

## Implementing an Agile GIS

Using the ArcGIS Platform to Deliver Focused Government Services

Local governments are faced with the challenge of how to efficiently and effectively deliver the benefits of GIS to a wide array of users with varying skill sets and requirements. A variety of local government entities in Wilson County, Tennessee, in partnership with GEO-Jobe GIS Consulting, are meeting this challenge by leveraging a combination of on-premises and cloud-based GIS technology.

When GEO-Jobe began looking closely at each participating organization, it realized that users could be grouped into two categories: power users and casual users. GEO-Jobe then formulated a unique strategy to successfully deliver GIS to users in both categories.

### Power Users

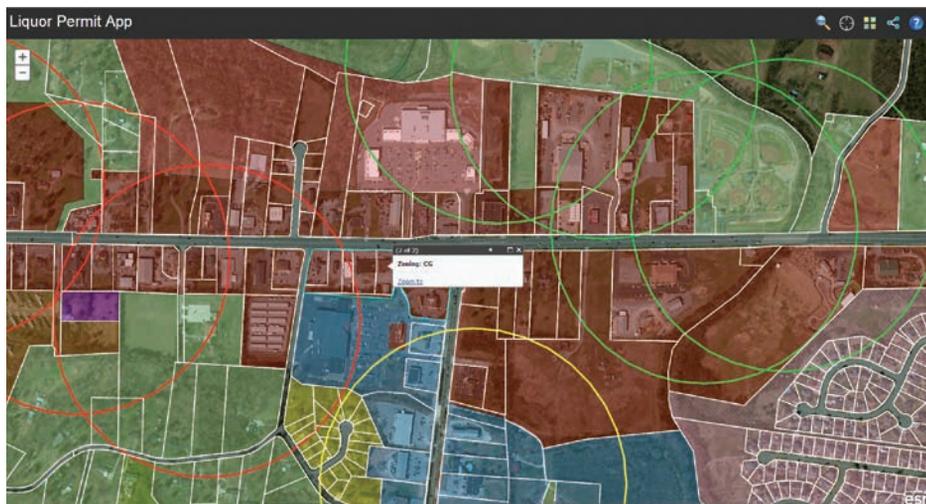
Power users require the robust capabilities of ArcGIS for Desktop. While the main focus is on their operational data, the ability to reference local copies of authoritative data from other organizations is valuable. Through Esri's distributed geodatabase functionality and GEO-Jobe's AutoExchange solution, the process of sharing data between power users has been significantly improved. On a nightly basis, power users replicate data changes between local geodatabases and distribute copies in GEO-Jobe's GEOPowered Cloud. This automated process has eliminated manual DVD and FTP exchanges, saving time and providing more timely data.

In addition to meeting the needs of local power users, this strategy created a continuously updated, centralized repository of GIS data in the cloud that acts as the data foundation for casual users.

### Casual Users

Devising a strategy for casual users was much more challenging. The key to this strategy was making sure the delivery of the technology would be focused and nondisruptive. A mapping platform was needed that could adapt to how users do business rather than users adapt to how an application works. This is where ArcGIS Online came in.

Three organizations in Wilson County—City of Lebanon, City of Mt. Juliet, and Wilson County Emergency Communications District (ECD)—purchased subscriptions to ArcGIS Online. Through the hybrid approach to ArcGIS Online, these organizations are able to access each other's data. This has facilitated content collaboration and sharing and, more importantly, allowed each organization to start building focused information products that directly support the needs of casual users within their organization. Below are a few examples of how ArcGIS Online is being used to integrate GIS into business operations in a nondisruptive way.



↑ City of Mt. Juliet's Liquor Permit Application Showing Restricted 1,000-Foot Buffer Areas, Current Zoning, and Parcel Data

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Fall 2013

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### City of Lebanon

Lebanon Gas Department is responsible for managing the natural gas infrastructure for the city. On a daily basis, field staff need to locate infrastructure. “Historically, location awareness in the field was achieved through map books and ArcReader on laptops,” said Erika Potts, GIS coordinator for the city. “This approach didn’t allow us to adapt to how our field crews work.” Because most staff members have smartphones and tablets, the approach to delivering GIS had to change. With ArcGIS Online, GEO-Jobe and the City of Lebanon were able to create a focused web map that exposed Lebanon’s gas distribution infrastructure data along with data from other entities. Using the Collector for ArcGIS app, Lebanon’s field crews were able to access data in real time and make attribute edits where necessary. This approach is saving staff time from a support standpoint and providing its users with a better tool for performing their work.

### City of Mt. Juliet

The City of Mt. Juliet recently passed an ordinance allowing liquor stores within the city. The ordinance outlined a variety

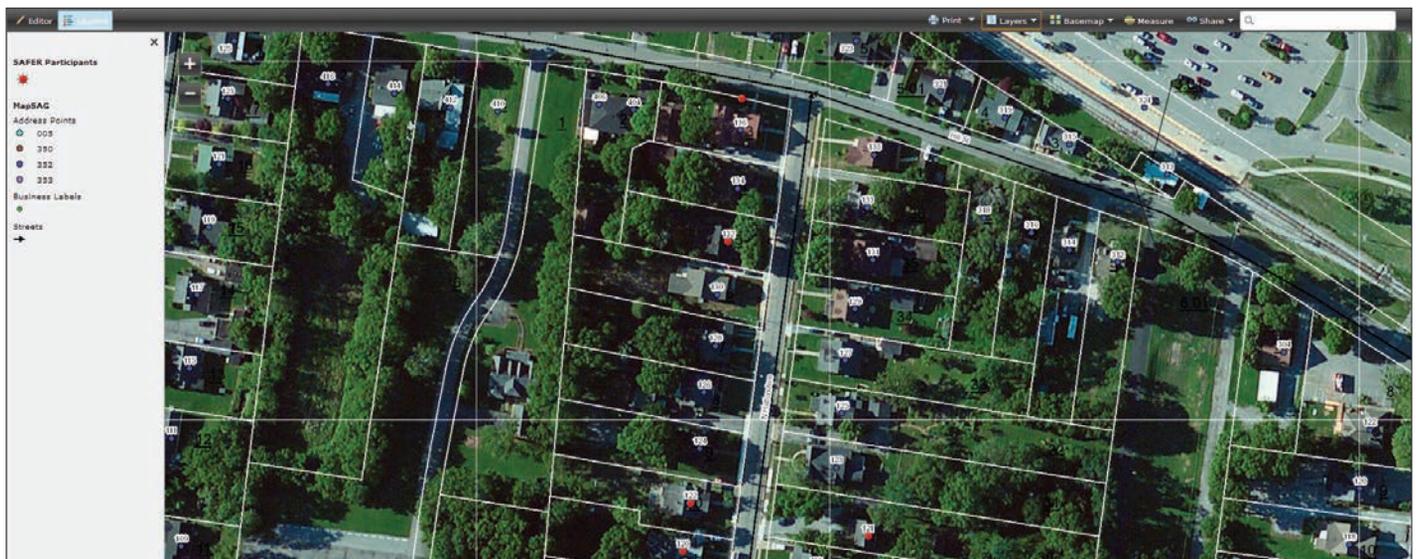
of location-based requirements that had to be met before applications would be considered. “Prior to implementing ArcGIS Online, I created buffer zones showing restricted areas,” said Bo Logan, GIS coordinator for the city. “The problem was that I had no way of allowing internal applicant reviewers to access this information as part of the review process.” With ArcGIS Online, Logan was able to publish the buffer areas he created as a hosted feature service and then create a web map that exposed this data along with zoning and parcel information. He then shared this web map as a web application using the Parcel Viewer template. The end product was a focused web application that directly supported the review process. Applicant reviewers were able to search for a property and, within seconds, determine whether the application met the location-based requirements, which saved city staff a tremendous amount of time.

### Wilson County ECD

The Wilson County ECD has implemented a program called Special Advisory for Emergency Responders (SAFER). Its objective is to increase operational

awareness for emergency responders by providing additional information about residents. “Because of the value of SAFER, we want to be proactive about identifying residents that have not signed up so we can reach out to them,” said Sarah Hillman, SAFER administrator. “I needed a user-friendly process to overlay SAFER participants with address points to identify non-SAFER participants to contact.” In addition, Hillman needed the ability to edit the SAFER data as information changed. Using ArcGIS Online, the GIS Department created a web map that showed SAFER points, address points, and parcels. The department then created a focused application that Hillman could use to quickly pinpoint areas for outreach and update information accordingly.

These use cases demonstrate how focused delivery of GIS is increasing its adoption, helping users and driving efficiency within local government operations. There are many more opportunities across these organizations, and with ArcGIS Online, staff members have a tool that can adapt and deliver the technology with success.



↑ Wilson County ECD’s SAFER application shows 911 address points, program participants, and parcel data.

# Garden to Table

## Battling Food Insecurity with Integrated Geospatial Technologies

In 2011, more than 18 million US households were labeled “food insecure,” unable to adequately feed every member of the household. CommUniverCity, a collaborative project of San Jose State University (SJSU); the City of San Jose, California; and neighboring communities, plans to lower that number by bringing food production back into cities and suburbs. Through a program called Garden to Table, San Jose residents with fruit trees on their property agree to share portions of their tree harvests to feed hungry families. Garden to Table identifies and maps fruit trees on residential properties, works with the homeowners, and mobilizes volunteers to pick excess fruit and deliver it to a local food bank.

### A Slow Process

“In 2011, we started mapping fruit trees, walking the streets and collecting data—address, tree type, productivity, and size,” recalls Zach Lewis, Garden to Table director. “We were using a simple, handheld GPS unit and handwriting each tree’s coordinates and information, which was incredibly time- and labor-intensive.”

In the first year, Lewis and his team mapped 930 trees on private properties within an one-mile radius. Field and keyboard time totaled more than 300 hours—an average of only about three trees per hour. Although the mapping and GIS analysis helped improve the efficiency of the harvests, Lewis saw potential in further automating the process.

### A Better Way

With close ties to SJSU, Trimble developed a three-part solution including a mobile GIS data collector, a back-office application for geospatial data analysis, and a tree-canopy monitoring segment for long-term planning. The solution helps local organizations manage productive urban forestry and agriculture programs and enhances the community’s ability to provide fresh food to families in need.

The efficiency and accuracy of the tree mapping efforts improved immediately after the integration of GPS. Compared to the pen-and-paper approach, the crews gathered tree data much faster in the field, while digital uploads to the database eliminated the need for transcription. With the mobile solution, the team mapped 1,400 trees in roughly 160 hours—nearly nine trees/hour.

The most significant advantage of the automated solution is expected this year with a boost in harvest productivity. “This application revolutionizes the way we are able to look at our tree data,” Lewis says. “We can query by fruit, season, condition, and productivity of inventory to make more informed decisions,



↑ eCognition for ArcGIS used lidar elevation points to distinguish trees from grass and bushes.

which will help concentrate activities in neighborhoods where the most fruit can be picked.”

### Future Growth (Literally)

The effort dovetails with a green initiative started by San Jose in 2009, one goal of which was to plant 100,000 new trees across the city. With fruit tree canopy inventory and monitoring in mind, the team turned to Trimble’s eCognition extension to ArcGIS and Equinox Analytics to create a script that calculates fruit tree canopy coverage by analyzing high-resolution aerial orthoimagery and airborne lidar elevation data acquired over San Jose.

Using eCognition, Lewis identified areas of vegetation in the digital orthoimagery using information from the visible green spectrum. To separate the trees from other green vegetation (e.g., grass and bushes), the script then used the lidar data’s elevation points to eliminate vegetation shorter than five feet in height, making it possible to calculate total tree canopy coverage. Armed with this information, they expect to more accurately measure specific tree canopies and improve fruit production estimates.

### 100 Percent Increase

Garden to Table will use the fruit tree canopy map as it moves into the project’s next phase: increasing the overall number of fruit trees. Lewis plans to work with city officials and private landowners to encourage tree planting where most beneficial; however, for CommUniverCity, the project is already successful. Garden to Table has dramatically reduced the time needed to map, catalog, and organize central San Jose’s fruit trees. This will translate directly into more picking time and a projected 100 percent increase of fruit in 2013, roughly 25,000 pounds, helping local families combat food insecurity.

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# Opening Health Data Channels

An Interview with Bill Davenhall, Esri Health and Human Services Manager



In March 2013, Bill Davenhall attended Health Datapalooza to represent Esri's commitment to the health care industry. Health Datapalooza is an annual event hosted by the US Department of Health and Human Services, the Institute of Medicine, and the Robert Wood Johnson

Foundation to encourage new ways of sharing health data.

## Why was Health Datapalooza significant this year, and how does it relate to the Affordable Care Act?

I think mainly because of the larger presence of the Health Data Consortium [HDC] compared to last year. HDC is an alliance of the event hosts and Esri to institute new open health data systems. The consortium is gaining more support every day to start the flow of data between the federal government and state and local governments. This will be absolutely essential to do before the full integration of the Affordable Care Act.

## Why is having open health data important to state and local governments?

State and local governments continually need more fine-grained information to do their work. They make policies about how money is allocated to certain services, and they also, in many cases, deliver the services themselves. So they play a complicated, dual role here: they're policy makers and service providers. That entails stewardship of massive amounts of data. The more fine-grained the data, the more variables that complicate how it's managed and served—all the complications of big data that we're facing today. How do we create new dataflow systems that harmonize with new health care legislation? For most of these state and local governments, it's extremely important to not only get fine-grained data but also intelligently use it once they get it, which is where GIS comes into play.

Another reason to open these data channels is because states and counties are actually required to integrate the services of everybody, from children to adults, from Medicaid to Medicare to immunization to birth registration/death registration. With Obamacare, states and local governments will only get paid for outcomes instead of just the volume of services they deliver. The exciting part is that groups like HDC are beginning to open these channels and get that information to cities so they can do their job well. If you're in a county like San Bernardino [California], and the best the federal government can give you is county-level data, it doesn't do Redlands or Loma Linda much good because it's not at a useful level of granularity to do any significant analysis.

A great example of open health data that HDC just recognized is the work of Dr. Nirav Shah, the commissioner of the New York State Health Department. He helped create the nation's first open health data website, [health.data.ny.gov](http://health.data.ny.gov). It's a model that other states are following. HDC's role is to recognize and promote innovation like that and also promote emerging technologies that will help illuminate data once the channels are open.

GIS has been around for a long time, but it is "emerging" in the sense that more people are beginning to see its utility.

## When you gave your 2009 TED talk, geomedicine was a relatively new term. Do you find more people are understanding how location makes sense of health data?

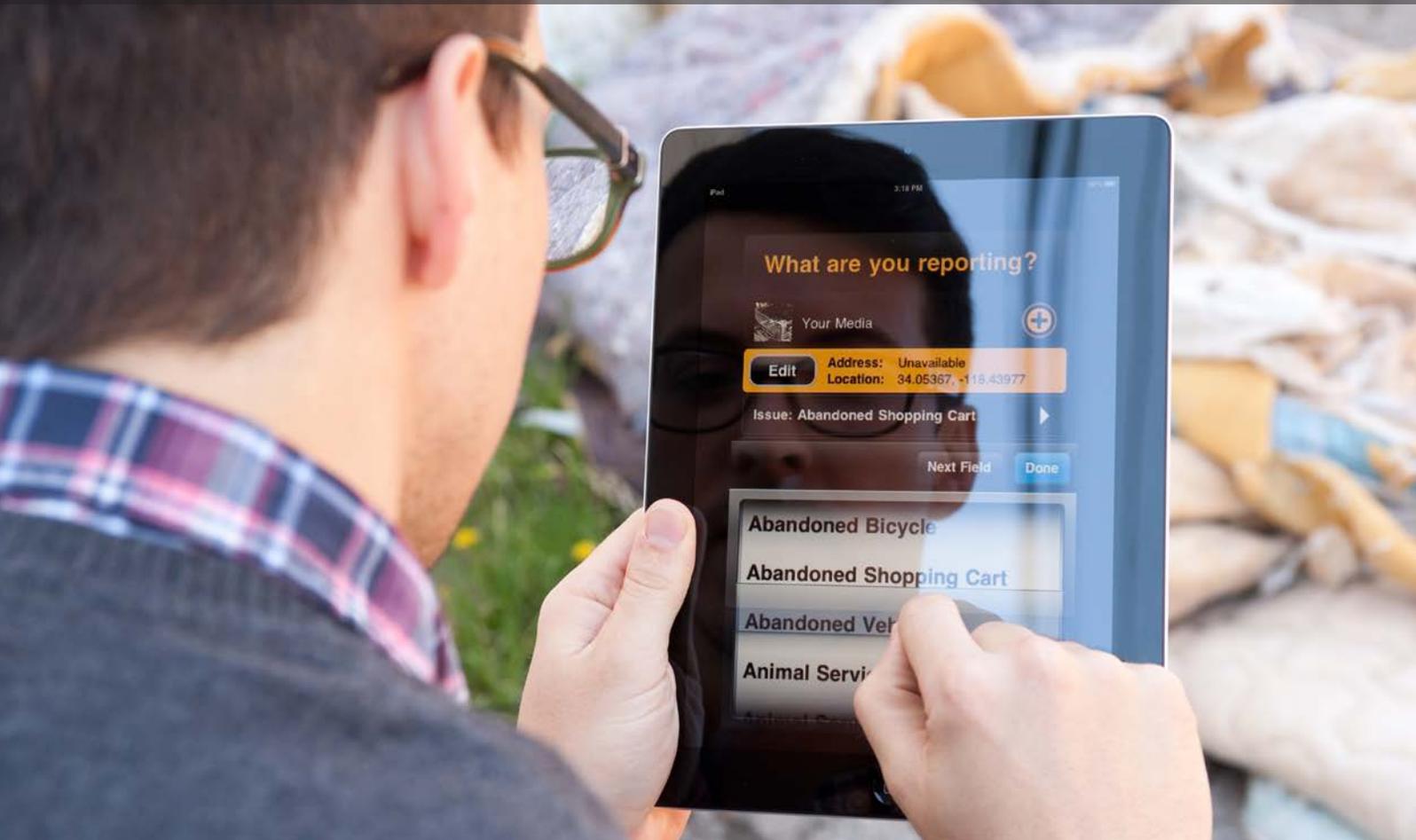
Absolutely, there's no question that geomedicine has caught on. It was introduced as sort of a concept to bring all this [information] together under one tent. Basically we said, let's connect the dots with our technology. Everybody has talked about that concept, but they've had trouble "operationalizing" it. Now they see it's the operational tool that makes the most sense because of its long track record of bringing clarity to data.

## What kinds of new health apps were showcased at Health Datapalooza that integrated geomedicine?

The first application we saw that wowed us was Asthmapolis. The Centers for Disease Control and Prevention was running an asthma program, and so it put GPS trackers on asthma inhalers. So when a kid on a playground squeezes his inhaler, it automatically fires off a signal that gets recorded. Now think about how much sense that makes; where people actually pull out their inhalers is directly related to the ambient quality of the air they're breathing. So, for example, kids playing outdoors in Loma Linda, California, would have less need to use their inhalers, but down closer to Los Angeles or Fontana, closer to the I-10, during heavy traffic, well, you just might see an uptake of inhaler hits. Applications like Asthmapolis clearly show that we need to build monitoring systems around this. With surveillance in place, it will be easier to determine what intersections create the greatest amount of air quality issues that drive asthmatics to medicate.

This whole idea has really caught on. People are now the sensors. One of the reasons we don't have a lot of fine-grained air pollution data is the cost of the sensor. Well, unfortunately, in this case, the cost of the sensor is being paid for by the health insurance industry or by people who pay premiums, because they have to have these inhalers. So putting the GPS on that was pretty smart because all of a sudden, they now have millions of people with inhalers, and they're just like little test stations.

# Making Your GIS Relevant to the Community



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# Using GIS for Civic Improvement— A Community-Led Approach

## Transforming Scarcity into Abundance

By DeKoven Ashley, thrdPlace

Cities, towns, and nonprofits across the country currently face a common problem: an increasing scarcity of critical resources. As funding decreases and the needs of communities continue to grow, both civic and nonprofit leaders are seeking new ways to achieve their goals and overcome the constraints created by ever-shrinking budgets.

### Recruiting the Community

Enter thrdPlace, a digital crowdsourcing platform designed to help create local community improvement projects resourced and led by local community members. thrdPlace is turning the normal approach of community on its head with a new model that challenges the notion of false scarcity. The idea is simple; in every community there are available supplies, funds, and volunteers. These resources can be tapped by organizations that can inspire and mobilize them to action. To stretch resources further and achieve their goals, organizations are moving away from the traditional top-down approaches to resource management to a new bottom-up approach that relies on local community members to get involved and help shoulder the burden of community improvement.

To help civic and nonprofit leaders achieve their goals, thrdPlace has created an online platform that combines Esri GIS and mapping solutions along with crowdsourcing and social media storytelling tools. The solution is designed to help local community stakeholders pinpoint areas of need, share their project story, define resources needed, and recruit local support and action through social channels.

### Green Overcomes Blight

thrdPlace was recently tapped by the Social Justice Learning Institute (SJLI), a nonprofit in Inglewood, California, to help reverse urban blight and create an alternative food source in Inglewood by building community gardens. Like many nonprofits, SJLI is a small organization with limited resources, but that's done nothing to stop it from dreaming big.

Last March, D'Artagnan Scorza, executive director of SJLI, partnered with thrdPlace to help build 10 community gardens in Inglewood in one day. The campaign witnessed a tremendous outpouring of community support. Each community garden project on thrdPlace was fully subscribed by Angelinos eager to get involved. With the help of over 60 volunteers, SJLI was able to accomplish its goal of building 10 community gardens in only four hours on a single Saturday afternoon.

"thrdPlace really helped us involve and engage our residents in the process," says Scorza. "It allowed us to generate the type of resources needed by helping find volunteers, funds, and supplies. Not everyone in our community can always give dollars, but they can come out and till the land; they can bring out a shovel or two."

SJLI is just one organization of many finding ways to tap local community to achieve its goals. By giving citizens the ability to map local needs and support community-led solutions, Esri and thrdPlace are creating valuable new data points of shared intelligence that can be captured directly from the community.

The screenshot shows the thrdPlace website interface for a project titled "Garden Build @ The Ali's". At the top, there is a navigation bar with the thrdPlace logo and links for "DISCOVER A PROJECT", "START A PROJECT", "SIGN UP // LOGIN", and social media icons. Below the navigation bar is a teal banner that reads "This Project Has Completed! Thanks for contributing!". The main content area features a project card with a photo of a garden, a "CREATED BY:" field, and three progress bars: "Funds Fulfilled: 0%", "Volunteerism Fulfilled: 100%", and "Supplies Fulfilled: 0%". Below the progress bars are buttons for "VOLUNTEER" and "SUPPLY". A "Description:" section follows, detailing the project's goal to build 10 home gardens. At the bottom of the card, there is a "PROJECT NEEDS:" section listing "FUNDS (\$100)", "VOLUNTEERS (3)", and "SUPPLIES (8)", along with a "VIEW ANNOUNCEMENTS" button and a map of the project location in Inglewood. On the right side of the page, there is a vertical sidebar with "FEEDBACK" and "PARTNER WITH US" buttons.

↑ Visitors can sign up for labor and contribute funds to local projects through thrdPlace's map-based interface.



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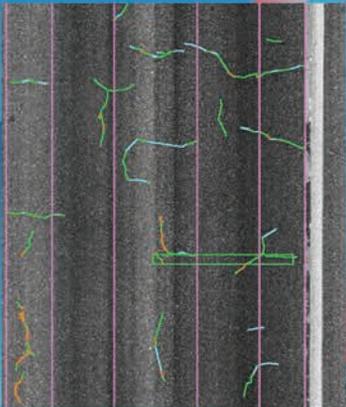


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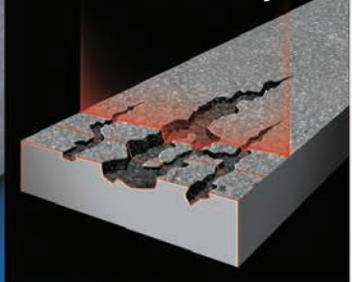
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# Grant County, Washington, Fosters Economic Growth with GIS Data

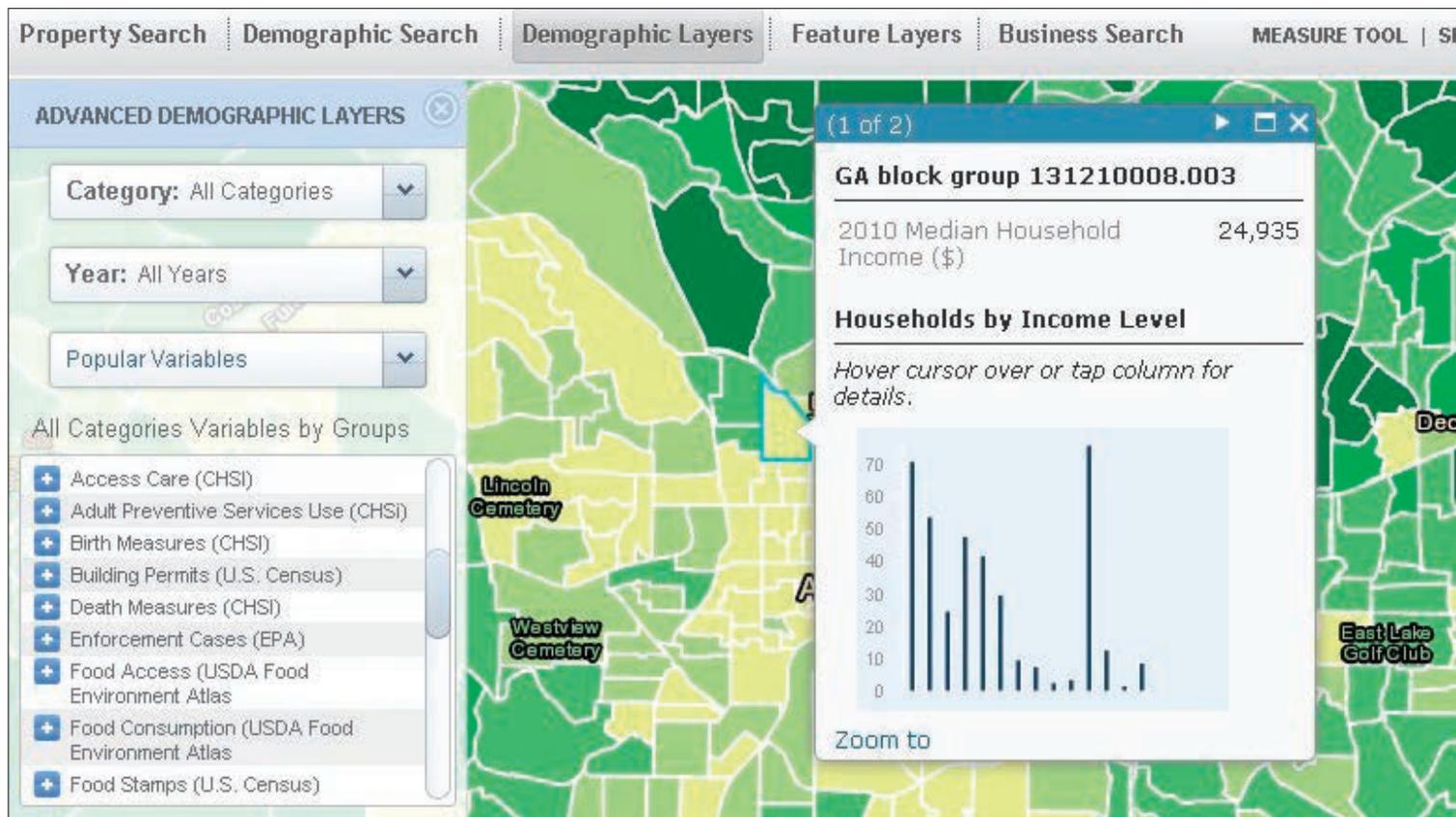
Each year, decisions affecting billions of dollars' worth of investments and jobs are made based on poor data, and mistakes are very costly. Yet, the majority of organizations and communities marketing their communities' assets present only a snapshot of their people and best features. Often, the statistics and supporting files made available online by some economic development organizations give an outdated and inaccurate picture of the community. Presenting the current reality to site selectors and consultants who research the viability of regions for commercial growth is critical.

## The Need to Ensure Data Accuracy

The Grant County Economic Development Council (GCEDC), located in central Washington State between Seattle and Spokane, has become well-known for its impressive recruitment of data and server centers, including existing facilities in the

county serving Microsoft (MS), Intuit, and Dell. Grant County offers a variety of attractive qualities for industry and businesses of all types, including an educated work force, incentives for industry-specific projects, and a high quality of life for its residents.

GCEDC had often struggled with updating its online files with current, local, GIS-based data from county government, the Department of Transportation, and other local authorities. GCEDC's executive director, Jonathan Smith, understood that site selectors have typically completed the majority of their research about the community before contacting the organization directly. Its research often includes a detailed review of the information that is presented on the GCEDC website. Ultimately, Smith and his team found that the best way to ensure that GCEDC's data is accurate was to leverage an automated, Esri software-based solution that would always be up-to-date; specifically, it would need to coincide with the data being presented by other local and state government agencies to site selectors and industry representatives.



## Recruit

GCEDC contracted Esri partner GIS Websites to modernize the organization’s web presence and dramatically improve the organization’s sites and buildings search module. Recruit software, created specifically for economic development recruitment by GIS Websites, provides a cloud-based, interactive web platform that eliminates many of the pain points for both staff members and site visitors researching the region. Recruit provides users with the ability to create custom map reports involving specific projects, assets, or inquiries—either manually or directly from existing MS Excel files—and then save those files for use on websites, in PowerPoint presentations, or within MS Word documents.

Site location consultants evaluate many variables about a particular location before deciding on new ones for the contracting company. GIS is a natural fit for solving location problems, particularly when hundreds of variables are considered at once. The Recruit product provides this advanced capability, saving site selectors hours of additional research time by providing highly

customizable heat maps of the community or region in focus, along with saving the GCEDC staff countless hours that would typically be spent in preparing custom reports and comprehensive statistical snapshots of their communities for prospects.

## Grow

In addition to recruiting major industries and large companies, most economic development organizations are also tasked with cultivating their communities by helping small businesses grow the job and tax base from within, often referred to as economic gardening. Grow, an economic gardening product developed by GIS Websites, provides small businesses, entrepreneurs, and chambers of commerce with access to the GIS data and stats that are available in mainline economic development.

The Grant County Economic Development Council has also incorporated the Grow platform for its website’s front end, ensuring that select small businesses can leverage the same data as they research current and future business locations and other variables, such as industry competition (based on NAICS/SIC codes in search queries) and overall demographic opportunity for an area. The software also provides report generation and Community Analyst research capabilities.

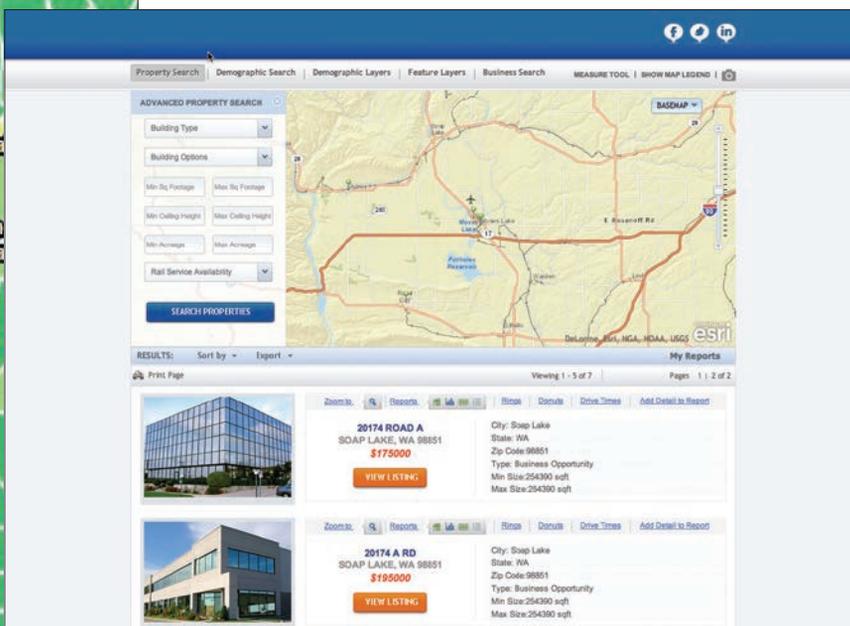
With access to data being crucial in the economic development industry, governments need tools for presenting up-to-date, easy-to-understand information for stakeholders

and developers. Thanks to geospatial technology, site selectors in Grant County have a reliable, comprehensive search tool to evaluate features of the community in one place.

For more information, visit [www.giswebsites.com](http://www.giswebsites.com).



↓ Recruit’s streaming data feed focuses down to block groups, displaying a detailed graphical breakdown of income distribution within each block.



# Esri Tools Empower San Francisco's Green Retrofit Campaign

## Targeting the Right Consumers with Map-Based Demographic Visualization

With the effects of climate change increasingly evident and greenhouse gas reductions now being required by many state and local governments, more cities are looking for ways to reduce the carbon output of single-family homes. Consider San Francisco, California. Its Department of the Environment (SFE) recently completed a successful initiative to improve home energy efficiency with the help of Esri Community Analyst, a web-based mapping and reporting tool. Embedded with up-to-date population and segmentation data on the entire United States, Community Analyst gave the department a granular perspective of San Francisco consumers, resulting in much more effective use of limited funds and more purchases than would have been possible otherwise.

### Cast a Big Net

In 2008, the San Francisco Board of Supervisors set a greenhouse gas reduction target of 80 percent below 1990 levels by 2050. With residential housing accounting for 22 percent of the city's greenhouse gas emissions, reducing home energy consumption has never been more important. To reach that goal, San Francisco participated in Energy Upgrade California, a statewide energy management initiative with a two-pronged mission to educate California property owners about energy conservation and make energy upgrades more affordable.

To increase the number of energy-efficient homes, San Francisco Department of the Environment developed a program to incentivize the city's homeowners to invest in deep but costly energy retrofits to their homes. To be successful despite a very limited marketing

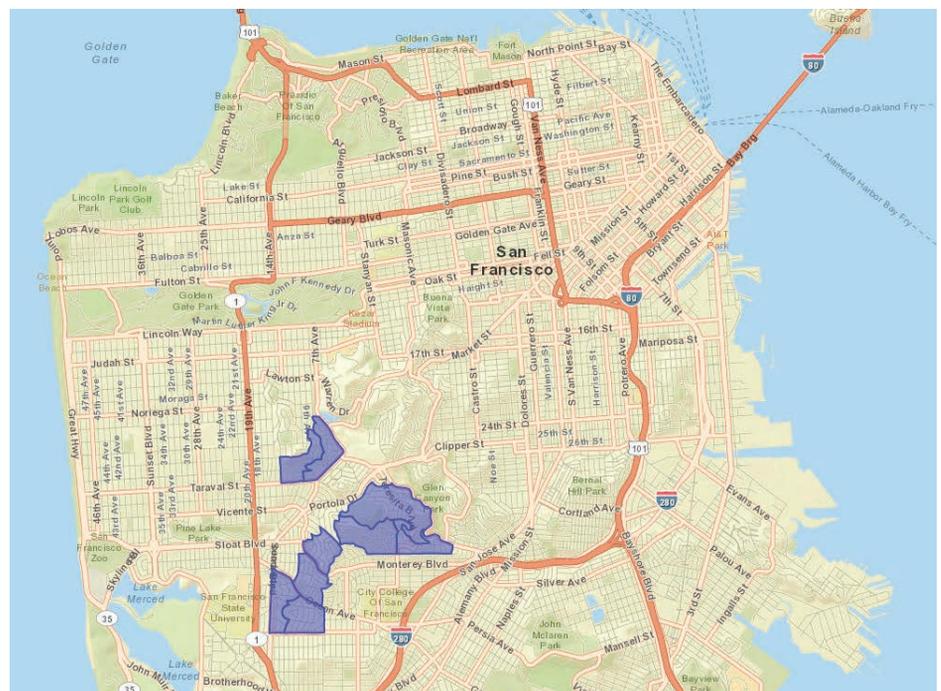
budget, SFE needed a plan to promote the program to homeowners who would be most likely to undertake such a major commitment. The department decided on a multifaceted outreach campaign that would begin with direct mail and citywide advertising and conclude with old-fashioned door-to-door outreach.

Before putting feet to pavement, the department achieved widespread awareness of the program through newspaper ads, signage, and leaflets in official city mailings. The city crafted its messaging for seasonal context, publishing ads declaring "It's Outta Here!!"—a reference not only to the reigning World Series champion team, the San Francisco Giants, but also to precious heat escaping from homes during the city's damp winters. The department estimated that at least

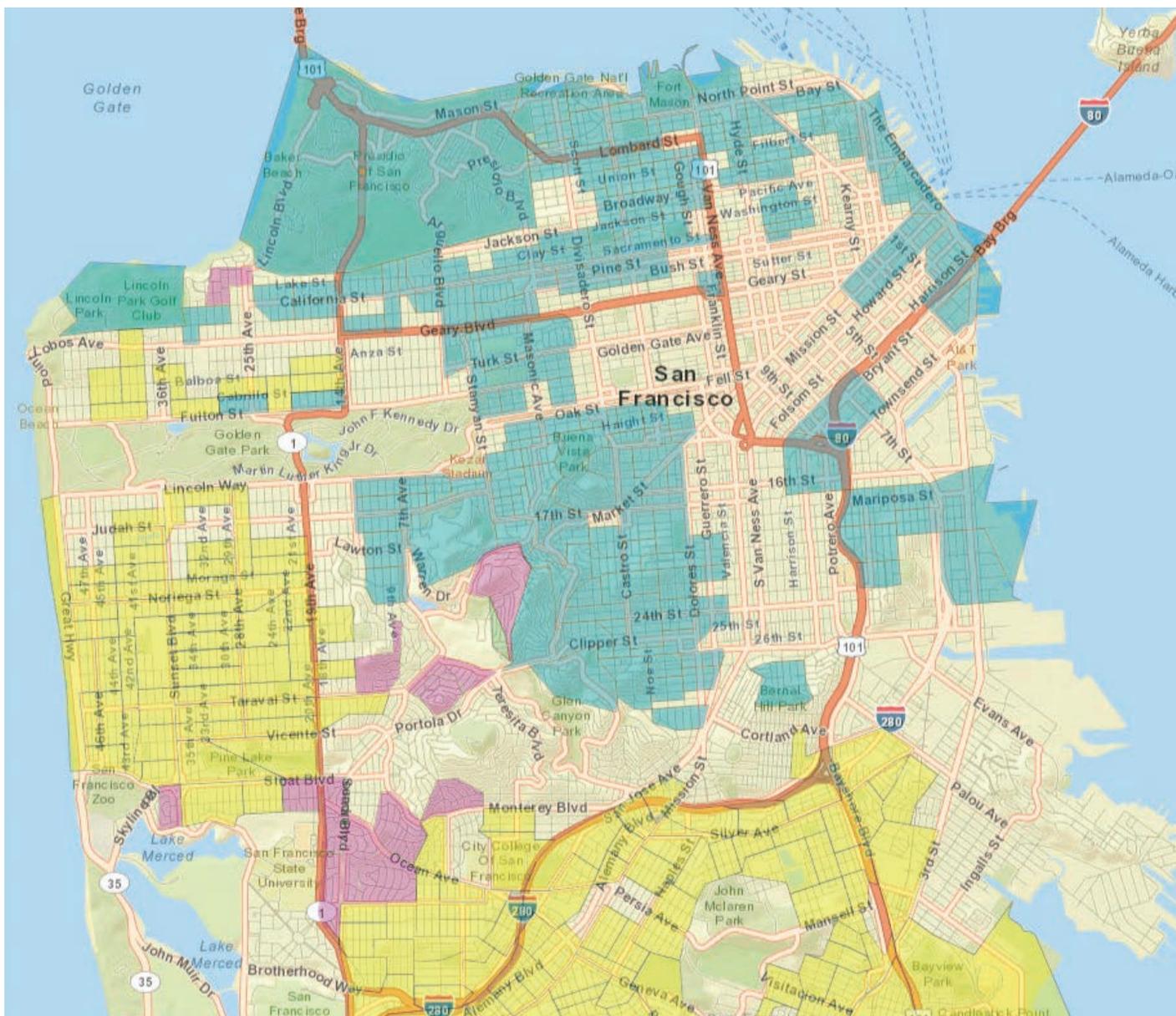
250,000 residents would see the ads for Energy Upgrade California. "We needed to introduce Energy Upgrade California to the public," said Luke Easdale, marketing and outreach coordinator for the city's energy program. "We determined the most effective way to initially raise program awareness was through citywide advertising and marketing channels." Although the state also offers Energy Upgrade California services to multifamily homes and commercial property owners, the department decided to market to single-family homes to simplify its demographic analysis.

### Find the Niche Market

Since not all residents are homeowners or have the means or motivation to perform green retrofits on their homes, more



↑ Located in San Francisco's District 7, *Connoisseurs* had the highest density of program participation (shown in purple) and was identified as the primary segmentation type to respond to direct marketing.



↑ Using Community Analyst and census block demographic data, San Francisco Department of the Environment identified three key segments where residents would likely consider purchasing energy upgrade packages.

targeted marketing was needed to complement the citywide awareness campaign. The department would first need a mechanism to understand the entire San Francisco community, both geographically and demographically, then focus on neighborhoods with the highest potential for program participation. This approach enabled the team to allocate its limited financial and volunteer resources more efficiently. People’s demographic and lifestyle details—income, retail spending potential, utility costs, environmental and

political group participation, media preferences, and spending patterns—would provide key insight into the areas that would be most receptive to the program.

Community Analyst, integrated with demographics and Tapestry Segmentation data, enabled the team to locate and market the program to the most receptive residents. “The complexities of Energy Upgrade California—San Francisco are difficult to succinctly summarize in widely distributed collateral,” Easdale said. “Ads and bus-stop signs

should be used to drive overall awareness, but they must be complemented by informed local outreach methods to ultimately be effective.”

### Tapestry Segmentation

The Esri Tapestry Segmentation system divides US residential areas into 65 distinct segments based on socioeconomic and demographic characteristics to provide an accurate, detailed description of US neighborhoods. Tapestry Segmentation can help identify targeted markets, define

continued on page 14

product and service preferences, and tailor marketing messages to fit specific audiences. Traits such as income, net worth, and spending patterns can be useful in predicting consumer behavior, especially when those attributes are represented on a map. Tapestry Segmentation data is available as reports and maps in Community Analyst and other Esri business intelligence products.

"From the outset, we wanted a simple visualization and reporting tool that would present the data accurately and help drive our interactive campaign," said Easdale. "A map-based app would give us an overview of the communities that we should visit, which was absolutely essential given our resources."

### Findings

Using Tapestry data in Community Analyst, Easdale identified markets to focus on during the final interactive campaign for Energy Upgrade California. To learn more about the types of people who might be interested in the offer, the team started by plotting the locations of residents who'd bought Energy Upgrade packages in previous years. Once plotted, Easdale used Community Analyst to look for clustering and commonalities of these completed projects. Tapestry identified *Connoisseurs* neighborhoods as the primary target owing to their past program participation. Residents of these neighborhoods tend to be wealthy, well-educated, married couples who own their homes and engage in civic activities.

Because Community Analyst displays data geographically, the team was able to see a concentration of *Connoisseurs* neighborhoods in San Francisco's District 7—clearly pointing where teams should visit during the door-to-door campaign. The team used Community Analyst to map individual residential addresses to organize customized "walk sheets" so staff could save time and walk continuously from address to address.

Community Analyst also revealed potential in the *Laptops and Lattes* and *Pacific Heights* neighborhoods. Community Analyst showed concentrations of these segments in five distinct districts, giving even more focus and direction to the team's interactive outreach planning.

Careful crafting of scripts for door-to-door presentation, as well as offering deep discounts for retrofit projects, helped strengthen the final targeted phase of the campaign. Packages consisted of insulation retrofitting (to conserve cool and warm air) and the replacement of old, energy-sucking appliances (such as antiquated water heaters and gas furnaces). Because of the high cost, even residents of the Tapestry targeted neighborhoods, who could afford the packages, would need incentive for buy-in. To sweeten the deal, staff offered rebates of up to \$5,000 per home.

"The high out-of-pocket cost of an energy upgrade was identified as one of the largest barriers to homeowner participation," said Easdale. "Incentives attracted homeowners who didn't have the means to cover an entire upgrade."

Besides those financial factors, attributes such as environmental group participation would also be evaluated within Community Analyst—lending further refinement of the department's route planning.

### Surpassed Expectations

Map-based demographic and lifestyle research tools that facilitate understanding are an essential tool in wide-scale marketing campaigns such as Energy Upgrade California—San Francisco. Visual orientation instantly conveyed to the department where its outreach team should go, whereas spreadsheets of population data would only have served to confound research.

Thanks to its extensive preliminary research and staggered marketing, the department was able to exceed its expected sales by 81 homes. Reuben Schwartz, who manages the department's residential energy efficiency programs said, "Correlating energy consumption to both geographic and demographic traits of our residents is critical to our success. Esri's tools were an invaluable tool to help us make those connections."



↑ Door-to-door sales staff engaged homeowners by explaining the energy program and providing collateral.

# Recruit

Created by GIS WebTech

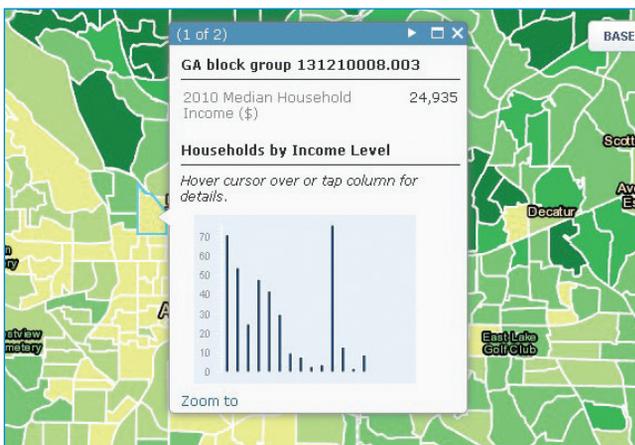
Designed for  
Economic  
Development

## What is Recruit?

Recruit is cloud-based software that serves as a research and decision-making tool for site selectors and economic developers requiring specific data, relative to available sites and buildings of interest. Through a streaming, continuously updated data feed, users can quickly discover geo-specific trends and characteristics that are highlighted for the address or regions of interest.

## Examine, Create and Present

Recruit provides a geo-analysis of data, featuring interactive heat maps and extensive demographic information and stats regarding variables such as education, income, traffic counts, health and the economy. The system's streaming data feed provides an extremely accurate perspective of a community and its corresponding ZIP codes, block groups and census tracts.



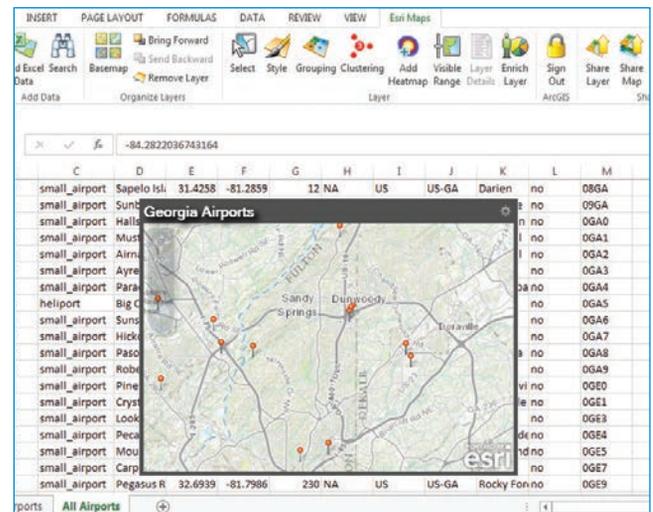
Recruit's streaming data feed focuses down to block group level, displaying a detailed graphical breakdown of income distribution within each block.

## Search, Emphasize and Share

Discover unique variables within a community by researching over 7,500 different variables, such as vehicle traffic, spending habits and educational attainment.

Create custom maps with Recruit's cloud-based report generator and present multiple variables related to a location, in one map, such as trade zones and suppliers' locations.

Share custom reports and interactive map files seamlessly on websites, documents, PDF's and PowerPoint files.



Recruit creates maps from existing MS Excel files and converts them into graphical data maps. The maps can be shared in the cloud or via the web, social media and blogs.

Visit [giswebtech.com/recruit](http://giswebtech.com/recruit) to learn more.

# Apps Most Wanted

by Bonnie Svrcek, ICMA President

Earlier this year, the International City/County Management Association (ICMA), in collaboration with Esri, announced a new initiative to integrate big data, open data, maps, and apps to better assist local governments in their work. While most of us will never become full-fledged techies, we do need to know what questions we should be asking of our IT staff and how we can take advantage of the efficiencies new technology affords our efforts to deliver high-quality service to our residents.

The Esri-ICMA Local Government and Technology Initiative held the first in a series of activities in April 2013 at Esri in Redlands, California. Twelve ICMA members from around the United States discussed the kinds of apps that would help their organizations better serve their communities as well as apps that would help them do their own jobs. Participants represented local governments ranging in size from Lake Isabella, Michigan (population: 1,681), to Montgomery County, Maryland (population: 989,794).

The group developed a list of 150–200 potential apps that would be useful for local government work, then narrowed that list down to the group's top priorities. Esri will be working with their solutions teams, partners, and start-ups to develop these apps so they can be implemented in any community. The complete list of app ideas helped drive the first-ever hackathon, Hackstock for #Local Gov, which took place at the 2013 ICMA Annual Conference in Boston, Massachusetts. There, start-ups and developers created prototypes for those ICMA-requested apps, wowing many in attendance with the power of Esri APIs and software developer kits (SDK).

Judging from the success of Hackstock for #LocalGov, ICMA believes apps and mapping technology will transform how local government delivers transparency and critical services. It's an exciting time, but we've got a lot of thinking to do as a profession.

## Rancho Cucamonga Maps Its Military Service Banner Program

Rancho Cucamonga, California, now has a website for service members and their families to view and locate banners online. The program was launched in 2005 to honor residents serving active duty and currently displays the photos and names of 400 service members from Rancho Cucamonga. Recently, the city's GIS team translated the program to an online story using the Esri story map template.

For years, Rancho Cucamonga looked for the most efficient way to manage its banner oversight and maintenance. After investigating several possible management solutions, the city chose a front-end viewer built with Esri ArcGIS API for Flex that connected to the city inventory database. The internal application helps city maintenance personnel easily find the locations of banners damaged by wind and replace them.

Soon after, the Rancho Cucamonga GIS team discovered the Esri story map template and decided to use it to promote the banner program. Specifically, the city wanted an interactive, publicly accessible site that mapped the locations of every banner in the program. It customized the template with an original design to match the city's website aesthetics, including logo, fonts, and color themes. Then it connected the site to a database that contained the pictures and descriptive information of each Rancho Cucamonga resident in the armed forces.

"The storytelling mapping templates bring about an interactive forum for community building," said Christopher Thomas, Esri's director of government markets. "The web application allows citizens to explore their community, share their pride with relatives and friends, and maintain a connection with loved ones."

The site launched last summer to praise from service members and their families. It can be found at <http://regis.cityofrc.us/RCHonors>.



↑ The Rancho Cucamonga Story Map displays photo, name, and branch of service for each city resident in the armed forces.

# Esri Supports National Day of Civic Hacking

Last summer, Esri participated in the National Day of Civic Hacking, providing software, apps, code, and technical assistance. Cosponsored by the White House, the event brought together government personnel and developers from many disciplines to collaboratively tackle civic challenges through the art of hacking. The National Day of Civic Hacking was created specifically to foster innovation in government via collective problem solving.

Esri sponsored National Day of Civic Hacking events in four US cities: Los Angeles, California; Denver, Colorado; St. Louis, Missouri; and Minneapolis, Minnesota. For each event, Esri brought geospatial awareness to hacking by providing subscriptions to ArcGIS Online, its cloud-based mapping platform, for hacker teams to use in their projects. Websites with data portal access and links to Esri developer tools—sample code, APIs, software developer kits (SDK), and map viewers—were supplied to all teams, giving participants a one-stop resource for creating applications that display authoritative national data.

Esri staff were present at each location to provide hands-on technical assistance. For the California hackathon, HackForLA!,

the City of Los Angeles worked with Esri to create an ArcGIS Online data portal providing datasets for hackers to exploit in their apps. The event attracted more than 400 people, including 200 developers, to the Boyle Heights Youth Technology Center (east of Los Angeles) to improve the quality of life in Boyle Heights.

The HackForLA! event invited developers to use technology and public data to innovate solutions for neighborhood and local challenges. Developers built apps ranging from emergency notification systems to pollution monitoring to communication platforms.

Check out the full submission gallery at <http://hackforla.challengepost.com>.

For more information about the National Day of Civic Hacking, visit [hackforchange.org](http://hackforchange.org).

HOME GALLERY MAP GROUPS SIGN IN

**City of LOS ANGELES OPEN DATA PILOT**

« A Story Map of Los Angeles Across the Top of LA City Boundary Council Districts »

**Welcome to the City of LA Open Data Pilot!**

This project is an experiment testing various technology solutions for publishing government data to increase transparency, help promote civic engagement and to spur economic innovation and collaboration. Data is available for download and the public can recommend specific data be made available.

[Click Here to Take a Brief Survey »](#)

[Review the Gallery »](#)

Browse through existing mapping data provided by the City of Los Angeles.

[Make a Map »](#)

# DNA Not Required

Kent County, Michigan, GIS Department Helps Narrow Suspect Pool in Murder Trial

**“Those maps were the glue that connected space and time in the jurors’ minds.”**

Robin Eslinger, Assistant Prosecuting Attorney at Kent County

A dearth of physical evidence in a murder case can be the bane of a prosecutor’s existence. Without a smoking gun, state attorneys need compelling circumstantial proof to convince jury members of a defendant’s guilt. In the absence of direct evidence, prosecutors are learning that visualization methods, such as mapping raw GPS data, can be as useful as DNA in narrowing down a suspect pool.

A bizarre event in Kent County, Michigan, in 2011 inadvertently resulted in a partnership between county litigators and the county GIS department, introducing prosecutors to the power of spatial technology as a jury-persuading tool. Recently, that teaming helped successfully convict a homicide suspect in Kent County based primarily on maps of cell phone activity on the day of the murder.

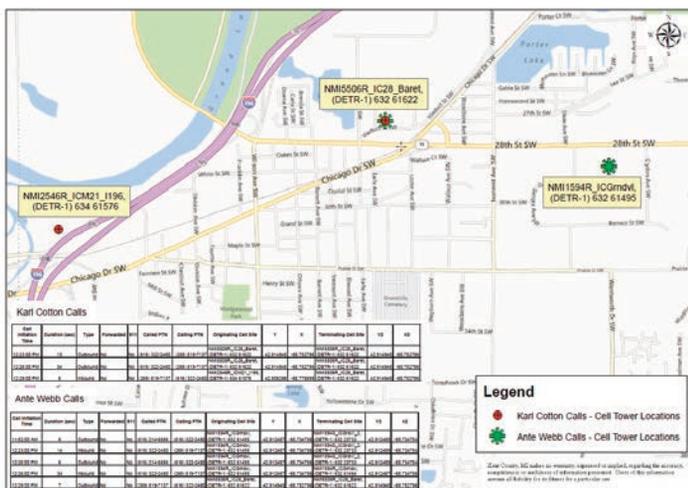
## Indecent Exposure

It started one sunny afternoon two years ago when Brodey Hill, GIS analyst for Kent County, went for his routine lunch-hour jog. Nearing a busy intersection, Hill was startled to see a guy exposing himself in front of commuters.

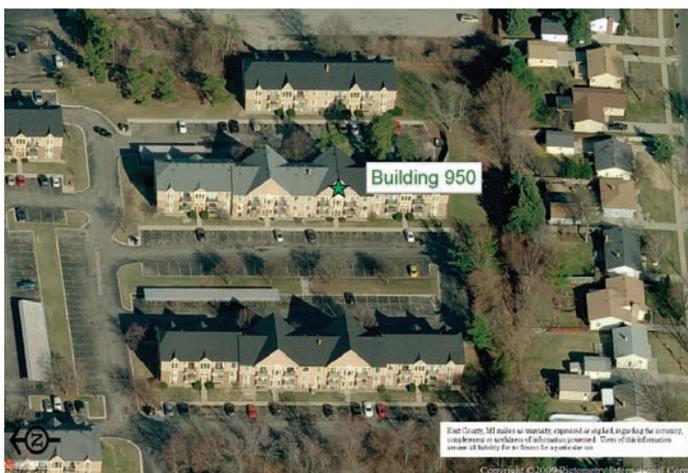
“I just kept running, hoping someone had already reported him,” said Hill. Later, on his way back, Hill noticed the man walking toward him. “I confronted him about his behavior, which made him belligerent.” Concerned that other pedestrians would soon be threatened, Hill decided to forcibly detain the aggressive nudist. A wrestling match ensued, migrating from the sidewalk to nearby foliage. Police arrived within moments. Hill got cleaned up and returned to work, thinking he’d seen the last of the offender.

To everyone’s surprise, the arrested man wanted to defend his lewd actions before a jury. His trial, in which Hill was subpoenaed to testify, effectively introduced the county prosecutor’s office to GIS.

“The prosecutor had been using Google Maps to depict the scene of the crime and establish his case,” said Hill. The images were spartan, consisting mainly of web screen captures with no features or symbols to help orient the jury. “When I saw those exhibits, I knew that more professional maps could demonstrate the prosecution’s case better.” Using ArcGIS, Hill voluntarily created oblique aerial views populated with relevant feature layers of the area. These more detailed exhibits showed that the defendant exposed himself in an area of downtown viewable from numerous angles, thus corroborating the public indecency charge.



↑ This map shows Karl Cotton arriving in the Grand Rapids area from Benton Harbor and meeting up with another suspect at a gas station on 28th Street before the murder.



↑ Pictometry oblique imagery shows the rear of the apartment building where the murder occurred.

## Tough Case

Around the same time, Robin Eslinger, assistant prosecuting attorney at Kent County, was handed the case of a murder with no direct evidence. Lead detectives believed that one of the suspects, Karl Cotton, an ex-felon with a long rap sheet, killed a woman named Jamie Powell after Cotton was robbed of \$10,000 by two of Powell's acquaintances who were present during a drug deal in Powell's apartment. Because the robbers fled through a bedroom window after stealing the money, police hypothesized that Cotton accused Powell of being an accomplice to the theft, fatally shooting her multiple times. Investigators believed Powell had no knowledge of any robbery or drug deal plans that day.

It was an unusual case. The crime scene had no useful fingerprints, and an exhaustive search of Powell's apartment yielded no useful DNA. To successfully prosecute Cotton, Eslinger would need to gather facts that would implicate Cotton beyond any reasonable doubt. That's when one of Eslinger's colleagues (the prosecutor from the aforementioned streaker trial) suggested contacting the county GIS department to create maps to build her argument.

## Some Alibi

Cotton's alibi, if you could call it that, was that he was somewhere else during Powell's shooting. Case detectives soon learned that Cotton canceled his cell phone and activated a different phone with a new number the day after the shooting. That key fact, combined with Cotton's denial that he had opened a new account, led investigators to believe that phone records could be the linchpin of the prosecution's case. Rather than throw detectives off the scent, Cotton's behavior focused their attention on all the suspects' cell phone activity that day.

After acquiring records from all the cell carriers involved, Hill used ArcGIS to digitally plot Cotton's and the other suspects' trails on the day of the crime. "We needed that information condensed so that we had time, phone number, and coordinates displayed in point symbology on the maps," said Hill. "We color-coded the routes to distinguish them, which clearly placed Cotton at the scene of the crime at the time that it occurred—no DNA required."



↑ This map plots the cell phone coordinates of one of Powell's acquaintances, eliminating him as a suspect because he was not in the area of the murder when it happened.



↑ This map shows the cell phone activity of Karl Cotton and the other suspects at the time of the murder. The data came from the cell tower nearest Old Orchard Apartments, the murder location. This map verifies the suspects were in the area of the murder when it was committed.

Hill created two other key maps that displayed the suspects' escape routes derived from calls they made that day. The maps demonstrated that all suspects—save for Cotton—were in other parts of the city when the shooting took place. Maps created for the prosecution thus became the centerpiece of the Cotton trial.

Lawyers are accustomed to seeing a jury zone out when presented with numbers and tables. Exhibits of blown-up cell phone records might have displayed key facts of the case, but they would have lacked a connective medium to join whereabouts with the time of each call. "Those maps were the glue that connected space and time in the jurors' minds," said Eslinger. "It was great to tell the jurors, look, this must be Powell's murderer because the mapped phone records put Cotton at the scene and show the other suspects weren't there. GIS helped us make that fact plain as day."

## Word Spreads

Since Cotton's conviction, word spread quickly throughout the county about the services and support Kent County GIS provides. Hill now regularly testifies as an expert witness in trials, explaining the significance of exhibits he has created with Esri software. "Consumer mapping doesn't hold a candle to professional maps," said Hill. "Displaying the county seal, legends, and labels—everything that defines an authoritative GIS map—amplifies the persuasive power of these exhibits, which is critical in murder trials lacking direct proof."

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