

Esri News

for State & Local Government

Winter 2024

Portland's Mission to Reduce the Impacts of Urban Campsites the Right Way

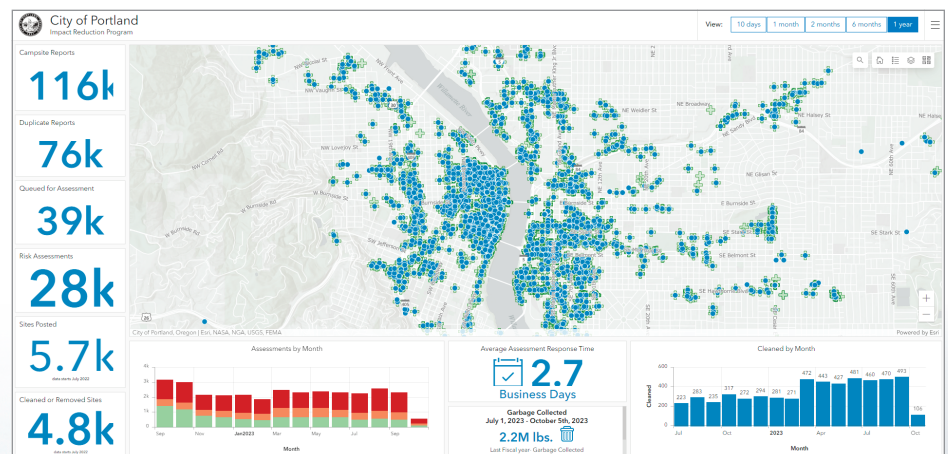
Homelessness is a human crisis that constantly calls for solutions in local communities. This crisis means that people displaced from their homes are forced to set up campsites around public areas, which can be unsafe and impede access to city amenities for others. Like other cities across the country, the City of Portland, Oregon, is experiencing the need to clean up shelters in its community that pose a risk and do so in a fair and unbiased manner. This past year, the city turned its urban campsite removal into a process based on a geographic approach, which has resulted in a streamlined automated workflow between government, nonprofit, and private entities and provides transparency to all residents on the city's efforts.

Paper Processes and Terabytes of Data Lead to Inefficient Workflows and Lack of Transparency

Portland's Homelessness and Urban Camping Impact Reduction Program (IRP) coordinates campsite cleanup on public property and rights-of-way owned by the city. Before implementing

geographic information system (GIS) technology into its workflow, the city was processing all intake forms via email first and then using a custom form on PDX Reporter that feeds a database. The city was also using spreadsheets as a means of dispatching mobile workers and

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↑ The IRP dashboard displays several metrics related to the city's efforts. The public can view the number of campsite reports submitted, the number of sites assessed, and which sites have been removed. As you click on a campsite, a pop-up displays images of the campsite before and after it was cleaned up, along with additional site information.



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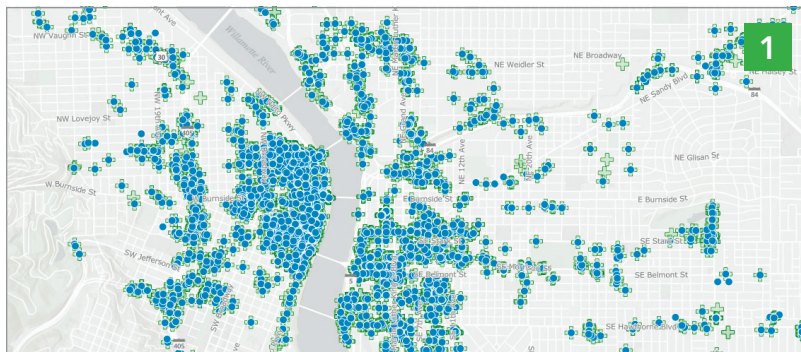
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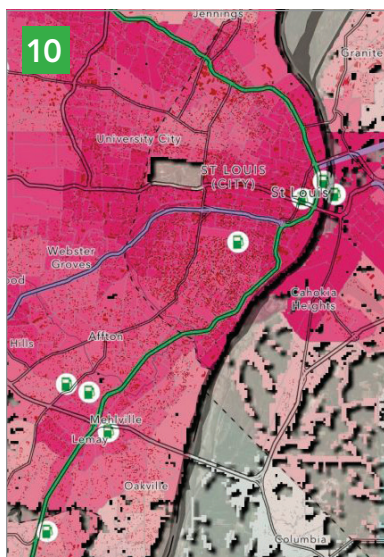
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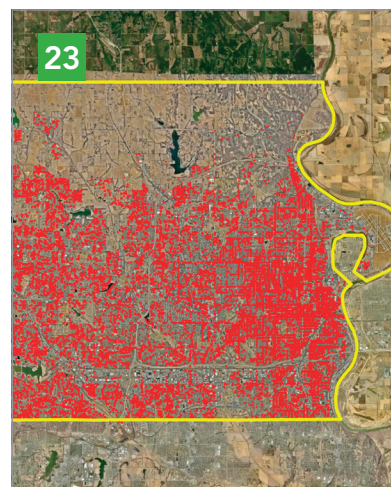


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Kansas Overdose Response Strategy Team Leverages GIS to Combat Substance Misuse Health Crisis

Governments across the nation are all struggling with responding to the substance use disorders and overdose deaths that plague their communities. Although various agencies have increased access to naloxone (a medicine that can rapidly reverse an opioid overdose) and provided more education around substance use disorders, drug-involved overdose deaths have steadily increased since 2019.

Another response was the launch of the Overdose Detection Mapping Application Program (ODMAP), a web-based tool that displays drug misuse spikes and clusters within and across jurisdictions nationally. The Kansas Overdose Response Strategy (ORS) team values the information ODMAP provides to jurisdictions. Still, the Kansas ORS team, in partnership with the Midwest High Intensity Drug Trafficking Area (HIDTA) and Wichita State University's Community Engagement Institute (CEI), saw value in taking ODMAP a step further with geographic information system (GIS) technology.

Seeing where overdoses are occurring and identifying hot spots are essential, as these allow organizations to allocate resources to the areas most in need. However, identifying these populations was the first step for the Kansas ORS team. By adopting ArcGIS® Community AnalystSM, a web-based app that provides GIS mapping software capabilities in a simple and easy-to-use framework, the team was able to

- overdose hot spots.
- Highlight social determinants of health (SDOH) to make overdose prevention efforts more equitable.
- Prioritize elementary schools located in hot spots for mentorship programs to help build resiliency for at-risk youth.

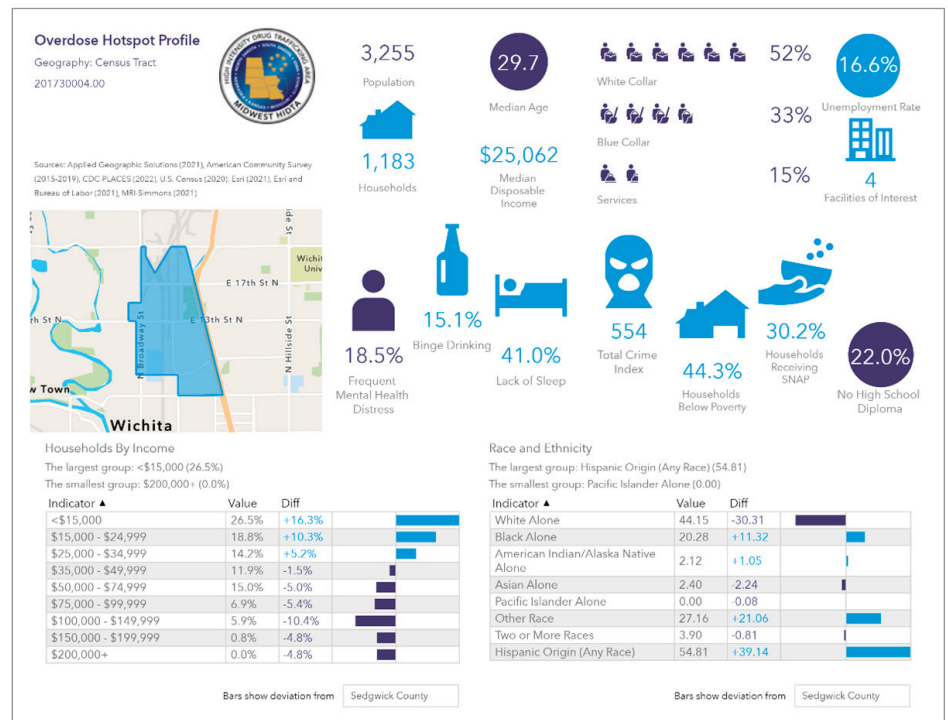
Identified Hot Spots: Hotels, Apartments, and Gas Stations

Leveraging the ODMAP, the Kansas ORS team located places where the state was seeing a high number of drug overdoses. Since adopting ArcGIS Community Analyst, the Kansas ORS team has

identified certain hotels, apartment complexes, and gas stations that were drug overdose hot spots.

Based on the location intelligence that GIS technology provided, the Kansas ORS team partnered with the Wichita Police Department and Safe Streets Wichita to distribute naloxone to the hotels where there were high rates of drug-induced overdoses. Safe Streets Wichita created door hangers and distributed them at the apartment complexes, informing tenants of overdose prevention tips as well as instructions on how to order

continued on page 4



↑ Midwest HIDTA Overdose Hot Spot Profile Infographic Created with ArcGIS Community Analyst

Kansas Overdose Response Strategy Team Leverages GIS to Combat Substance Misuse Health Crisis

continued from page 3

naloxone. Currently, the organizations are working with gas stations to further increase access to and awareness of the life-saving medicine naloxone.

"The overdose heat maps provided by the ORS team supported Safe Streets Wichita's targeted approach for distributing naloxone," said Ngoc Vuong, a community mobilizer for Safe Streets Wichita. "The data also allowed us to reach out to Wichita Police Department [staff], who cultivated long-standing relationships with the lodging facilities, and partner with them to equip those facilities with naloxone."

The Kansas ORS team members knew that this could only be one part of their response. They needed to expand their location-based solutions even further and investigate the role of SDOH as potential contributing factors that can lead communities to substance misuse.

The Social Determinants of Overdose Prevention

The Kansas ORS team can now build hot spot profiles off the data from ArcGIS Community Analyst. For example, the team can identify whether a hot spot area is predominantly Hispanic—information that enables partnering community organizations to tailor their outreach, resources, and education efforts accordingly. This allows the Kansas ORS team to reach out to and work with the most fitting community organizations based on the hot spot profile results.

Prioritization of Elementary Schools Near Hot Spot Areas

The Kansas ORS team also worked with the elementary schools located near the hot spot areas. Through their use of ArcGIS Community Analyst, the Kansas ORS team members identified at-risk students who were going through adverse childhood experiences (ACEs). Also, the team worked with community



↑ Photos from the Safe Streets Wichita Door Hanger Event and Naloxone Partnership with Wichita Police Department

organizations like Kansas Big Brothers Big Sisters to increase access to mentorship and prevention resources. The team is also currently partnering with local police departments to ensure that law enforcement staff work with schools. This activity provides the schools with insight to better help students who may need guidance.

"Data matters because our community matters," said Mary Shannon, CEO of Kansas Big Brothers Big Sisters. "Only when we have a complete understanding of the state of our community do we know how to focus our work as an organization to truly reach underserved populations who need the power of our mission. Our leadership and board of directors are grateful for the eye-opening data the ORS put together, and it has helped inform how we will focus our strategies to help break cycles through our one-to-one mentorship, as well as put forward discussions on who our future partnerships are so we can work together as a village to combat the significant challenges our community is facing."

The Road Ahead: Leveraging GIS for Change

What makes the Kansas ORS team and its partners leading health organizations is the fact that they constantly take their work a step further. Mapping overdoses was not enough, so they worked to

increase access to naloxone. Committed to addressing this health crisis, they then created profiles for at-risk youth and partnered with community organizations to ensure that these young people were not forgotten and received the extra mentorship they needed. In addition, the team has now partnered with the Kansas Prevention Collaborative to participate in Prevention Advocacy Day, an event that provides guidance on how to be effective when speaking with elected officials, while also educating people about upcoming prevention-related legislation.

"The infographics created by the ORS put sophisticated data in the hands of community members focused on substance misuse prevention, equipping them for more current and specific conversations with their elected officials about the needs in their communities," said Chad Childs, prevention initiatives manager with CEI, sponsoring partner of the Kansas Prevention Collaborative's event.

"GIS technology allows us to provide location-based solutions to communities being affected by substance misuse and even set up prevention methods in communities that are at risk," said DJ Gering, Kansas overdose response strategy public health analyst.

GIS technology allows organizations like the Kansas ORS team and its partners to show elected officials where a health crisis is occurring as well as which communities are affected, and, most importantly—to identify the best resources when providing assistance.

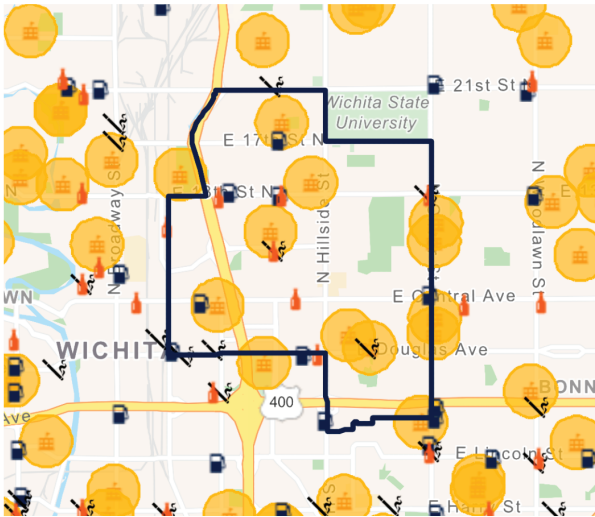


To learn more on how to address substance misuse by leveraging GIS technology, scan the QR Code.

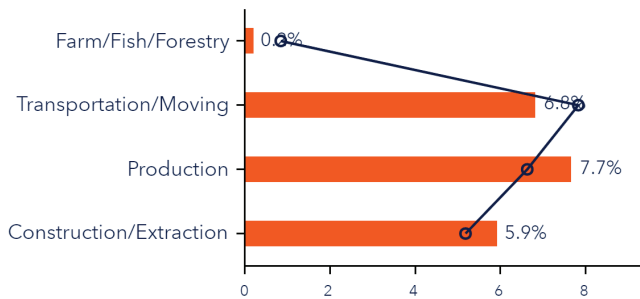
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KANSAS PREVENTION COLLABORATIVE



Injury Prone Employment Rates by Type



Dots show comparison to **Kansas**

Households By Income

The largest group: <\$15,000 (19.2%)

The smallest group: \$200,000+ (3.2%)

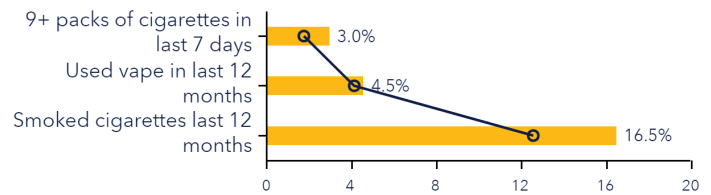
Indicator ▲	Value	Diff
<\$15,000	19.2%	+11.2%
\$15,000 - \$24,999	11.4%	+4.5%
\$25,000 - \$34,999	11.1%	+3.6%
\$35,000 - \$49,999	15.6%	+3.5%
\$50,000 - \$74,999	16.8%	-2.3%
\$75,000 - \$99,999	8.7%	-5.8%
\$100,000 - \$149,999	10.4%	-7.2%
\$150,000 - \$199,999	3.6%	-3.5%
\$200,000+	3.2%	-3.8%

Bars show deviation from **Kansas**

Kansas House District: 84

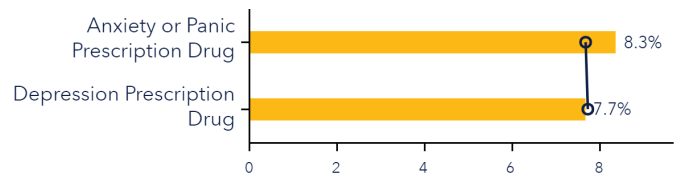


Smoking Rates



Dots show comparison to **Kansas**

Mental Health Prescription Rates



Dots show comparison to **Kansas**

Race and Ethnicity

The largest group: White Alone (41.58)

The smallest group: Pacific Islander Alone (0.14)

Indicator ▲	Value	Diff
White Alone	41.58	-33.57
Black Alone	31.69	+25.94
American Indian/Alaska Native Alone	1.48	+0.42
Asian Alone	2.39	-0.60
Pacific Islander Alone	0.14	+0.02
Other Race	9.40	+4.37
Two or More Races	13.32	+3.41
Hispanic Origin (Any Race)	21.42	+8.24

Bars show deviation from **Kansas**

Data source: American Community Survey (2016-2020), Applied Geographic Solutions (2022), Esri (2022), Esri & Bureau of Labor Statistics (2022), MRI-Simmons (2022)

Leading Application Focuses on Bird Interaction with Electrical Infrastructure

Background

In the United States, the federal government provides protection for migratory birds through several laws, including the Bald and Golden Eagle Protection Act (BGEPA), the Migratory Bird Treaty Act (MBTA), and the Endangered Species Act (ESA). In addition to federal regulations, states may also have bird protection regulations.

Many of the protected birds are attracted to utility infrastructure for perching, nesting, and hunting. Bird use of utility infrastructure can create challenges for utilities tasked with delivering safe, reliable power to customers.

As a community-based not-for-profit water and energy company, Salt River Project (SRP) provides reliable, affordable water and power to more than 2 million people living in central Arizona. SRP engages in efforts to protect and conserve wildlife and acts as a responsible steward of Arizona's natural resources. SRP's Avian Protection Program addresses bird interactions with electrical infrastructure. For SRP, this often means investigating

avian encounters across a variety of assets covering a large water and power service territory.

Challenge

Recording, tracking, and reporting on bird encounters with SRP assets were becoming difficult for SRP's resident biologists. Details provided were not always clear, photos were rare, and exact locations and associated asset information had to be researched. Several follow-up questions needed to be asked by the biologists.

On occasion, a time-consuming follow-up visit to the site was required to supplement missing details. Once assets were identified, work orders were manually created. Tracking down details on work completed by maintenance crews was another step in a lengthy process. Finally, the process to associate photos in the field was also manual.

On the reporting side, it was often challenging to retrieve information on bird guarding expenditures year to year. Additionally, details about work completed were not easy to associate with assets

in the field because of the lack of precise geographic data.

Solution

SRP's biologists approached the company's Enterprise Spatial and Mobility Solutions (ESMS) and Cartographic and Geographic Information System Services (C&GISS) teams to produce a solution.

In collaboration with several other internal departments, the group was able to implement a solution to address these challenges. Using existing standard company technologies and including ArcGIS Server, ArcGIS Desktop, and ArcGIS API for JavaScript, they were able to blend separate workflows into a single streamlined approach.

The Bird Incident Reporting Database (BIRD) web application was hatched to bridge the existing field data collection application to the work order management system.

SRP was easily able to expand the use of its mobile data collection application, Geographic-Take-a-Picture (GeoTAP), in the field by providing new groups access

The screenshot displays the BIRD web application interface. On the left, a form for 'Incident 4741' is shown, reporting by 'Lyle Swinly' on '3/29/2022'. The location is 'SRP Asset: Distribution (Distribution_pole) Facility ID: 1455097'. The weather is 'Rain' and 'SRP Service Disruption' is checked. The damage description is 'Nest on pole caused outage. Nest removed'. Below the form, there are sections for 'Affected Bird' (showing a photo of a bird) and 'Attachments' (showing two photos of a bird on a pole). At the bottom, there are buttons for 'Create Service Request', 'Merge', 'Delete', and 'Save'. On the right, a map shows the location of the incident, with a red circle highlighting the specific asset. The map includes labels for 'AREA 4', 'Dune Pass Rd', 'Kyaukse Rd', and 'Black Opal Ln'. A search bar at the top right of the map says 'Find address or place'.

← Screenshot of the details page of the new BIRD application.

to the existing application. With little training required and in more hands, the mobile application has become the preferred method for collecting data on bird encounters.

Once field data, photos, and location are collected, a new data process imports the data into the office web application (integrated with ArcGIS API for JavaScript), BIRD. After the data is imported, the biologists are notified via email. Then they can quickly evaluate the encounter by looking at photos, precise locations, company assets, and field notes. From these details, the biologists associate the encounter with a specific asset by clicking on a map.

Once the encounter details are reviewed, the biologists readily create a service request in SRP's work order and asset management system (Maximo) by clicking a button in BIRD. Specifications are automatically created in the request to highlight nearby infrastructure needing to be evaluated for bird guarding.

When the service request is created in Maximo, the transmission or distribution group responsible for the asset is alerted. These groups then assess, prioritize, and transition the service request into a work order.

A dashboard was created in Maximo to provide the biologists with a quick view of the work orders and service requests relating to bird encounters. Other processes were put into place to identify and track costs associated with bird guarding efforts.

Result

The BIRD web application and enhanced workflow contributed to an estimated savings of 25 percent in office labor annually and 50 percent fewer on-site visits by a biologist. The application streamlined the annual US Fish and Wildlife report process from a 3–4 day effort to a 60-minute process.

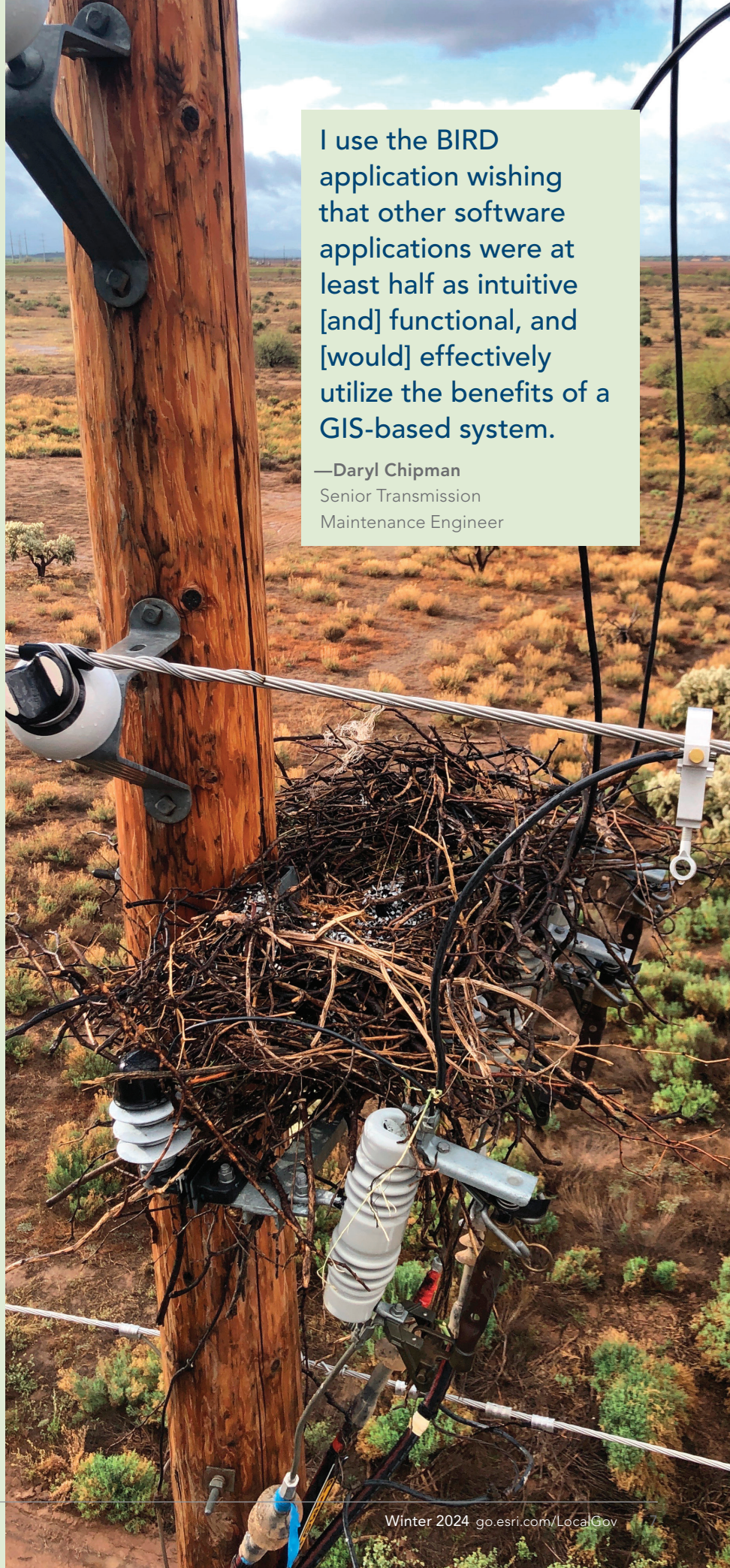


To learn how GIS applications help track assets in the utility infrastructure network, scan the QR Code.

go.esri.com/SRP4SLG

I use the BIRD application wishing that other software applications were at least half as intuitive [and] functional, and [would] effectively utilize the benefits of a GIS-based system.

—Daryl Chipman
Senior Transmission
Maintenance Engineer



storing campsite photos as hyperlinks. The terabytes of data being delivered and stored through email made the work chaotic, and it took an immense effort to manage and keep records up-to-date. In addition, with the number of cleanup requests coming in, there was no easy way to see if multiple reports of the same campsites were submitted, which resulted in duplicated efforts.

The lack of data visualization also made the workflow hard to manage for the three-person team, with team members having to take turns working on weekends to ensure that there was not a massive pile of reports that needed to be taken care of come the start of the work week.

"Our team worked weekends to ensure that our residents' inquiries were handled in a timely manner. The bandwidth of our team made it difficult to process these requests through our old intake processing system," said Lucas Hillier, IRP program manager.

Although the city was actively responding to all incoming requests, constituents had no insight into the progress being

made, which at times led to heightened tensions among community members and neighborhoods. The city realized it needed a way to not only organize its efforts and workflow but also provide transparency to residents in real time.

Campsite Cleanup Is a Community Effort with GIS

To demonstrate to residents that the city was listening and responding to their requests to the best of its ability, Hillier teamed up with the city's Corporate GIS (CGIS) team to incorporate a geographic approach into every step of its workflow.

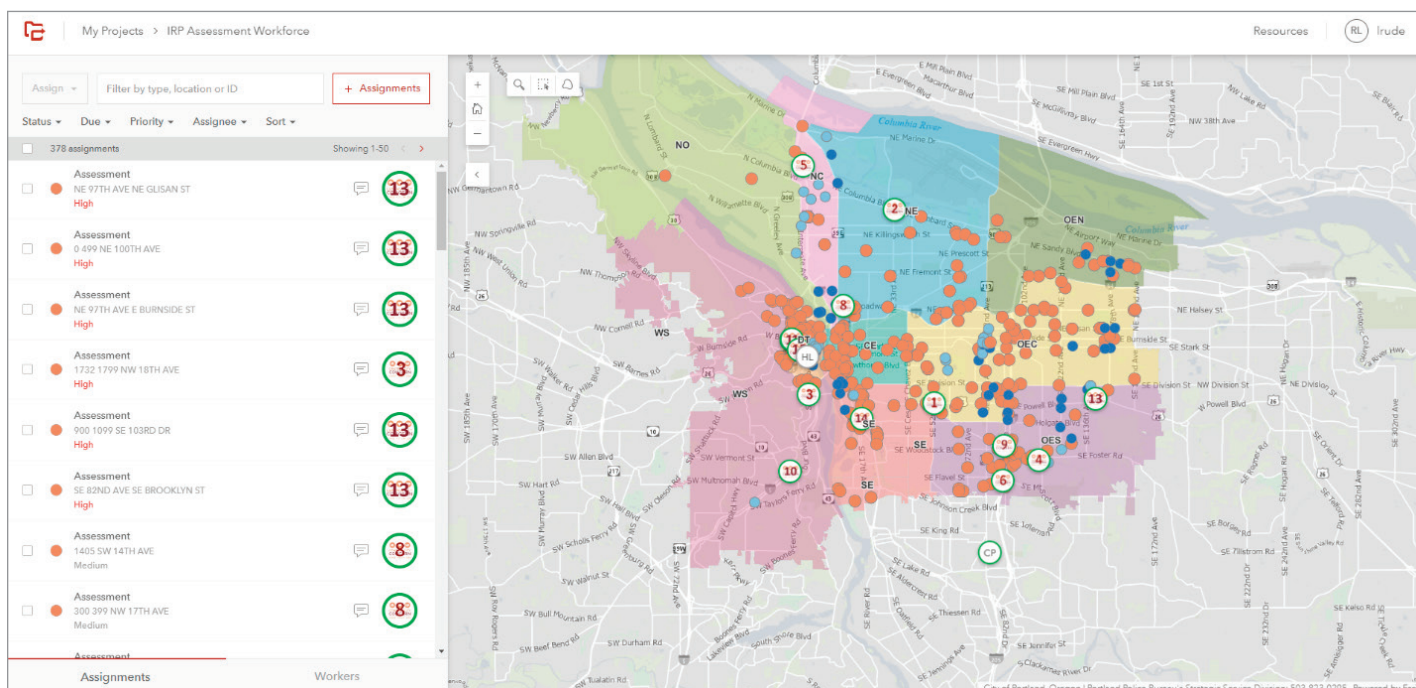
Using the city's existing 311 app, all urban campsite cleanup requests are automatically extracted and moved to an ArcGIS REST web service where duplicate entries are identified and consolidated into one work order. Using ArcGIS Workforce, a mobile app solution that coordinates mobile workforces, requests would trigger the work order as an assignment for Clean Start, a Central City Concern program. Central City Concern is a nonprofit organization serving people

experiencing or at risk of experiencing homelessness through employment programs (like Clean Start), housing, health care, and recovery services.

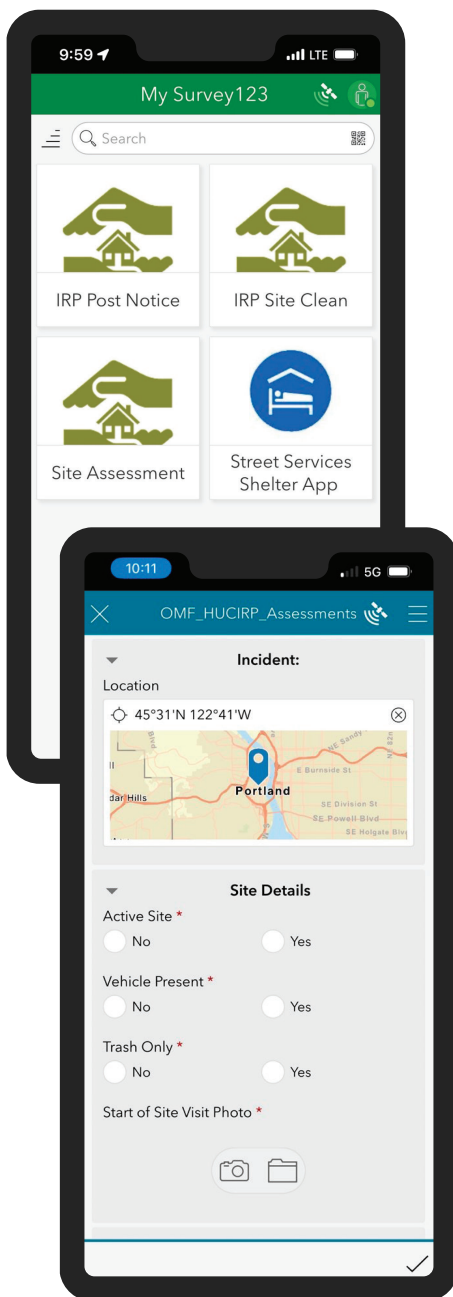
Once they receive the work order, Clean Start staff use ArcGIS Survey123, a form-centric data collection solution, to assess the campsites for the city. Since the staff have lived a shared experience, they can address the situation with more empathy and come off as less confrontational to those experiencing homelessness. The mobile workers collect key information about everyone at the campsite.

In addition to collecting assessment information, Clean Start staff engage with campers to offer to clean the space around their camps and leave garbage bags on-site. Meanwhile, the city will send trained outreach workers who will offer additional services and resources.

A prioritization score is given to each campsite based on the information the field staff input into the ArcGIS Survey123 form. This score helps the city identify which campsites need to be cleaned up first. Once each campsite has been



↑ In this ArcGIS Workforce screenshot, internal staff can see in near real time which of the requests are being assessed, receiving a legal notice, or undergoing cleanup.



↑ Top: ArcGIS Survey123 separates each workflow into tabs, making the application easy to use for mobile workers to complete their tasks.

Bottom: The ArcGIS Survey123 form allows staff to assess campsites quickly by answering a series of questions. The assessment will give the campsite a score that will aid in prioritizing high-problem sites to be scheduled for removal.

prioritized, IRP staff also analyze campsites that are located near schools or on streets where there are historically high traffic collision rates. This analysis cleaned up first. Once each campsite has

been prioritized, IRP staff also analyze campsites that are located near schools or on streets where there are historically high traffic collision rates. This analysis helps the city further prioritize cleanup requests. Despite a campsite's initial score, if it is within a school route or dangerous street corridor, staff will raise its priority level.

ArcGIS Workforce consolidates site assessment information collected by field staff that displays priorities for removal. This feature makes it easier for staff to address the higher assessments first, saving time and effort for the IRP team.

The highest prioritized sites are then issued a legal notification. Using ArcGIS Workforce, this generates a task for a city-contracted cleaning company that removes unhoused people's items and tents from Portland's public spaces. The task is to post a legal notice near the site of an upcoming scheduled cleanup effort. The city's contractors use ArcGIS Survey123 to collect additional on-site information and take a picture of the posted notice.

Once the required amount of time has passed before cleaning up a site, a work order is again generated through ArcGIS Workforce to initiate the cleanup process. Throughout the cleanup process, the city contractor documents personal property taken from the site and placed into storage, takes before and after photos, and documents the types of waste collected (biohazards, sewage, drug paraphernalia)—all through Survey123.

After the completion of each step of the workflow, the information collected is reflected in real time onto the IRP dashboard, using ArcGIS Dashboards. Using the interactive web app provides instant feedback and status updates about the urban campsites. At any given time, Hillier can have a clear understanding of the program's operations and ensure all stakeholders involved are addressing the requests on time.

"I now have full insight on what the program's progress is on a daily basis, and our program can relay that

information to the public without any additional effort on our part," said Hillier. "The amount of time that was once spent on tracking who was doing what and taking citizen requests can be allocated toward other aspects of the IRP's objectives."

Applying an Empathetic Lens to Connect People with Resources

Since the city implemented GIS, staff can now streamline report intake processes and deploy mobile workers to a campsite quickly. Since campsite reporting is now displayed on a dynamic dashboard, community members can proactively monitor the campsites in the area as well as their requests. By leveraging GIS, Portland has been able to increase safety and transparency for community members. As of this year, the city has assessed approximately 20,000 campsites and cleans up an average of 97 sites per week.

"The IRP team can visualize its data much clearer and continue to analyze with additional context," said Diego Portillo, Corporate GIS manager for the City of Portland. "We've streamlined the way the city engages with those experiencing homelessness while maintaining an authoritative system of record. We are now set up to support future initiatives around homelessness and provide the transparency that the city has needed for quite a while."

For Portland, GIS facilitated the coordination among several entities with each supporting entity playing a key role in tackling the complex human issue of homelessness. Given that the city is cognizant of the ongoing need for unsheltered Portlanders to have access to safe shelter, sanitary services, mental health, and substance misuse recovery services, GIS will continue to allow the city to take proactive action.



For more information on how GIS is used for the health of state and local communities, scan the QR Code.

go.esri.com/UrbanCampsSLG

How Governments Site New EV Charging Stations to Speed Adoption and Ensure Equity

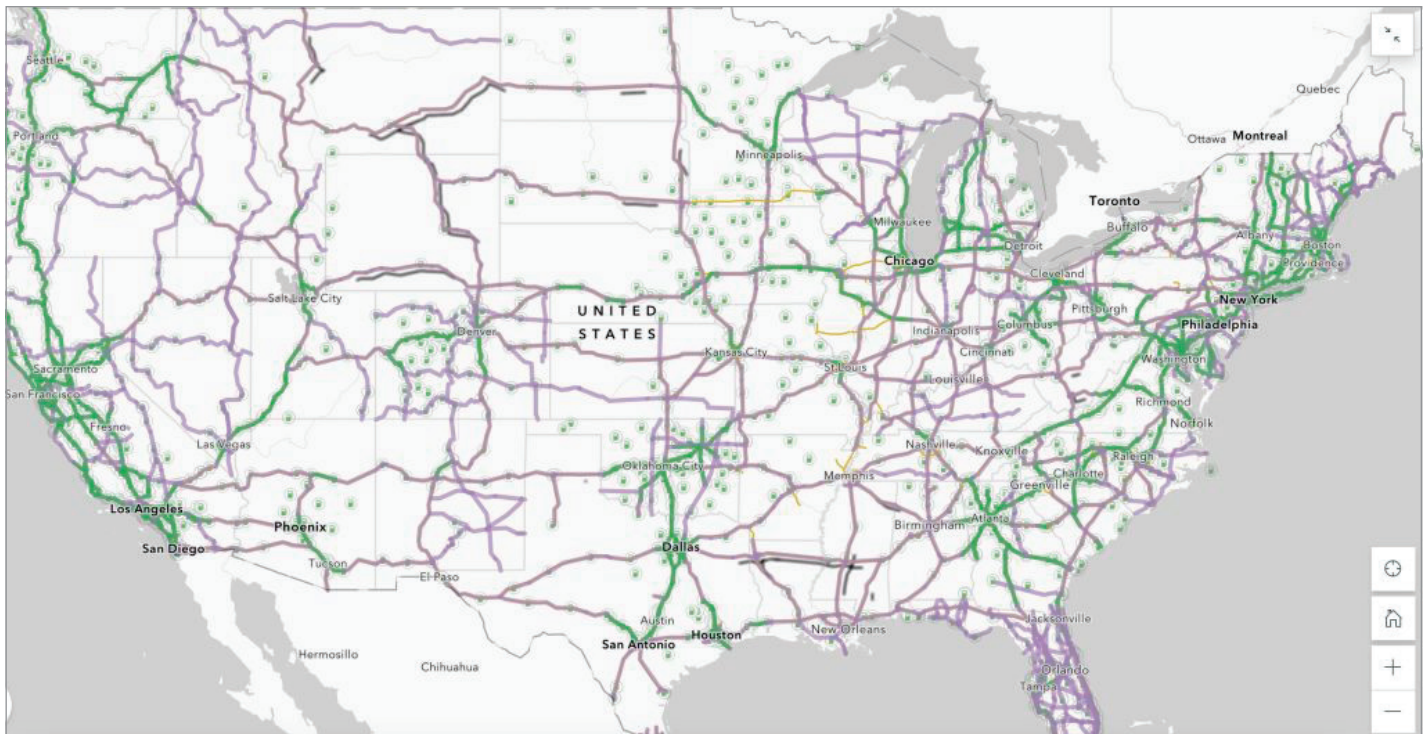
As electric vehicle (EV) use grows, planners and policymakers need to know where to build charging stations to accommodate drivers and encourage adoption—and do so equitably.

Increasingly, government leaders are turning to data-driven maps and location analysis to better position charging

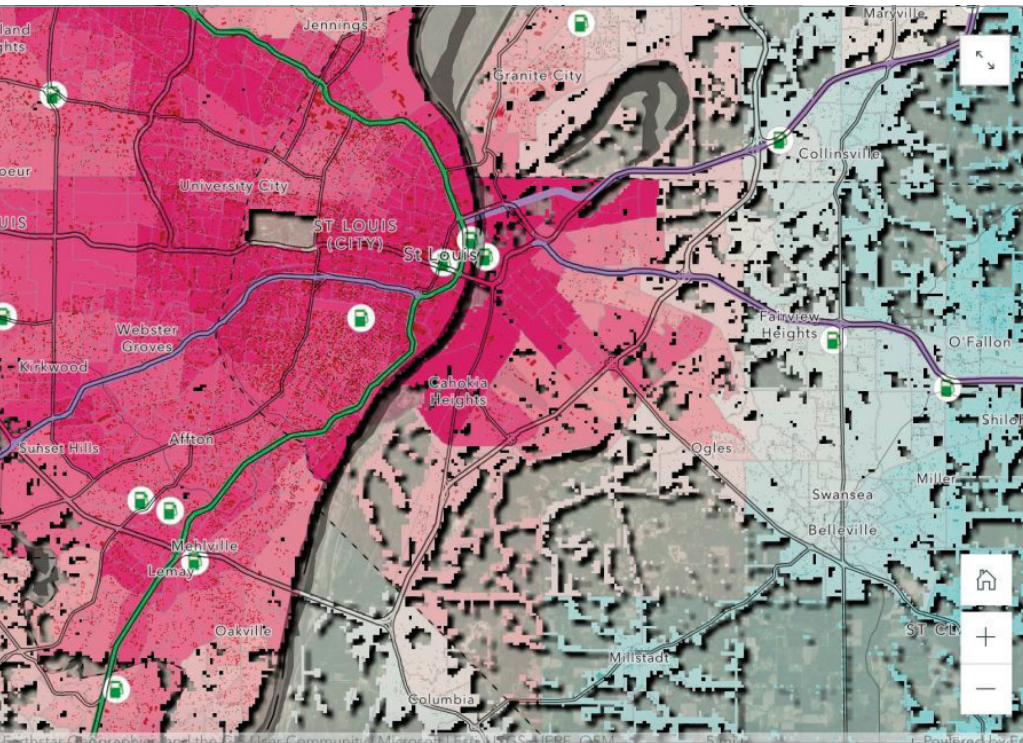
stations in their communities. With this location intelligence, they can see where current EV owners live, where charging stations already exist, and where new charging stations will need to be positioned to support EV growth.

Until recently, EVs were mostly bought by higher-income homeowners who

had garages where they could charge their cars. According to US Department of Energy estimates, 80 percent of EV charging happens at home. Though affordable base model EVs have expanded consumer reach, a lack of accessible and dependable public chargers discourages



↑ This map of the US shows corridors that are EV ready (green) and ones which still need additional charging stations (purple).



↑ This map layers the levels of air pollution (higher levels displayed in pink) over EV-ready corridors.

many from driving these cars. For instance, apartment residents may not have access to overnight chargers.

EV Charging Station Build-Out Is a Location Challenge

In California, a state-funded organization partnered with a Los Angeles-based engineering firm to develop a site-suitability application for EV charging stations. The location-based tool, built using geographic information system (GIS) technology, integrates multiple data streams onto maps and dashboards so that people can visualize a community down to the curb level.

Planners can see all relevant data—including demographics, pollution levels, government funding requirements, and electric grid capacity—in the context of location to consider variables that otherwise may have been missed. They can identify, for example, where best to place accessible chargers near residents for safe overnight charging or for a fast charge so that drivers can travel with ease.

Policymakers also can use maps to seek Justice40 Initiative funding for their EV

infrastructure projects. The initiative dedicates 40 percent of federal investments to communities that have been disproportionately affected by environmental pollution and a lack of access to clean energy resources. The Disadvantaged Communities (DAC) map layer, created by the US Departments of Transportation and Energy, matches Justice40 criteria with census tract data. With this data and other indicators like multiunit housing and Department of Motor Vehicles (DMV)-registered vehicles, policymakers can prioritize EV charger installation in disadvantaged communities.

Getting from Point A to Point B without Worry

Equally important to charging at home is a driver's ability to charge while traveling long distances. Whether traveling on city streets, in neighborhoods, or on interstate highways, many drivers experience range anxiety—the fear their vehicle won't have enough charge to make the trip.

GIS can help planners strategically position EV chargers along freeways, helping curb range anxiety while maximizing

funding for interstate highway projects. Smart maps can show high-traffic routes along with current charging stations to identify where additional ones are needed. Using GIS, planners can verify whether those routes correspond with designated Alternative Fuel Corridors (AFCs) and input locations of interest like rest stops, hotels, and tourist sites to determine where drivers might stop long enough to charge up.

As promising as electric vehicles are in emitting far less harmful carbon emissions, it's wealthy communities that have benefited to date. Wider adoption will require a well-developed, accessible network of EV chargers. Policymakers and planners can use GIS maps to target some of the \$7.5 billion in federal funding through 2026 to build out a network of charging stations in a way that is practical and equitable.



To learn more about how state and local governments can map federal funding targets for sustainable infrastructure, scan the QR Code.

go.esri.com/EVFundingSLG

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How Close Is the Nearest DCFC EV Sta

This map shows the distance in miles to the nearest direct current fast charging (DCFC) EV stations relative to a given highway segment. EV charging stations data is from the US Department of Energy's National Renewable Energy Lab for the US and Canada and is updated daily.

Visualizing the distance to DCFC EV stations is crucial in understanding range anxiety—the fear that an EV won't have sufficient charge. Distance is still perceived to be one of the greatest barriers preventing whole fleets from going electric. Range anxiety is heightened in rural, disadvantaged, and underserved communities—areas where federal funds should be allocated in line with the Justice40 Initiative.

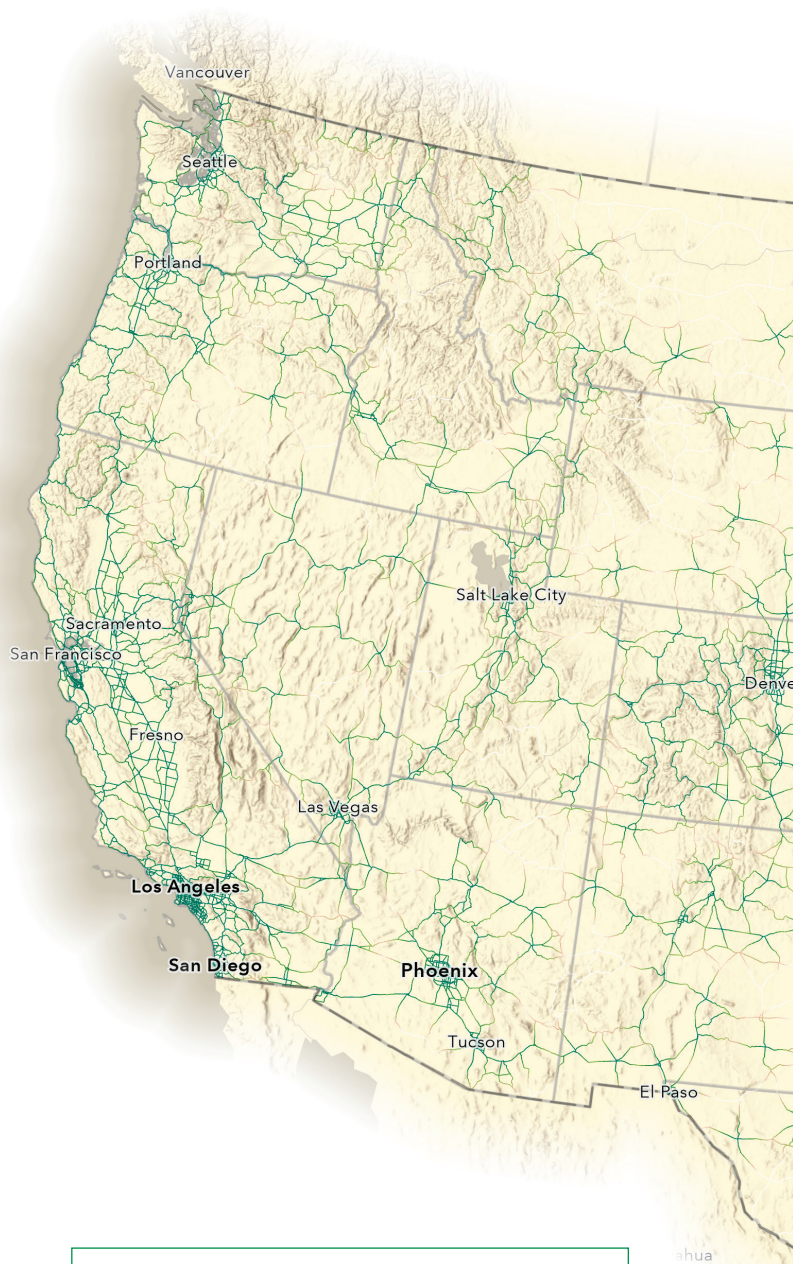
Justice40 is a government effort to allocate at least 40 percent of federal investments to disadvantaged communities. Wealthy communities have reaped the benefit of EV charging stations. Policymakers and planners can use GIS maps to target some of the \$7.5 billion in federal funding to build out a network of charging stations in a way that is practical and equitable.

The changing landscape of people becoming more cognizant of their carbon footprint is reflected in more electric vehicles being on the road. Most of the population who would switch to an EV are much less likely to do so until they are confident that they can travel long distances without fear of not being able to charge their vehicle. So, the need for more charging stations is becoming more apparent.

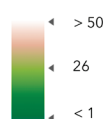


To see where EV charging stations could be placed to reduce range anxiety, scan the QR Code.

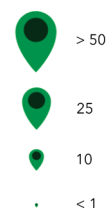
go.esri.com/EV4SLG



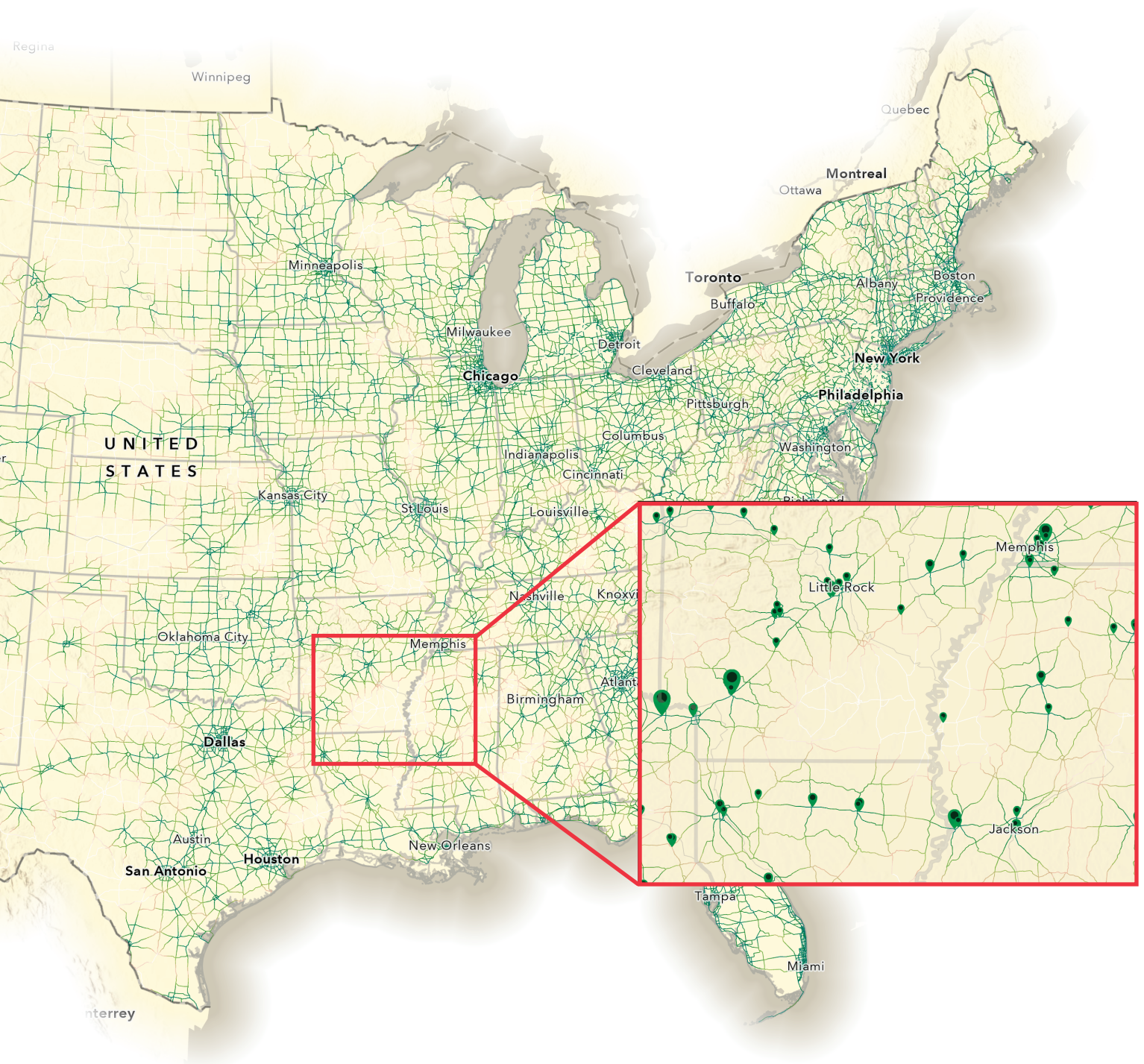
Nearest level 3/DC fast charging EV station (in miles)



Number of level 3/DC EV fast chargers



ation to a Highway?



Solving the Affordable Housing Puzzle by Using ArcGIS Urban: Rocky Mount, North Carolina

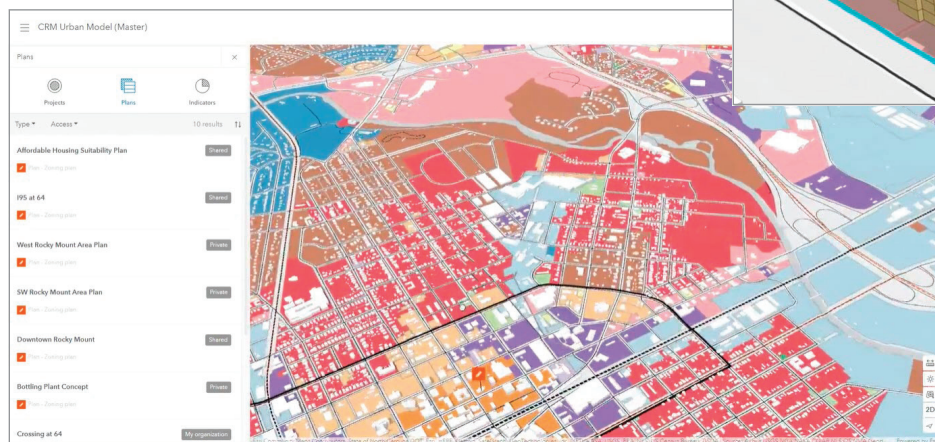
Rocky Mount, North Carolina—home to about 55,000 people—faces significant pressure to grow. Housing development is not keeping up with the demand at Rocky Mount, and the cost of housing is slowly becoming more unaffordable for current and would-be residents. City leadership wanted to solve the affordable housing puzzle and check the feasibility of its current housing density bonus initiative. It knew that leveraging the right technology would be key.

Previously, the city worked with Esri partner ViewPro to build out a digital twin. The digital twin created a 3D representation of Rocky Mount's existing built environment and served as a necessary contextual background, allowing for modeling future changes to zoning and land development regulations. This would give the city a foundation for making more informed decisions regarding future development. In addition to visualizing how code changes could increase or decrease development, the digital twin allowed Rocky Mount to simulate and visualize infill projects.

Rocky Mount's Housing Challenges

A myriad of market forces has created a situation where whole new subdivisions on the edge of town are more prevalent than infill housing or mixed-use projects. This has resulted in single-family homes that are, on average, priced between \$300,000 and \$400,000 and on a half-acre parcel. City officials recognized the increasingly dire need for more affordable housing units, but the city's existing affordable housing stock is dated and in need of capital repairs.

Prioritizing housing has long been a critical component of Rocky Mount's health



↑ Suitability Analysis Process for the City of Rocky Mount

and growth prospects. The city's comprehensive plan identifies affordable housing as an important benchmark, expanding on allowable locations, housing choices, neighborhoods, and level of maintenance.

An April 2021 retreat of the city council—partly focused on ideas and insights for housing affordability—led to policy changes. The city's Land Development Code (LDC) was amended to remove barriers to the creation of affordable housing. Specifically, a scaled density bonus was created, clarifying residential use definitions and types and permitting residential development in commercial districts.

Rocky Mount Affordable Housing Plan

The goal of Rocky Mount's Affordable Housing Plan is to increase the availability of safe, sustainable, and affordable housing options for low- and moderate-income households in the city.

The plan includes several key objectives such as the following:

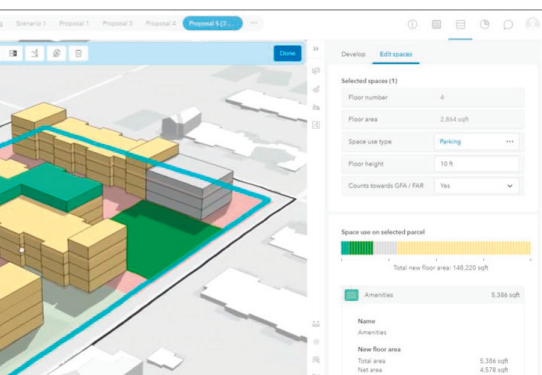
- Preservation of existing affordable housing through rehabilitation and renovation efforts
- Development of new affordable

housing units through partnerships with private developers and nonprofit organizations

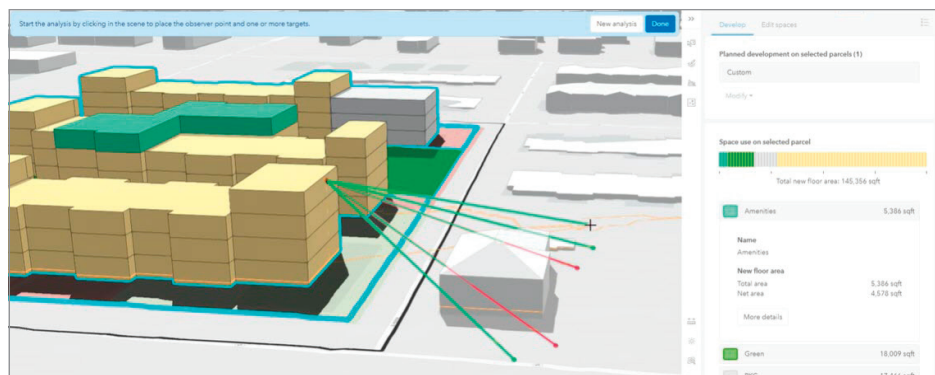
- Utilization of federal and state funding programs to support affordable housing initiatives
- Inclusion of affordable housing requirements in new development projects
- Improvement of housing quality and safety standards in existing affordable housing units
- Promotion of transitional housing and supportive services for individuals and families experiencing homelessness

Overall, the goal is to create and maintain a diverse range of affordable housing options in Rocky Mount that promote economic stability, social equity, and high quality of life for all residents.

The City of Rocky Mount has set a goal of providing 250 new affordable units over the next five years. The city is targeting residents currently classified as cost burdened or severely cost burdened. According to standards established by the US Department of Housing and Urban Development (HUD), if a household spends more than 30 percent of its



↑ Scenario for Modifying Housing Policy with a Two-Story Development



↑ Scenario for Modifying Housing Policy with a Three-Story Development

income on housing, then it is considered a cost-burdened household. If a household spends more than 50 percent of its income on housing, it is considered a severely cost-burdened household. Nineteen percent of Rocky Mount households are classified as severely cost burdened.

Parcel Suitability Analysis

Applying the tools associated with Rocky Mount's smart city initiative allowed for analyzing potential sites across the city, and this analysis needed to answer two key questions:

- Where is the need for more affordable housing the greatest?
- Which areas meet the ideal variables for affordable housing development?

Using ArcGIS Urban software's suitability analysis tool, city staff and the ViewPro team put together a model with eight different variables for identifying suitable parcels for affordable housing development. These variables included civic facility access, transit, preferential zoning regulations, parcel structure, and sites that have a potential for purchase agreements. The suitability analysis results identified six potential areas, which Rocky Mount officials termed *Catalytic Sites*.

Determination of How Many Units Can Be Built

ArcGIS Urban utilized the city's digital twin to apply the existing housing policy to Catalytic Site 1 and validate and

understand its development potential. The model built a typical scenario with an injected housing density bonus. The density bonus allowed for doubling the number of dwelling units with no additional parking requirement in return for designating 20 percent of the units as affordable.

Per the ArcGIS Urban analysis, the city would be able to construct 10 affordable units; however, that would only achieve four percent of the city's five-year goal of building 250 affordable units. Planning and development officials confronted the issue of whether the current policy was sufficient or an update was needed.

Tests of Revised Policy Ideas

Modifying the city's affordable housing density bonus could increase the number of affordable units. Likewise, so could changing floor-area ratios and other building code requirements. Officials used ArcGIS Urban to test a change to the density bonus that allowed for units of two different sizes: 750 square feet with one bedroom and 1,200 square feet with two bedrooms. With the one-bedroom option, more housing can be created, potentially up to 32 affordable units (13 percent of the city's goal). Even with that development, to reach 250 affordable housing units, Rocky Mount would need 7–10 good sites, which is more than had been identified.

Next, the city tested changes to its floor-area ratios in the hope that increasing the height of a development would

increase the number of affordable units. A code change that allowed for three stories (instead of the current two) demonstrated that 47 percent of the goal of affordable units would be possible.

A four-story project, though, adds a maximum of 62 units—a significant percentage of the city's goal. Each of these 62 units would have one bedroom. The city recognized that a mix of one- and two-bedroom units are likely to be needed, requiring from five to seven total sites.

Summary

The initial suitability analysis identified six sites in Rocky Mount that make for good infill developments. Thanks to the ArcGIS Urban analysis, Rocky Mount knows that it can achieve its goal of constructing 250 affordable units in five years through code changes that allow for building heights of at least four stories (in addition to keeping the existing affordable housing density bonus). The use of technology in urban planning is allowing Rocky Mount officials to make data-driven decisions to change affordable housing policy in order to create a thriving, sustainable community.



To learn how to achieve your goal of new affordable housing units, scan the QR Code.
go.esri.com/Housing4SLG

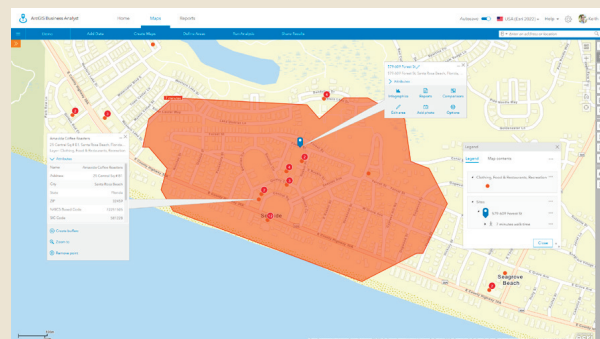


What Makes a

Every community will have variations in its response to this question, but here are five core components of a walkable community:

The concept of a walkable community is not new. America's early neighborhoods were designed strictly for that purpose out of necessity. But the exponential growth of automobile use over the last 100 years made walkable communities a lower priority in many neighborhood designs.

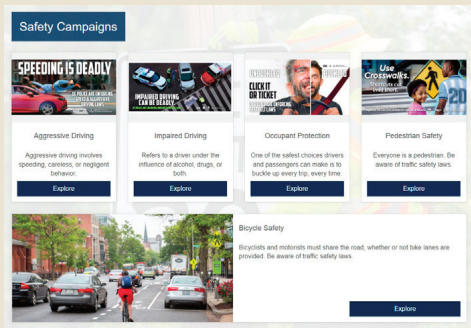
Today, walkable communities are making a strong comeback with public demand and innovative approaches by planners. Since geography is at the core of nearly every facet of planning, geographic information system (GIS) technology has a natural role in the design, development, and analysis of walkable communities.



Economic Mobility

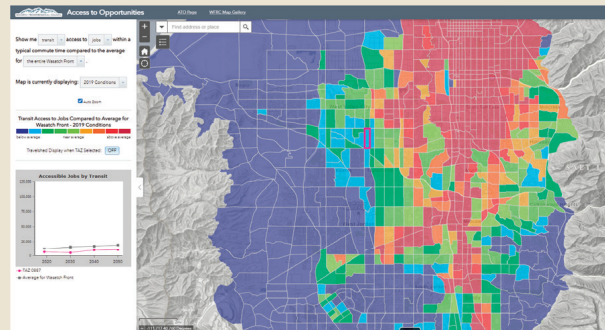
An automobile is not needed for every trip. Residents should have easy mobility through their neighborhoods as well as access to parks, services, grocery stores, schools, health care, jobs, and so forth. A holistic approach to planning walkable communities means actively engaging with economic development organizations (EDOs) and the business community to encourage business retention and growth in these neighborhoods.

Community Walkable?



Safety

Residents of all ages should feel safe from automobile traffic. Feeling safe encourages more outside activity, which, in turn, improves overall health. It also increases sociability, creating a collaborative, close-knit neighborhood.



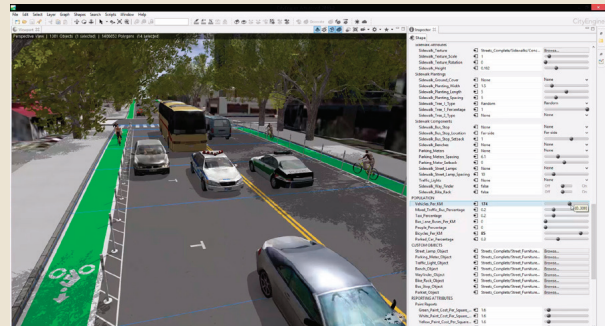
Transportation Accessibility

Easy access to public transit and other transportation options for pedestrians and cyclists should be a priority when designing a walkable neighborhood. This concept is directly tied to economic mobility. Creating a walkable neighborhood minimizes the necessity for automobiles.



People First, Vehicles Second

Pedestrians and bicyclists should be a priority when designing a walkable neighborhood. Well-designed walkable communities mean that access to services, jobs, transit, and more are attainable within reasonable walking or biking distance. Motorized vehicle access does not have to necessarily be removed, but it does need to be relegated in priority to achieve this goal.



Street Design

New developments and streets (both existing and new) should be designed to accommodate pedestrians comfortably and safely, including creating safer crossings.

See more about the geographic approach to planning at go.esri.com/planning4SLG.



Houston-Galveston Area Council Facilitates Stronger Decision-Making with GIS

Web of Influence

Online GIS applications developed by the Houston-Galveston Area Council are facilitating more strategic decision-making and having an impact well beyond transportation.

Over the past 20 years, there has been a tremendous revolution in online digital mapping and the ability to share large amounts of information easily and seamlessly to many users. Some of the most successful transportation agencies leveraging the technology include the Council of Governments (COGs) and metropolitan planning organizations (MPOs), that are responsible for long-range transportation planning, as well as housing, economic development, and land-use policies (among others) for their urban regions.

Because of the large data and information requirements of long-range transportation and economic forecasting, as well as data needed to make long-range strategic capital improvement decisions, these COGs and MPOs were early adopters of GIS software. The

Houston-Galveston Area Council (H-GAC) was one such agency that recognized its advantages in enabling more data access and transparency. Staff use Esri's ArcGIS Online to shorten the time taken to complete transportation and infrastructure projects and to navigate their way through the planning and approval processes. Widely accessible data is also helping the agency better understand a project's potential environmental impacts and plan greater resiliency against the future effects of climate change.

Handling Growth

H-GAC is a region-wide voluntary association of local government organizations in the Gulf Coast planning region of Texas. Its geographic area covers a total of 13 counties, 134 cities, and 12,500 square miles. H-GAC is also the metropolitan planning organization for the eight-county metro area surrounding Houston, Texas, and is responsible for regional planning activities in most areas of shared governmental concern, including transportation.

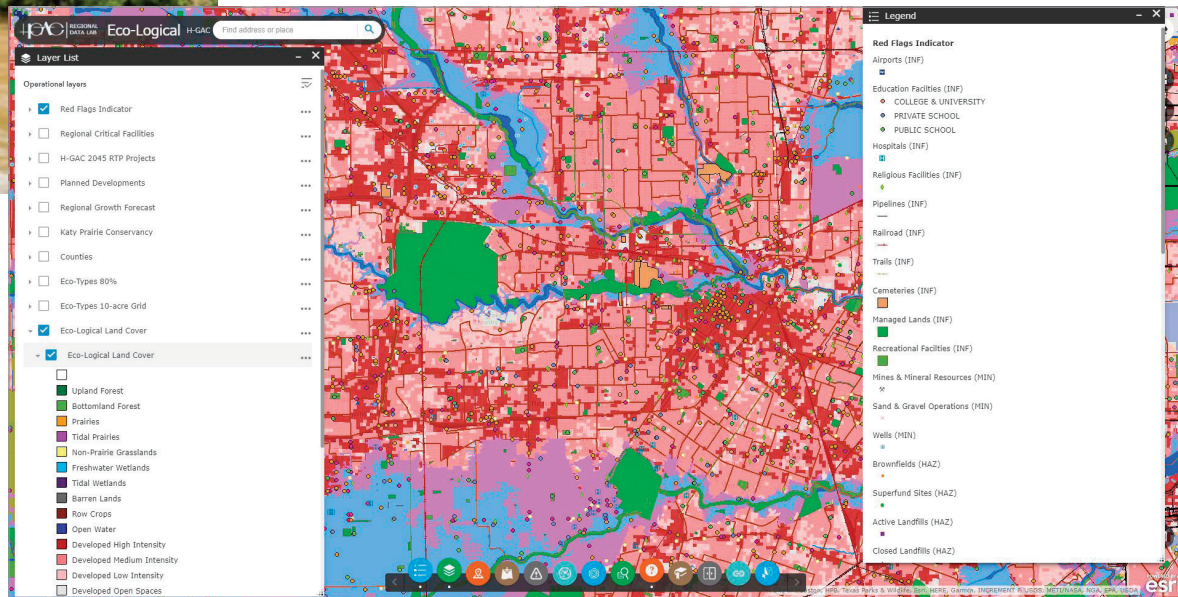
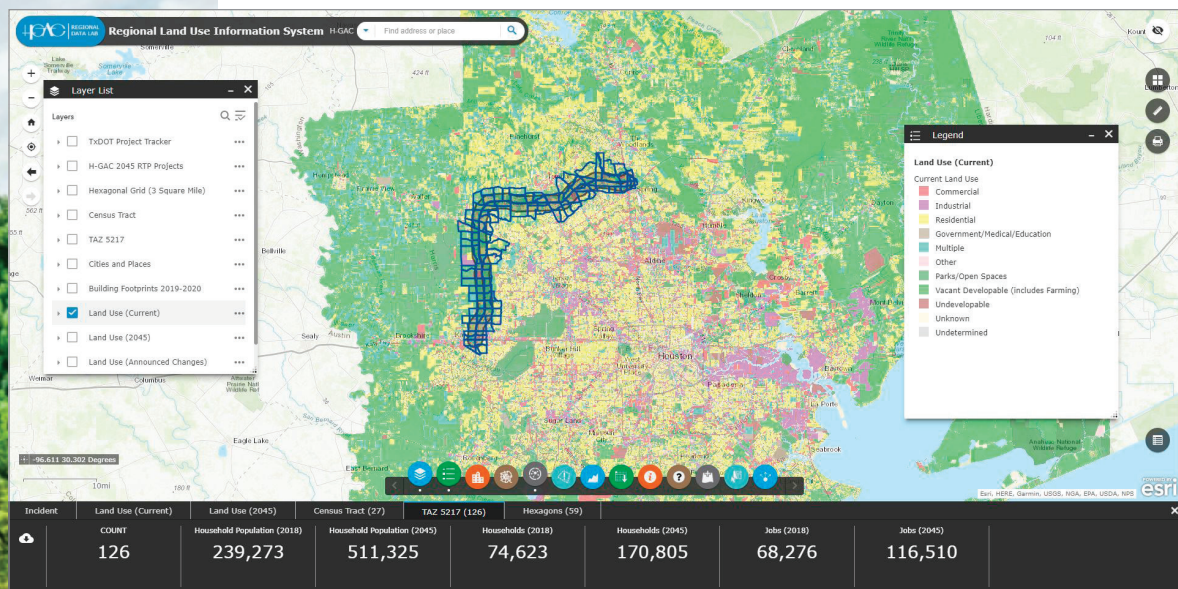
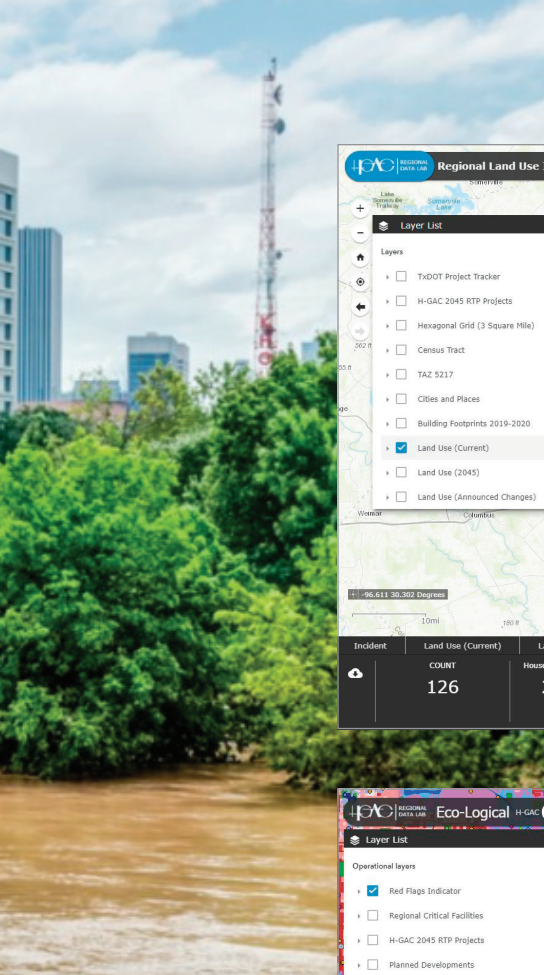
It expects to see both the overall

population and the number of jobs in the region increase by more than half as much again by 2045. In a little over two decades, the population will rise from 7 million to 10.6 million, while the number of jobs will grow from 3 million to 4.7 million.

H-GAC is therefore under significant pressure to help provide the right infrastructure and service solutions in the right places.

Getting Online

The availability of ArcGIS Online enabled H-GAC to develop a suite of applications, now numbering more than 50, of which a significant number have been made available to external agencies and the public. The main aim was to provide quick, easy access to data that would lead to informed decision-making. Because the data is stored in the cloud, it is easily accessible to H-GAC's planners and decision-makers, helping them make more strategic capital improvement decisions for the region's future while providing better visibility and transparency in what can often be a politically charged



environment.

Previously, information queries would be initiated via telephone or email. The times taken to respond—whether in physical (paper map) or tabular form via return email—were very much driven by the

capacity of the staff and the complexity of requests. By providing free, direct access to data, this bottleneck was removed.

Additionally, according to Pramod Sambidi, assistant director of data analytics and research at H-GAC, the applications have been developed to provide not just raw data but also some element of background analysis of what it all means. The outcomes are twofold: a more comprehensive service to planners and other stakeholders and a better understanding across the user community of what H-GAC does and how.

The audience for H-GAC's series of

apps is a broad one. It includes its own staff, as well as those in local government (such as planners); consultants and contractors; educational establishments; public sector and private-sector businesses; nonprofit organizations; and, ultimately, the public itself. H-GAC also leveraged ArcGIS StoryMapsSM (which is included with ArcGIS Online) in the effort to communicate often-complex information to a sometimes nonprofessional audience with immersive visual presentations that combine text, interactive maps, and other multimedia content.

Information Provider

A major element of what H-GAC provides is a timely and accurate reflection of demographics, based on US Census Bureau information. The information available online is updated by the H-GAC team and is in line with annual census data releases, and it contains a wealth of demographic data for the greater Houston area. It includes data by race, age, language spoken, educational attainment, income, homeownership, number of people experiencing poverty, and

continued on page 20

transportation variables such as vehicle ownership. This is linked to transportation travel times, which are defined for a range of locations, including independent school and congressional districts, as well as down to the individual block level.

Each H-GAC application features a user guide that explains how to access data. A more advanced demographic data explorer tool enables downloads.

Other key apps include the Regional Commute Flow Map, which is based on Census Longitudinal Employer-Household Dynamics Origin-Destination Employment Statistics (LODES) data. It provides an accurate reflection of where people live and work and vice versa.

App users can readily see flows, as well as access the underlying information. As an example, Harris County, the most populous county within H-GAC's limits, has 1.5 million people who live and work within its boundaries. It also has 0.5 million people who live outside the boundaries but work within them, and 200,000 people who live within the boundaries and work outside them. All of this data can be found with just a few clicks.

H-GAC has divided its geographic region into 25 sectors, based on the highway network geometry. As with the census data, information is available down to the individual block level, but it has been consolidated into square-mile grids.

The app supports those looking to manage and mold commuting patterns. It provides, for example, a strong basis for decisions over where to implement park-and-ride schemes as well as mass transit changes.

H-GAC's land-use model was developed in-house and uses the same methodology as the open-source UrbanSim system developed in collaboration with the University of Berkeley, California.

Land-use data at the parcel level includes present use as well as planned/announced changes and forecasts of how these will have an impact. It includes

primary planned community information.

Clicking a parcel will show, for instance, the number of expected units. This helps with demand modeling. Data is summarized for defined traffic analysis zones, and users can also draw polygons, which will show current and future (out to the year 2045) populations. Download is accomplished by clicking an on-screen icon.

The Eco-Logical tool measures the impacts of transportation projects on local ecosystems. This was also developed in-house and uses satellite/aerial imagery to classify land cover. Users can click projects to see their effects. They can see all or select by type and include future projects and those within the regional transportation plan.

A red flag indicator provides a series of layers, including oil pipelines that are abundant in the Houston area, making this tool particularly useful there, cemeteries, managed land areas, wells, brown-field sites, and closed landfills. Users can very quickly determine the locations of potentially constraining assets and features and how these might influence projects and their viability and cost.

Regional resilience, meanwhile, is reflected by a number of dashboards that provide a criticality and vulnerability index, as well as information on road segments' exposure to flood risk.

These tools enable the scoring and selection of transportation projects, and Sambidi also notes that users can improve the accuracy of the information broad-range. When individuals have more accurate or specific knowledge of a location, they can provide it through the apps via an online form.

Improving and Expanding

Many public sector organizations responsible for broad range planning have introduced online access to GIS to reduce direct workloads caused by inquiries from those involved in project definition and development. In H-GAC's case, the result of implementing apps has been

not so much a reduction in workload as a shift in emphasis.

At the transportation project proposal stage, requests for all the information within a defined geographic area were once common. These have now fallen off to almost zero, and the information requests that are received have evolved considerably.

"We've moved away from a situation where people would simply ask us to provide a shapefile," explained Sambidi. "We don't see that now because they can go online and access and extract the information for themselves. What we are experiencing instead is more detailed questioning and interaction relating to more specific data issues."

The success of this has not gone unnoticed. Locally, other government entities have seen the value of what H-GAC is doing with its data and, particularly, how H-GAC prepares it for ease of consumption. This has led to explorative talks, with a view to H-GAC developing tools for other agencies, which will enable them to achieve similar results with their own data.

The capabilities being provided by H-GAC already address many transportation, environmental, and equity issues. Sambidi expects an increase in internal requests for support, which will result in the expansion of GIS services into an ever-wider range of societal areas including childcare and health care.

"That greater level of interaction results in better data, and we look at this less in terms of saving time and more in terms of building better client relationships and overall quality of service," said Sambidi.



To learn more about how GIS facilitates transportation decision-making, scan the QR Code.

go.esri.com/HGAC4SLG



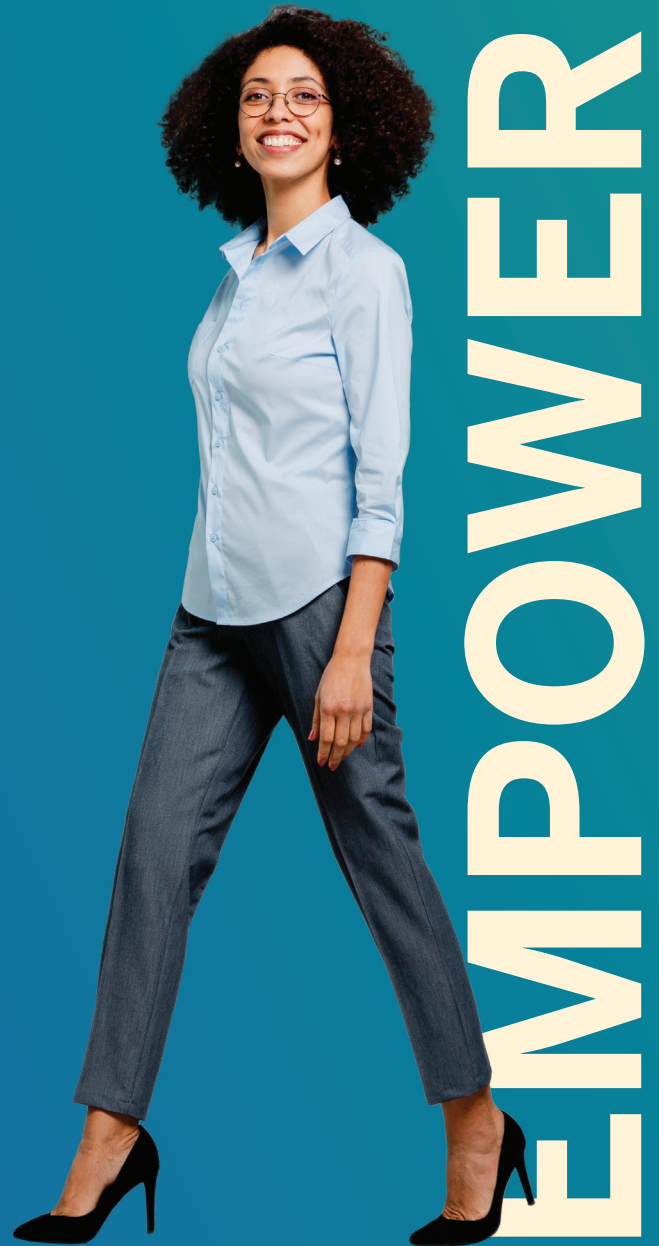
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County Innovates Using GeoAI to Inventory ADA Curb Ramps, Saving Significant Time and Money

A big part of unlocking the value of GIS technology is constant innovation, including learning new capabilities and searching for opportunities to apply them. Douglas County, Nebraska, has established an innovation culture in its GIS group—it constantly expands its knowledge and use cases of the technology across the organization. With about 585,000 residents, Douglas County is the most populous county in Nebraska and home to the city of Omaha.

Like all US government agencies, Douglas County and the City of Omaha must abide by the stipulations in the Americans with Disabilities Act (ADA) of 1990. This important legislation protects people with disabilities in many areas of public life. One of the accessibility standards associated with the act covers curb ramps, where sidewalks end at a curb and provide access to people crossing the street. These can be dangerous for people with disabilities, so there are ADA-specific design standards that must be followed in their construction. Over the years, as the Omaha Public Works Construction Division has been improving its roadway intersections and adding new intersections, each of those projects

has included installation of ADA curb ramps.

As the city installed the ramps, it wanted to collect asset information and location to help with its asset life cycle management program, powered by Cityworks. Field data collection requires too many resources. Since the city was collecting aerial imagery every two years, it had administrative staff in the office enter the ramps and their attributes into its GIS using the aerial imagery as a reference. Over the years, there was no consistency and no data standards with this process, which led to poor data quality for the ADA curb ramp layer.

County GIS staff had become aware of geospatial artificial intelligence (GeoAI) capabilities within ArcGIS, like deep learning models for extracting features from imagery, and had been looking for an opportunity to try them out. The ADA curb ramp inventory seemed like a great use case to test these capabilities, since ramps can be recognized by the human eye. Using ArcGIS Pro and the county's one-inch-resolution digital aerial imagery in a mosaic dataset, Steve Cacioppo, a senior GIS analyst at the county, set about applying a deep learning model to

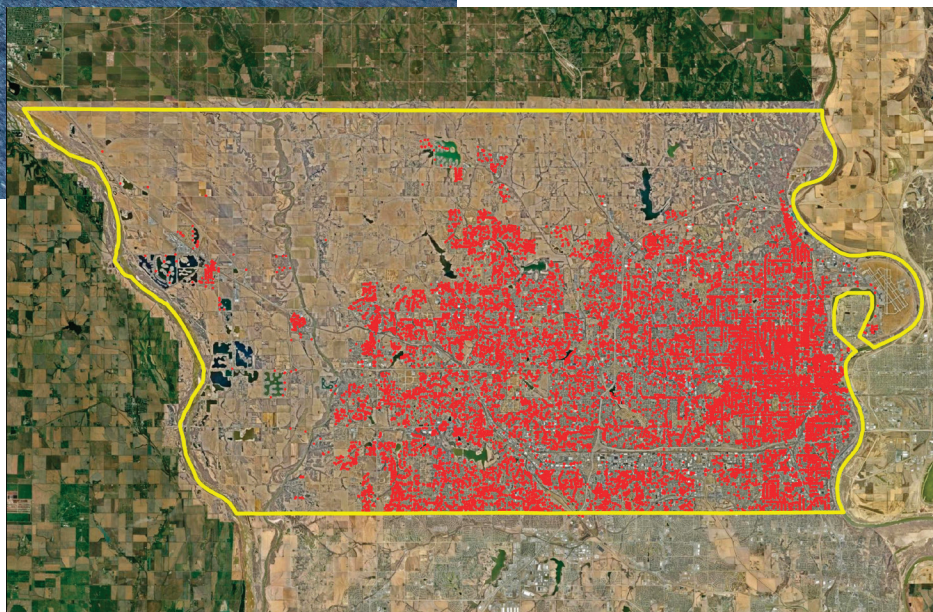
help solve this problem.

Developing a deep learning model takes some trial and error, and Cacioppo worked through many different scenarios using samples of data. One scenario narrowed down the focus of the model to only areas where intersections and ramps are located, since there is no need to analyze every square inch of the county. Multifamily housing and commercial areas were also isolated, since they have curb ramps. The county has a layer identifying areas without sidewalks; these areas were not analyzed. The model was not 100 percent accurate—some ramps were lost in shadows, and initially it identified some car sunroofs as curb ramps—but these issues were minor and correctable.

Once the model was finalized and run, it identified 34,183 ADA curb ramps. The original inventory included 16,775 ramps, so the improvement was substantial; the number of ramps was over double the initial number, and the Construction Division was excited about this big improvement in data quality. The time savings have been considerable. On average, it had taken county staff one to two minutes to add a ramp into the GIS.



← This image shows the GeoAI-extracted ADA curb ramp features, outlined in red, compared to the manually entered point data, symbolized by yellow crosses. It also shows how the GeoAI model missed two curb ramps due to shadows.



↑ A countywide view of all ADA-compliant curb ramps that were located using the model can be seen in red.

The GeoAI model identified the ramps in about 12 days on a PC using ArcGIS Pro. With the curb ramp inventory completed, staff can now identify which remaining crosswalks need ADA curb ramps and can use GIS to prioritize their installation for inclusion in the CIP, as well as review those projects through an equity lens, like the Social Equity Analysis ArcGIS solution.

The resultant ramp data was shared with other municipalities in the county, so they now know where their ADA curb ramps are located. Now that the county has this process in place, when new aerial imagery is flown every two years, county

staff will be able to update the inventory in an automated fashion. Accurate management of these critical assets is important for the county in terms of its safe streets and Vision Zero programs, and the GIS team is already supporting that effort with ArcGIS HubSM and ArcGIS Dashboards.

This innovative experience has expanded the county's appreciation for GeoAI, and staff are looking for additional ways to apply it, including feature extraction of swimming pools for property appraisal and health department inspections, and testing to see if this is applicable for pavement markings, sidewalks, and

bike lanes. The county also wants to apply GeoAI to its lidar data to extract trees and the edges of pavement. Other improvements being considered are moving the imagery to ArcGIS Image Server or ArcGIS Image for ArcGIS Online to improve GeoAI model and other geoprocessing performance.

The responsibilities of a GIS professional include constant learning and innovation, and Cacioppo and the rest of the Douglas County staff take that to heart. This project was another example of how they are being creative with GIS to make a real difference at the county and in the community. This entrepreneurial attitude includes the development and implementation of an accomplished drone program. Douglas County is a great example to emulate, so the next time you start a new project, before doing it as you always have, take time to brainstorm how you can be creative with GIS to maximize your impact on the organization and community using new capabilities and methods.

We Want to Share Your Story

The stories that appear on our industry web pages and in our industry digital and print newsletters and other media are contributed by Esri software users, partners, and others. These stories are meant to help you raise the profile of GIS both inside and outside your organization, highlight innovative approaches to addressing challenges by using GIS, and inspire others to replicate your success. If you have a story to tell, we welcome you to submit your recent success story with us at go.esri.com/sharestory.



To learn the full capabilities of GeoAI, scan the QR Code.
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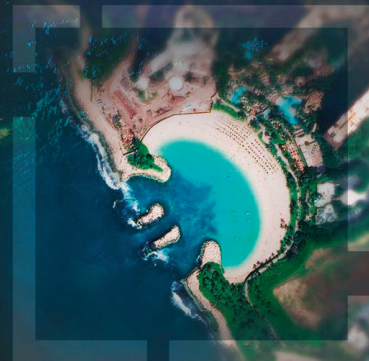
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