses the imagery for forest inventory and to advise commercial foresters and private forest owners on practices that balance long-term timber production and the preservation of environmentally significant forestlands. The near-infrared imagery helps foresters detect tree species, vegetation health, and indicators of disease and forest pests. Imagery also forms an important backdrop for MDNR’s Mi-HUNT app, which helps hunters find public hunting land.

For the Michigan State Police, imagery provides an important input to enhance situational awareness. The department relies on state-derived imagery to furnish a “before” picture that it compares to mission-specific imagery it captures from helicopters.

“We have a constant increase in users and use of the data,” said Root. “The most common reaction from new users is from those who have never seen high-resolution imagery and are instead used to looking at images that are free and available online. Looking at leaf-off imagery with a good resolution really allows you to see what was going on, on the ground at that time.”

For more information on how GIS can create the foundation for states to become smart, visit go.esri.com/SmartStates-MI.



How GIS Inspired a New Way for the Point-in-Time Count in Placer County

Placer County and Nevada County extend over rural land just east of San Francisco, and like other counties, they are federally mandated to conduct a Point-in-Time Count (PTC) to survey the homeless population in their communities. The PTC is critical to secure resources and understand the at-risk population. Both are part of the Placer-Nevada Counties Continuum of Care (CoC), and they are committed to the goal of ending homelessness by connecting services and resources more effectively.

There Has to Be a Better Way

A year ago, Placer County was depending on paper surveys to conduct the PTC. To prepare for the count, the county was responsible for printing and providing all the surveys and tally count sheets. Volunteers, including county staff and nonprofit service providers, would then be sent into the field with the paper surveys. Once the surveys were returned, county staff were responsible for data input, which took about 50 hours. The data received would be manually entered into a spreadsheet. This process included sorting through papers and trying to interpret the handwriting of the volunteers in the field.

With no accurate way to capture their location, volunteers would estimate by street cross-sections. Back in the office with the survey results, staff had to locate the street cross-sections and manually plot the point on a map. Results were displayed in a heat map that only gave estimated locations of where homeless populations were.

Another major challenge was understanding and compiling the data into reports in a timely manner. As data had to be imputed before reports could be generated, reports would take many days to ensure the data is clean and there are no duplicates or missing data elements.

Making the Count, Count

In October 2018, as the counties were preparing for the 2019 PTC, Sue Compton, homeless management information system administrator at Placer County, was introduced to GIS mobile data collection tools. Compton and her team were about to begin preparing for the next count, and she recognized the value GIS could bring to this effort to increase efficiency in the PTC. Compton presented a strategy to the CoC board to use GIS as the foundation for the PTC

to receive resources to aid the homeless population. Compton turned to the Placer County GIS team to explore the possibilities of enhancing data collection for volunteers in the field and presenting the collected information efficiently and accurately through reports for decision-makers.

Esri's Survey123 for ArcGIS would allow them to send volunteers in the field with a mobile survey, which would provide an accurate location, cut down concerns around data security from carrying around paper surveys, and allow Placer County to create maps and run reports at a quicker rate. Using Survey123 for ArcGIS would relieve the pressure of leaving room for error when the count would be taken.

This proposed mobile strategy answered the concerns staff had for effectively carrying out the PTC in Nevada County. Nevada County stretches over more rural land and is harder to reach. The county relies on its staff as well as additional community volunteers to help conduct the count. Training an additional 50 volunteers in the previous year's PTC would've required much more work and even a walk-through on how to collect information. Ensuring that the additional

help was all on the same page was critical to executing an efficient PTC strategy. The application's simplistic user interface sped up Placer County's training on how to collect information and optimized staff's time to get out and get going.

On the day of the PTC, volunteers used their smartphones to easily and quickly collect information while in the field. While volunteers were out collecting data, the information was channeling back to the office in real time, and the team was able to see and QA the surveys being collected. Incorporating GIS into their strategy allowed them to accurately collect data in a fraction of the time, meet federal US Department of Housing and Urban Development (HUD) requirements, report back to stakeholders

more quickly, increase understanding of the crisis, and present opportunities to intervene with policy.

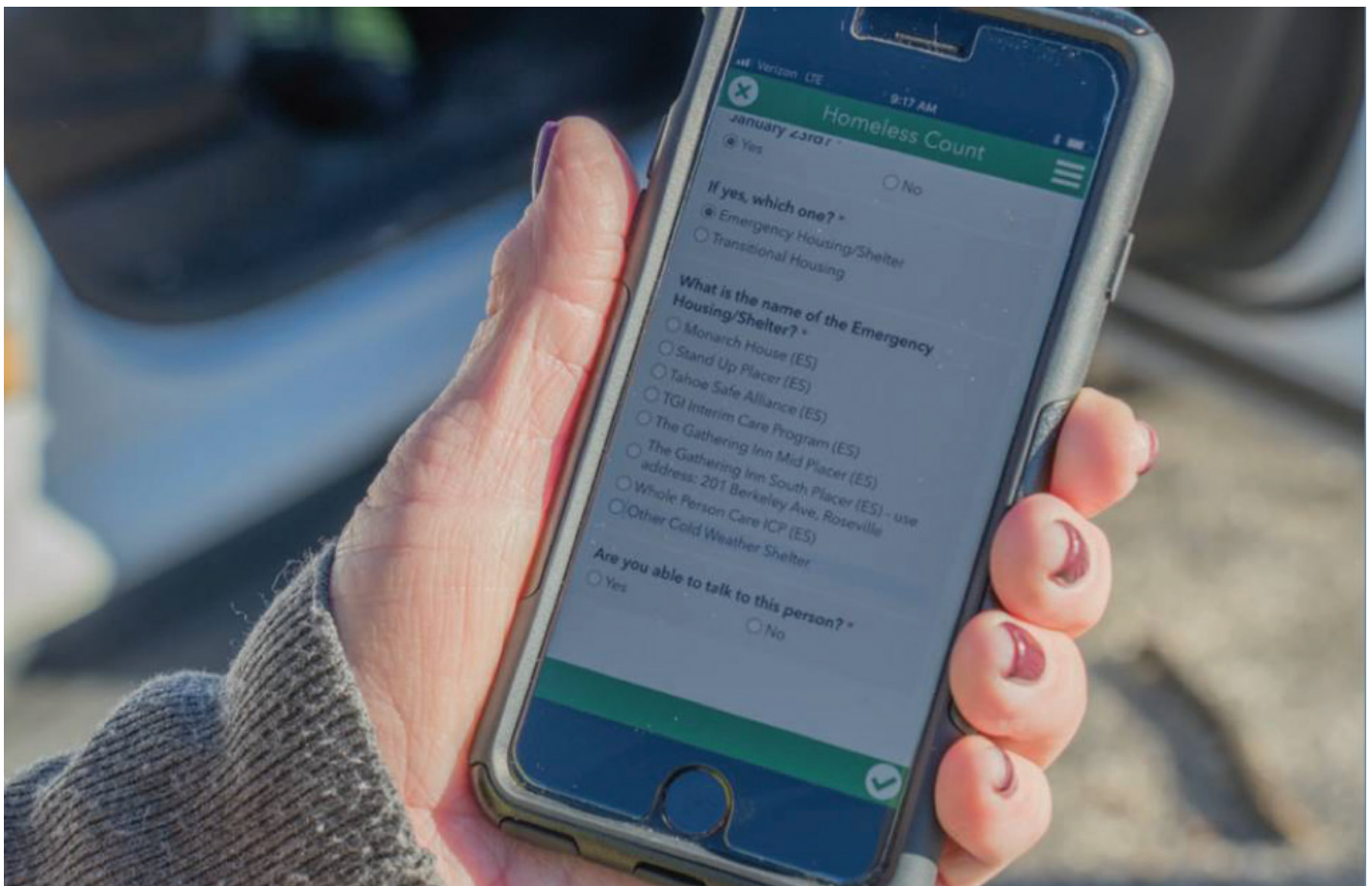
Raising the Bar for Future Counts

By embracing a geospatial strategy, the Placer County team and volunteers were able to work efficiently to collect and appropriately count the homeless community. "With GIS, we are able to improve the efficiency of our homeless count and more accurately identify areas where we can target services and resources to help reduce homelessness in our community," said Compton. Using Survey123 for ArcGIS on their mobile devices allowed volunteers flexibility to collect federally required HUD information to better understand the unique needs of each

community and create a performance dashboard.

After analyzing the data and visualizing where the homeless population is, the Placer-Nevada Counties CoC was able to gain greater insight into the homelessness crisis in the community. The counties are planning to enhance the use of GIS for future Point in-Time Counts to see how to continue to foster their geospatial strategy into their ecosystem and leverage real-time data.

For more information on how you can address the homelessness crisis in your community, visit go.esri.com/addressing-the-crisis.



↑ A volunteer fills out a survey of questions that are required in the PTC.

Polk County, Minnesota's Journey to Enterprise GIS

With accelerating growth in its community, Polk County recognized the need to take its GIS to the next level. Focusing on collaboration, public engagement, and future growth, the county made the move to enterprise GIS, positioning itself to amplify its GIS capabilities now and for the road ahead.

The county was enthusiastic about moving to ArcGIS Enterprise and the new capabilities it would unlock but faced the challenge of implementing enterprise GIS without rebuilding its entire GIS structure.

"We had a wealth of ideas for bringing value to our GIS users with an enterprise system but were stuck when it came to take those ideas forward. We needed to move now to avoid falling behind," said Rick Thompson, county GIS coordinator.

Having the right support has always been important, especially with only two GIS staff. Working with GIS partner Pro-West & Associates, the county created a plan to keep Polk County's enterprise GIS evolving.

The most important step was deploying a system that would support the county's immediate needs and allow for growth. Collaborating with Pro-West, the county designed a five-server infrastructure to support the new enterprise GIS and the solutions that would be deployed. Various functions and components are supported by multiple servers to eliminate the need for a complete rebuild in the event of a server crash.

Polk County identified four key themes in the solutions it had traditionally provided: land records, public safety, public works, and elections. By deploying ArcGIS Hub, the county can deliver these maps and apps in ways that are searchable and discoverable and tell the complete story behind its data.

What Was Achieved?

Since deploying an enterprise GIS, Polk County has transformed how the public and staff interact with GIS and business information that is critical to making more informed decisions. Before they knew it, staff were able to quickly stand up the following:

- New hardware and software configurations
- ArcGIS Hub
- ArcGIS Enterprise Sites
- Nine Collector for ArcGIS solutions for assessors, planning and zoning, and highway maintenance
- Eleven web apps for the general public
- Six web apps for county staff

Solutions ranged from the Bridge Viewer to a Cemetery Locator, while internal solutions included applications to manage open data and a satisfaction survey dashboard. Location technology is rapidly becoming ubiquitous with powerful capabilities that provide value to all users. The county's new enterprise GIS empowers

it to grow efficiently, support user needs leveraging modern tools, and provide easily accessible information to all.

Counting on Collaboration

County staff believe that one of the biggest mistakes departments or organizations can make is embarking on a project without collaboration and trying to handle everything themselves.

"Quite simply, without proactive collaboration, Polk County's project would have failed," said Thompson.

GIS staff also understood the importance of sharing their work and encouraging feedback to improve their solutions. By reaching out to local media, the GIS department was able to promote its work and share the latest resource to residents.

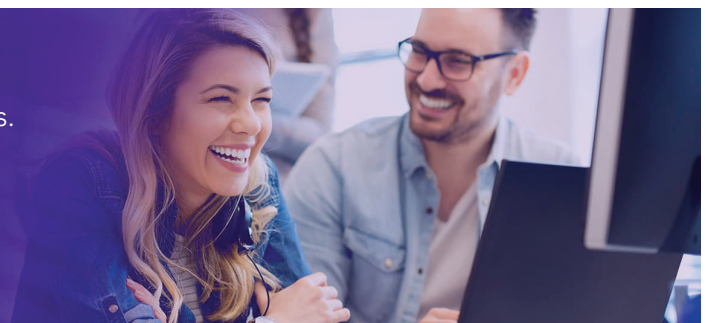
In the Works

With doors now open to embrace all of Esri's local government tools, Polk County's plans include a transition to the parcel fabric for ArcGIS Pro and expanding its hub to further enhance citizen engagement. Staff are looking forward to bringing even better services to users in the future.

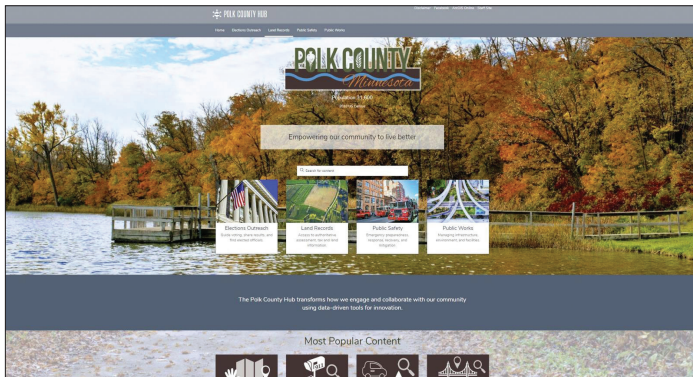
For more information, visit go.esri.com/Pro-West-Polk to see how Polk County was able to implement ArcGIS Hub to its county site, or connect with Thompson at rthompson@co.polk.mn.us.

Stay up-to-date with the latest ArcGIS Hub customer success stories, news, and best practices.

Sign up now by visiting
go.esri.com/HubNewsNow.



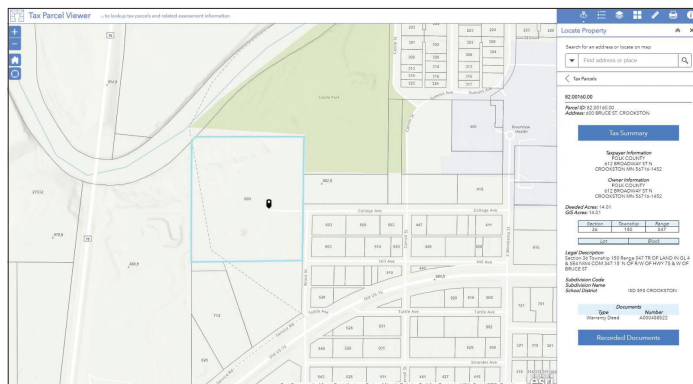
Polk County, Minnesota's Featured Applications



Polk County Hub

Based on Esri's ArcGIS Hub, Polk County Hub provides a common platform for users to engage with the county's data-driven maps and apps. It serves as the launching point for citizens and staff to access information products carefully designed to meet business challenges.

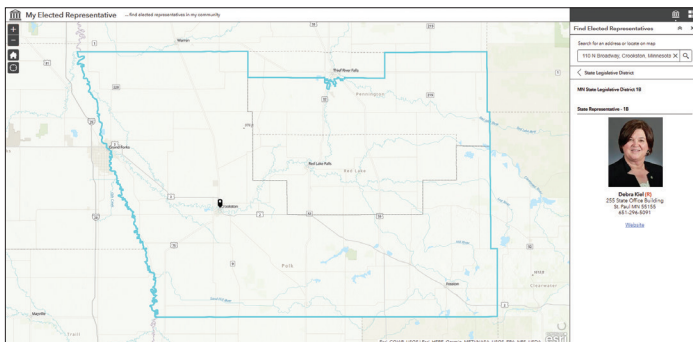
hub-pcg.hub.arcgis.com



Tax Parcel Viewer

The Tax Parcel Viewer provides the public and staff with a map-based view of tax parcel information. It allows access to recorded documents and information stored in the tax data-base through integrations with the county's third-party business systems.

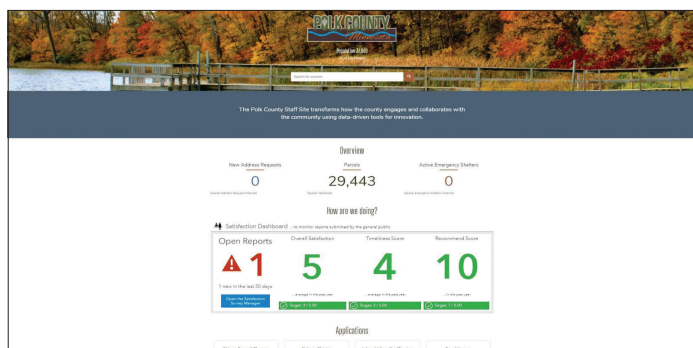
go.esri.com/polk-tpv



My Elected Representative

My Elected Representative allows the public to look up who represents them in elected offices, encouraging civic engagement by making it easier for citizens to connect with their representatives.

go.esri.com/polk-mer



Internal Enterprise Sites

Internal Enterprise Sites provide staff with critical maps, apps, and information for business operations. These sites support workflows that include managing information shared with the general public and feedback submitted by citizens. They enable staff to efficiently manage data that impacts the community.

If you'd like to transform how you communicate critical information with your community, visit go.esri.com/PolkMN-Hub to learn more.



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