



CITY COUNCIL
Staff Report

Meeting Date: April 23, 2019
To: Mayor and City Council

From: Scott Chadwick
Staff Contact: David Graham, Chief Innovation Officer
david.graham@carlsbadca.gov

Subject: Connected Carlsbad: An Inclusive Smart Community Roadmap

Recommended Action

Receive an informational report regarding Connected Carlsbad and associated community engagement.

Executive Summary

The terms "smart city" and "smart communities" have grown in prominence over the last decade. These terms can generally be summed up as the use of data and technology to improve decision-making, operations, services and lives.

For many years the City of Carlsbad has been deploying technology and using data in ways that demonstrate it is on the "smart community" path. Given what has been accomplished to date and the need to be strategic going forward, a connected community roadmap and action plan is needed to guide the city while engaging the public. Based upon City Council approved projects, existing city documents, previous IT assessments, and interviews with departments, a preliminary roadmap and a collection of initiatives ideas is being presented.

Similar efforts in other cities have focused on the opportunities that the strategic use of technology provides. Our effort aims to take a human-centered focus that is inclusive in its development. Based upon feedback from the City Council, staff will initiate a public input process to solicit community feedback and ideas regarding the roadmap and action plan. Based upon that information, the final Connected Carlsbad: An Inclusive Smart Community Roadmap and an associated action plan will be presented to the City Council for consideration later this year.

Discussion

The City has a track record of using data and technology to improve decision-making and the lives of residents. Demand from the public for greater connectivity, more convenience, and more robust information is rising and the City is strategically adapting to meet those demands. As the needs of residents, organizations and businesses rise so does the complexity of providing

services to the community. New technology brings with it new challenges around integration, change management, legacy system replacement, data management and public policy. A roadmap and corresponding action plan is warranted to guide the city and the public in the co-creation of a smart community.

The City of Carlsbad has been deploying “smart city” technology for many years. One example is the traffic signal network which is wirelessly connected and controlled from a central traffic management center. This system is the largest of its kind in the region. The system is also being upgraded with adaptive controls that will create a dynamic and connected traffic signal system the first of its size and scale in the region.

Another example is the city’s use of digital tools to foster a vibrant culture of civic engagement. Complementing in-person events, public hearings, interviews, surveys and other outreach methods, the city recently launched a new digital tool for the public budget prioritization effort and Veteran’s Park project. An online portal for public records requests went live in 2018 and City Council recently approved a digital legislative correspondence tool to assist in responses to public inquiries. Committed to accessibility and transparency the city continues to expand its public engagement efforts and use new tools to expand the amount and diversity of participation.

An example of connected infrastructure that is supporting the use of data analytics is the Advanced Metering Infrastructure network that the Utilities Department operates. It remotely collects water meter data rather than requiring staff to read the meter on-site. This network covers the entire system which is something that few municipal utilities in the state have achieved. The department is using the data to identify anomalies that may lead to higher water bills. They then inform the property owner of the issue which could be the result of higher usage, a leak or other factors. Informing customers of significant deviations from their regular water use led to a savings of nearly 16 million gallons of water and approximately \$233,000 over a six-month period from July 2018 to January 2019.

There are many other examples of how data and technology is being used by Carlsbad to solve specific problems or enhance services. Developing a roadmap based upon multi-departmental input and informed by community engagement will guide future projects that are strategic, integrated, and impactful. The lack of a roadmap can lead to siloed projects, redundancy and untapped latent potential that could be wasted.

Once finalized later this year, Connected Carlsbad: An Inclusive Smart Community Roadmap and its associated Action Plan can be the strategic guide for future projects and initiatives. Recognizing the dynamic nature of technology, the roadmap is intended to provide goals that have longevity. The action plan, that would implement the roadmap, would be annually updated based upon public input and department needs. The preliminary roadmap being presented now has been informed by City Council approved projects, existing city documents, previous IT assessments, a global scan of smart community efforts and approximately 75

interviews with city staff. Based upon that information three approaches with five goals have been developed. They are:

- Modernize and Strengthen IT Infrastructure
- Build Capacity for Data-Driven Decision Making
- Foster a Vibrant Civic Engagement Culture
- Enhance Accessibility and Transparency
- Promote Safety and Sustainability through Connectivity

These five goals will be complimented in the final roadmap by objectives that guide specific initiatives to advance the overall city goal of being an inclusive smart community.

Fiscal Analysis

The community engagement and finalization of the roadmap and action plan will be completed using existing staff resources. No additional financial resources are necessary.

Next Steps

Going forward city staff plans to:

- Conduct in-person and online public engagement regarding the roadmap and potential initiatives.
- Return to City Council with data from the public engagement and a final Connected Carlsbad roadmap and action plan.

Environmental Evaluation (CEQA)

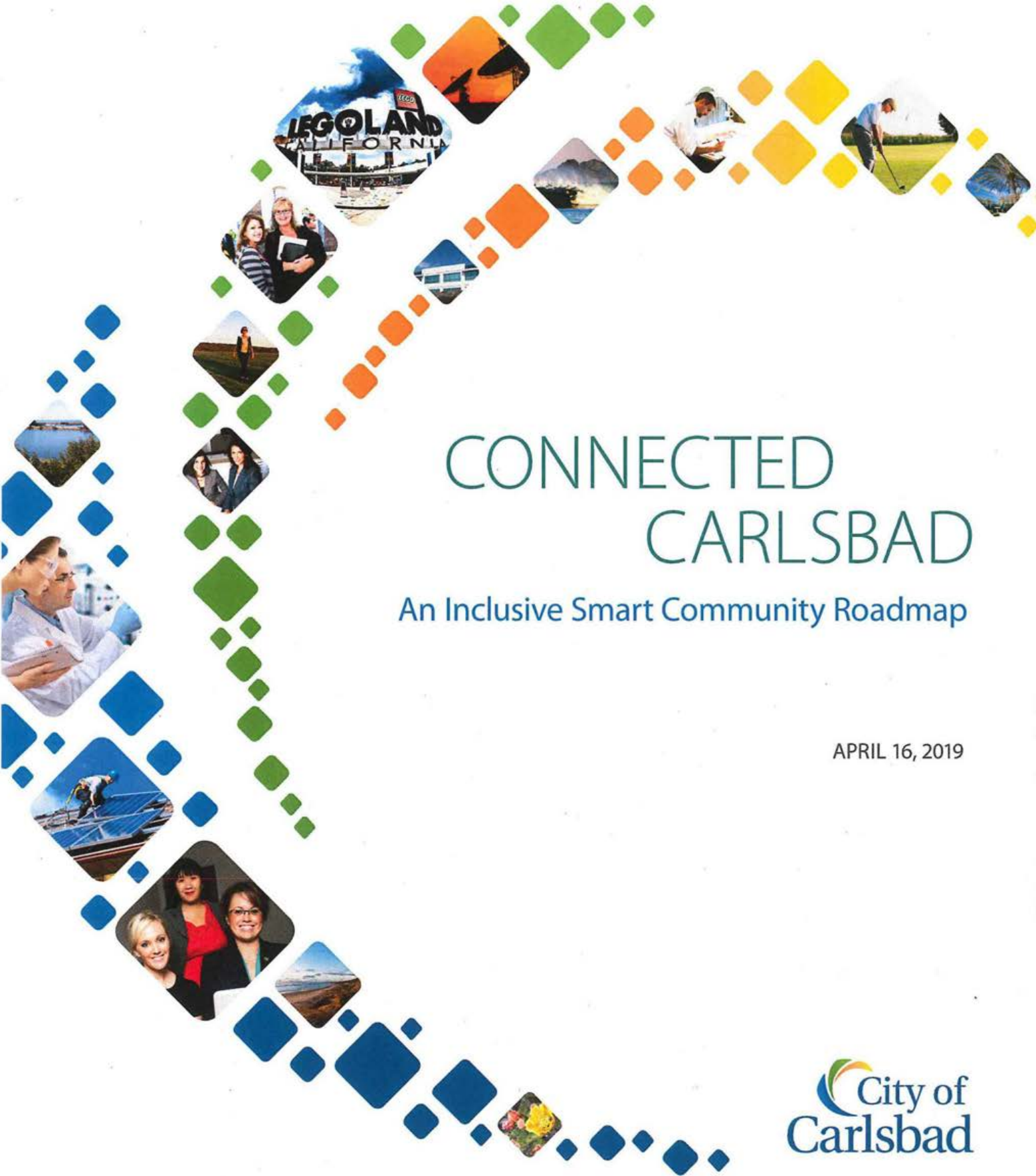
Pursuant to Public Resources Code section 21065, this action does not constitute a “project” within the meaning of CEQA in that it has no potential to cause either a direct physical change in the environment, or a reasonably foreseeable indirect physical change in the environment, and therefore, does not require environmental review.

Public Notification

The item was noticed in accordance with the Ralph M. Brown Act and was available for public viewing at least 72 hours prior to the scheduled meeting date.

Exhibits

1. Connected Carlsbad: An Inclusive Smart Community Roadmap Executive Summary



CONNECTED CARLSBAD

An Inclusive Smart Community Roadmap

APRIL 16, 2019



CONNECTED CARLSBAD

An Inclusive Smart Community Roadmap

April 16, 2019



EXECUTIVE SUMMARY

The rapid evolution of business, government and consumer technology over the past decade has changed daily life to a degree not seen since the rise of the automobile a century ago. Smartphones and nearly ubiquitous high-speed internet in metropolitan areas have revolutionized the way we stay in touch with each other, the way we bank, the way we shop and the way we travel. New vehicle technology is changing the way we drive and park our cars. As the adoption of new technology expands, making life ever more convenient and in other ways more complicated, the expectations of the public and what they demand from government has changed too.

The City of Carlsbad has long used technology to solve public problems. Until recently, city initiatives were often developed in silos to meet the limited needs of a single city program or department. The ever-increasing connectivity and integration of technologies demands a more unified approach, guided by a common understanding of needs and priorities with a focus on fiscal realities.

The roadmap will unite current initiatives with future ideas

Connected Carlsbad: An Inclusive Smart Community Roadmap is designed to provide a high-level, organized guide to the work the city will do in using data and technology. This customized strategic roadmap is based on City Council approved projects, existing city documents, previous IT assessments, and interviews with departments, combined with a global scan of other cities and best practices that have emerged from leading smart city thinkers and Carlsbad-specific community engagement. The roadmap is organized into five primary goal areas.

The first goal, **Modernize and Strengthen IT Infrastructure**, focuses on the foundational elements that must be in place to enable all other smart city measures, including connectivity, up-to-date hardware and software, and a robust security strategy.

The second goal, **Build Capacity for Data-Driven Government**, focuses on the policies, procedures and staffing necessary for the city to fully capture the value of emerging models of data analytics.

The third goal, **Foster a Vibrant Civic Engagement Culture**, builds upon the first two goals with a human-centered perspective that an engaged city that uses data and technology in a way that respects people and their privacy will support a vibrant culture where residents, organizations and businesses are invested in their community and its future.

The fourth goal, **Enhance Accessibility and Transparency**, recognizes that open government and approaching problem-solving from an accessibility perspective leads to better outcomes for all.

The fifth goal, **Promote Safety and Sustainability Through Connectivity**, leads to understanding the interconnected nature of our communities that can achieve environmental, mobility and sustainability goals when approached in a cross-departmental and community informed manner.

Since the city already has existing infrastructure and capacity, work on achieving some of these goals is already underway. The initiatives that are underway have been guided by previous city action. This roadmap serves as a general guide to unite current initiatives with future ideas, spark collaboration, foster innovation and promote sharing.

SMART AND GETTING SMARTER

Among cities of its size, Carlsbad is already a leader in deploying advanced technological and data tools to provide better services for the community. Examples include:

- The Carlsbad @Your Service app gives community members a quick and convenient way to report issues they see around town.
- The Carlsbad City Library uses a data analytics service to evaluate and calibrate its collections to ensure that each branch has the books, movies and other materials that best serve local residents.
- The Planning department offers an “e-zoning” map that helps users quickly determine what land-use zone a property is in, the assessed acreage of the property, what school district the property is in, and related information.
- The traffic signal network and management center is centrally connected, the largest network of its kind in the region, and upgrades are being made to make the network dynamic and adaptable.
- The Utilities department has full deployment of advanced metering infrastructure that has improved accuracy, reduced on-site visits and provided analytic capability that has saved millions of gallons of water and hundreds of thousands of dollars.

Over the next five years, technological advances will depend more directly on the interconnected nature of city systems. The next wave of innovation in local government is the use of data to drive efficiency and innovation to reach better outcomes for the community. The adoption of devices and sensors is generating an exponentially larger stream of data. In 2018, estimates were that 90% of the data in the world had been generated in the previous two years. City officials recognize that data is a strategic asset that can be used to gain insights and surface ways to improve city operations and services. To realize the value of this asset, however, the city must address issues such as data governance and the capacity of city staff to organize and analyze data.

Smart communities should be prepared for the risks associated with deploying new solutions

In 2018, the City Council approved the creation of a new position, the Chief Innovation Officer, who worked cross-departmentally to develop this roadmap and action plan and guide its implementation. Carlsbad is among the few cities in the country that have prioritized innovation by dedicating this type of resource. Most cities with robust innovation programs are large metropolises, such as Los Angeles, Boston and San Francisco; and of the 14 cities that have received formal recognition from What Works Cities, only two (South Bend, Indiana, and Topeka, Kansas) are comparable in population to Carlsbad. Since coming on board, the Chief Innovation Officer has worked with departments on innovation thinking and prioritization, launched a cross-departmental Future of Cities education series, developed a training session about data and program evaluation that was applied to the development of the fiscal year 2019-20 budget, and supported departments on special projects, especially those related to data.

UNDERSTANDING AND MITIGATING RISKS

An effective strategic approach to being a smart community requires the city to fully consider and prepare for the risks associated with technology and data tools. While vendors might demonstrate how a project works in the most favorable environment, city staff must be equipped to consider all ramifications before moving forward with an initiative. This section identifies and describes some of the most common risks.

I. Security Vulnerabilities

Without proper security measures in place, a city's exposure to cyber-attacks grows as more devices, systems and services are connected. This is also known as a growing "attack surface." Historically, most of a city's devices were kept inside a building, such as City Hall or Operations Center. As the City has grown, devices are located in multiple buildings and vehicles. This risk will be mitigated by incorporating security efforts into the action plan.

II. Diversion of Resources

City staff have a finite amount of time to devote to their work. Implementing new technologies and data strategies often requires staff to spend less time on their current duties in order to provide enough time to work on new initiatives. This risk is especially prevalent in pilot programs, where the pilot is a project in addition to a standard city process. This risk will be mitigated in multiple ways – in some cases, the Technology Leadership Committee will play a role in addressing and managing resource allocation, while in others these decisions will need to be made by the City Council with public input.

III. Mitigating Bias Toward Technological Solutions

As the private sector churns out an ever-increasing array of technological solutions to public problems, the city may be conditioned to look first for a technological solution to a problem. It is important to consider that technology may not always be the best solution. To avoid skewed decision-making resulting from technological bias, city staff will ensure that an evaluation of non-technological solutions is included as part of the decision-making process.


A CULTURE OF CONTINUOUS IMPROVEMENT

Being a smart and connected city is about more than just having the right software applications, or the most cost-effective devices, or the best network configuration. Those technical pieces are simply the means to an end. Ultimately, it is the people in Carlsbad — city employees, local businesses, residents, students and visitors — that matter.

If you forget about the people you will miss the point of being a connected community

Many existing processes have been in place for years, some for decades. The challenge of changing systems and adapting to new processes is as much about the people involved as it is about getting the technology right, and it can be challenging, both for staff and for the public to adapt. Initiatives to implement the roadmap goals should include a human-centered approach that:

- Creates opportunities for internal buy-in and engagement
- Highlights the need for training opportunities for both staff and the public
- Recognizes the importance of community engagement in the decision-making



The constantly changing nature of technology requires dynamic approaches to its use and implementation. Becoming a smart community requires a platform of people who understand the need for continuous improvement and are equipped to adapt. The roadmap and action plan, informed by people inside and outside the organization, not only serves as a guide, but also as a way to generate buy-in from everyone involved.

NEXT STEPS

This roadmap lays out the goals the overall strategy intends to achieve. Designed to be agile, the goals will have a digital presence and as projects that support the goals are completed, the digital presence will be updated providing the public with information on what the goals mean in practice. Additionally, a list of potential initiative ideas has been generated through interviews with departments and the work of the Chief Innovation Officer. The next step is to solicit feedback from the City Council and then engage the public on the roadmap and initiative ideas in-person and digitally. The internal initiative ideas have been categorized by the corresponding roadmap goal.

Goal 1: Modernize and Strengthen IT Infrastructure

- Develop and implement a citywide network master plan
- Complete and implement SCADA master plans
- Establish a working group to guide cross-departmental data and technology efforts
- Upgrade, sunset or replace software applications
- Develop and implement a policy regarding obsolete and noncompliant city devices
- Transition to a unified communications platform
- Evaluate options for a citywide asset management system
- Continue to develop human capital in the IT department

Goal 2: Build Capacity for Data-Driven Government

- Develop and maintain a data inventory
- Establish a data governance team
- Create a citywide data governance and management policy
- Establish practices to maintain data quality
- Develop an open data policy
- Identify data sharing opportunities
- Develop a business intelligence framework
- Establish a data and data-driven decision program
- Build capacity for geospatial data analysis
- Expand city geographic information systems (GIS) capacity and use
- Transition to an Enterprise Resource Planning (ERP) system
- Formalize a city-wide operational performance management system

Goal 3: Foster a Vibrant Civic Engagement Culture

- Expand the use of digital tools for community engagement
- Review existing service request technology and consider comprehensive 3-1-1 with online and mobile capabilities
- Evaluate and expand use of digital tools to enhance public access to information
- Evaluate existing public records portal accessibility and responsiveness
- Deploy a digital tool for legislative correspondence
- Create an open data portal
- Create public facing performance dashboards
- Enhance digital promotion and feedback of city programs
- Establish a local CIO and CTO roundtable
- Evaluate participation in a "startup-in-residence program"
- Consider development of a local program to streamline development of pilots and ultimate procurement


We are co-creating
an inclusive future
for all

Goal 4: Enhance Accessibility and Transparency

- Review existing city policies to inform the development of a data privacy policy
- Consider an age-friendly initiative
- Provide connected safety lighting in the Village and Barrio
- Consider parking management and wayfinding technology
- Provide remote training and education opportunities for the residents and staff
- Support STEAM education and talent pipeline
- Create a mobile maker space
- Encourage transition of licensing and permitting to effective digital platforms
- Simplify customer payment systems
- Unify user account identities for the public

Goal 5: Promote Safety and Sustainability Through Connectivity

- Build out the advanced traffic signal controller network
- Expand energy efficiency and management efforts
- Implement a transportation demand management program
- Evaluate last-mile solutions to connect with job centers and improve transit utilization
- Develop GIS based capability for fire response planning
- Work with regional fire dispatch to improve data integration with GIS
- Evaluate next-generation police dispatch opportunities
- Evaluate Text to 9-1-1 technology
- Consider development of policies regarding unmanned systems for public and private use
- Ensure new technologies are mirrored into the Emergency Operations Center



There are two parts to the overall strategy: the first is the roadmap that will include goals and objectives. This is designed to guide strategic thinking and have longevity consistent with the values of the organization. The second part is the action plan that includes the specific initiatives to implement the roadmap. The action plan is intended to be a living collection of initiatives that provides relevant information regarding status, schedule and cost. Combined together, Connected Carlsbad: An Inclusive Smart Community Roadmap and its corresponding action plan will guide the city as it co-creates an inclusive future for all.

ACKNOWLEDGEMENTS

A special thank you to the Connected Carlsbad consulting team, led by the Smart City folks at Madaffer Enterprises as well as to the following organizations that have published numerous resources that were consulted in the development of this document:

- What Works Cities
- Smart Cities Council
- The Center for Government Excellence at Johns Hopkins University
- The Ash Center at Harvard Kennedy School
- The Data Governance Institute
- The Behavioural Insights Team
- The Sunlight Foundation
- The American Civil Liberties Union
- Connected Communities Collaborative
- The National League of Cities
- Future Cities Catapult