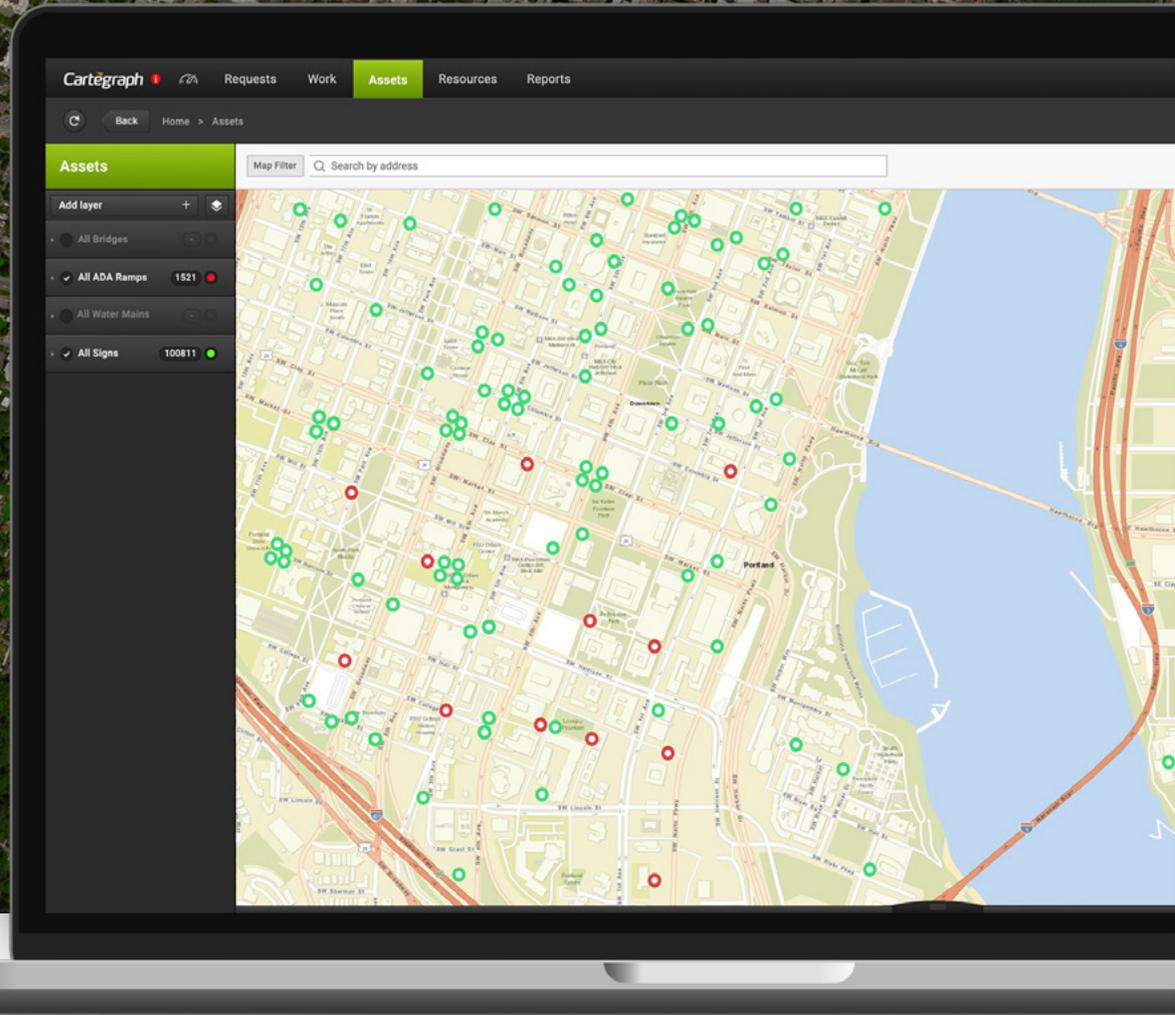
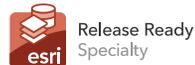


Cartegraph



CARTEGRAPH + ESRI

A Map for Success



CARTEGRAPH + ESRI

A MAP FOR SUCCESS

From your web browser to your phone, there's something we love about the freedom to choose our technology. The right tools increase productivity, driving enjoyment and efficiency throughout our days. Technology solutions for governments are no exception. By choosing the right, best-in-breed solutions, you can create a comprehensive system that streamlines the important work you do for your community.

Limited budgets and the rapid pace of digital transformation can make it tough for your municipality to keep up, let alone stay ahead of the curve. But, the importance of connecting your people, processes, and products is widely acknowledged—and grows wider by the day. That's why it's critical for high-powered solutions, like Cartegraph operations management software and Esri ArcGIS, to work together seamlessly—multiplying the effectiveness of each system without the need for time-consuming integration work.

"We can depend upon and use each other's services in various ways. I like to call it a system of systems. And, I think that's what's evolving in our future."



Jack Dangermond, President of Esri

Cartegraph is an advanced work and asset management solution built to perfectly complement the ArcGIS platform. Esri provides the world's most robust, accurate, and comprehensive geo-spatial platform. When the systems are combined, ArcGIS maps bring life to Cartegraph's advanced operations management functionality like preventative maintenance schedules, predictive asset assessments, and powerful scenario planning capabilities.

Throughout this guide, you'll learn why pairing these solutions together is the most effective and efficient way to manage your day-to-day operations. By seeing where things are happening and how information is connected, your team will increase productivity, improve data-driven problem solving, and provide a better experience for your residents.

WHY DOES MY MUNICIPALITY NEED TO STEP UP ITS GAME?

That's a great question! Many factors have changed and challenged the local government landscape over the last year. Here is a summary of just the top five:

- 1 A CRUMBLING INFRASTRUCTURE IN DESPERATE NEED OF REPAIR.**

The U.S. infrastructure received a near-failing grade of C- from the American Society of Civil Engineers in their [Infrastructure Report Card](#). With most infrastructure assets across the country below standard—many elements approaching the end of their service life—it's imperative to power your team with real-time asset, work, and spatial data. By giving them the right tools for the job, they're empowered to act fast to avoid failures and help management strategically invest in maintenance—repairing the right assets at the right time.



- 2 CITIZENS ARE LOOKING FOR A CONSUMER-QUALITY EXPERIENCE.**

Your day-to-day operations directly impact the quality of life of your citizens. Today, residents think of themselves as the end users and government services as a “product” they have “purchased” with their taxes. What’s more, in our mobile-driven world of 24-hour news cycles and instant e-commerce, citizens increasingly demand a personalized, customer-focused experience with platforms that support two-way communication—and quick response. Combining best-in-breed solutions like Cartegraph and ArcGIS, your team has the power to exceed service delivery agreements, interact with taxpayers in real time, and really wow your community.

3

AN AGING WORKFORCE THAT'S RAPIDLY RETIRING.

According to the [Center for State and Local Government Excellence](#), 44 percent of local governments experienced an uptick in retirements and 34 percent saw a rise in quit rates. With fewer skilled workers pitching in, municipalities need to become more effective and efficient to keep up. Maintenance knowledge can no longer be hidden away in rows of filing cabinets or lost to the memory of former employees. Instead, high-performing communities are shifting to mobile solutions that pinpoint asset location, provide a digital archive of maintenance history, and attract and retain a younger, tech-savvy workforce.



4

SLUGGISH REVENUES EQUAL MID-YEAR BUDGET CUTS.

According to the National Association of State Budget Officers' [Fiscal Survey of States](#), lackluster revenue performance prompted seven states to make net mid-year budget cuts totaling \$456 billion. In an uncertain world, proactive, data-driven communities will come out on top. Whether that's combining CarteGraph and ArcGIS data to prepare your infrastructure network for a potential flood event, figuring out why there are so many graffiti requests on the edge of town, or the estimated financial impact of a forecasted disaster.

5

CITIZENS ARE AFRAID OF GOVERNMENT CORRUPTION.

Seventy-five percent of Americans' single biggest fear, according to Chapman University's [Study of American Fears](#), is the corruption of government officials. To overcome this fear, many communities are making data more open, available, and easy for citizens to understand. This is especially valuable when it comes to critical infrastructure like roads, bridges, and water supplies: What condition are they in? Are you working on them? Are they safe? These questions and more can be answered through public operations dashboards, powered by CarteGraph and Esri.

CASE STUDY 01:
BAY COUNTY, FL

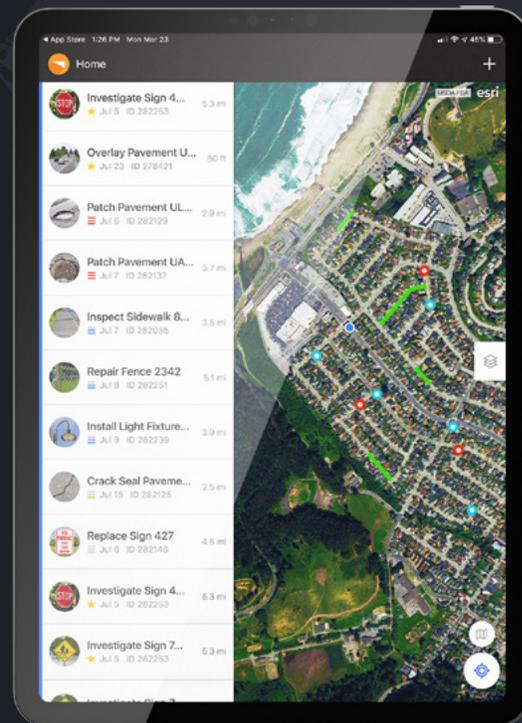
BAY COUNTY'S HIGH-PERFORMANCE APPROACH TO FEMA REIMBURSEMENT

Being on the coast of the Sunshine State, Bay County is prone to flooding brought about by hurricanes, tropical storms, and surging rainfall. But, for many years, the team didn't have clear insight into how they were spending their time or what condition their assets were in.

The problem became especially apparent when assessing the damage and repair costs on county assets after natural disasters. It would take weeks—even months—to compile damage assessment information into reports to send to FEMA, and the team often felt they were leaving money on the table.

Leveraging ArcGIS maps within **Cartegraph's** operations management system, Bay County set out to manage all of its infrastructure assets in one centralized, real-time database. Public works staff assigned an overall condition index (OCI) for each asset. Those OCI data points helped the team generate automatic work orders, so they could do repairs more proactively and eliminate stacks of slow-moving paperwork.

Today, the Bay County team has collected data on thousands of assets; so they can track conditions, work history, and maintenance costs—down to the penny. When disaster strikes, they compile FEMA reports with ease—recouping millions of taxpayer dollars.



The U.S. has experienced 61 natural disasters that have each caused at least \$1B worth of damage over the past 5 years.

NOAA (2019)

THE POWER OF CARTEGRAPH AND ESRI

In an era when citizens demand more impact with fewer resources, how does integrating your operations management and GIS technologies boost municipality performance? Let's examine the two categories independently before outlining what a smart linkage looks like.

OPERATIONS MANAGEMENT

Operations management for local government is a combination of asset management, work management, and resource management. It's maintaining, upgrading, and expanding physical assets throughout their life cycles—preserving and extending the service life of assets by intervening at strategic points in an asset's normal life cycle to improve its performance. It's organizing requests, tasks, and work orders to be completed in an efficient and productive manner. And, it's using the right resources at the right time to maximize results for your community.

GEOGRAPHIC INFORMATION SYSTEMS

GIS allows users to visualize, question, analyze, and interpret data to understand relationships, patterns, and trends. In the words of our friends at Esri, "Rooted in the science of geography, GIS integrates many types of data. It analyzes spatial location and organizes layers of information into visualizations using maps and 3D scenes. With this unique capability, GIS reveals deeper insights into data, such as patterns, relationships, and situations—helping users make smarter decisions."

CAN'T I JUST USE COLLECTOR OR WORKFORCE FOR ARCGIS?

For some things, yes. Collector for ArcGIS is perfect if you're trying to collect asset locations and basic attributes in the field. Workforce for ArcGIS uses the power of location to coordinate your field workforce. As you progress on your high-performance journey, you'll need a more robust mobile solution that takes your work and asset data to the next level, increases proactivity, runs projections, automates processes, and engages citizens. That's where Cartegraph comes in.

BETTER TOGETHER

Cartegraph will be the system of record for your asset condition, work history, and resource cost data. ArcGIS will remain the system of record for your spatial attribute information. With a built-in, two-way, real-time integration, Cartegraph consumes GIS data and maps while also pushing critical operations data, such as cost and condition, right into ArcGIS. You can work in either system to derive actionable insights and make smart, data-driven decisions.

DID YOU KNOW?

CARTEGRAPH AND ESRI HAVE PARTNERED SINCE 1994.

By combining the best of both systems, your team will unlock the ability to:

- Consume spatial and non-spatial attribute information about assets.
- Analyze assets in context with each other, including routing and spatial correlation.
- Schedule preventative maintenance and plan for future maintenance.
- Drive operational efficiencies and improve communication by automating workflows.
- Track the real-time progress of your goals and if you're meeting service agreements.
- Quickly build reports for council meetings, FEMA reimbursement, budget requests, capital improvement planning, and more.

As you can see, no one system can do it all. But, by combining your operations management and GIS solutions, you get the best of both worlds. It's time to unleash the potential of your GIS data and become a high-performance government organization. **Are you ready?**

CASE STUDY 02:
NEW BRAUNFELS, TX

NEW BRAUNFELS SAVES WEEKS ON ANNUAL PAVEMENT PLANNING

As one of the top 10 fastest growing cities in the U.S., New Braunfels, TX isn't about to run out of road any time soon. But, when it comes to pavement management for its 74,000 citizens, this city just northeast of San Antonio finds itself in a constant chase to keep pace with booming growth.

With an ever-increasing infrastructure and minimal increases in personnel, city engineers tapped into Cartegraph's two-way ArcGIS integration to ensure crews were performing the right work on the right segment at the right time. Additionally, they're leveraging the best-in-breed solutions for location-based analysis and building interactive maps that keep council members and citizens in the know.

New Braunfels holds an annual public survey meeting to help build their annual pavement plan. In prior years, citizens would indicate what they'd like fixed on paper forms, and it took several days for a team of engineers to interpret and compile the information—20 percent of which couldn't be mapped because the handwritten entries were unclear.

Today, the city maps citizen requests in real-time during the meeting thanks to the power of **Cartegraph and ArcGIS**. The city also created an easily accessible online submission form so residents can submit requests year-round. These on-demand capabilities have helped New Braunfels work with the public more closely and gain their confidence. In the end, they're able to take a mountain of data and turn it into something more tangible: something they can work with, report on, and share.



FINDING YOURSELF HIGH-PERFORMANCE TECHNOLOGY PARTNERS

Ever purchased a technology solution that wasn't what it was cracked up to be? It sounded great, but as soon as you signed the dotted line, you were passed off to a third-party implementer who wasn't familiar with your needs or goals. And, after a rushed project that didn't really fit your needs, you were left wondering who to contact for help. Sound familiar?

In today's technology-driven world, it's important not to lose sight of why we're implementing these smart systems: to help our people. Ensure you're working with the right partner by asking the following questions:

PEOPLE-FIRST APPROACH

When choosing a technology partner, it's important to pay attention to the people on their team. Do they seem to care about you? Are they asking questions about your goals and objectives? Are they comfortable talking about or connecting you with other customers? These are telltale signs of someone who will be a partner, not just another vendor.

PROCESS OWNERSHIP

Ask if they stand behind their product. Do they build it in-house? Who handles implementation? What about support? A trusted partner believes in their own product and isn't afraid to stand behind it. They build it, implement it, service it, and support it. When you have a question, you know exactly who to call to get the answer.

7 CHARACTERISTICS OF A STELLAR OPERATIONS MANAGEMENT SYSTEM

As we mentioned earlier, success is all about looking at the people, the process, and the product. Now that you have a few questions to ensure you're working with the best people and guaranteed to have a smooth implementation process, it's time to talk about product quality.

In addition to asking about reliability and downtime, here are seven features you should look for in your high-performance technology:

7 CHARACTERISTICS OF A STELLAR OPERATIONS MANAGEMENT SYSTEM

- 1. User-Centric Design:** When choosing an operations management system, consider the ease of use and intuitiveness of its design. A clean and straightforward interface enables staff to concentrate on the task at hand, rather than trying to muddle their way through inefficient software that makes tasks more difficult to manage and complete.
- 2. Mobility:** The system you choose needs to provide optimal power and functionality for your mobile workforce. Look for a system that performs as well, or better, on a mobile device as it does in the office. That way, no matter where the asset is located, your team has everything they need to access and complete work accurately and on time.
- 3. Data Organization:** Does the system make it easy to input, view, and find data? If not, look elsewhere. Quick, easy access to well-organized data, such as a particular asset's work and inspection history, helps your team to make well-informed decisions when performing their work in the office or on the go.
- 4. Adaptability:** Identify your technology needs today. Got it? Now, consider how those needs might evolve in the future. Use that knowledge to choose a technology solution that can expand and grow with the needs of your community and the operations that serve it.
- 5. Integration:** The future of local government is moving toward a "system of systems" in the words of Esri President Jack Dangermond. That means each system thread in your organizational fabric needs to propel you forward, not slow you down. The right system integrates easily with everything from your ArcGIS platform to your fuel management system—and will share data with them in real time.
- 6. Cross-Functional:** A system should be able to meet the needs of multiple departments and areas of your organization. Organization-wide thinking—along with the communication and collaboration that makes it successful—isn't possible using a system that creates data silos. Productivity and decision making improve when every user has access to the same data.
- 7. Automation:** To be more effective and efficient, high-performance governments must accomplish more with less energy. Look for automation features that let the system do some of the heavy lifting for you when it comes to data entry and repeatable actions. You'll be out creating more of an impact while the system saves you time, keeps you organized, and reduces data-entry errors.

WHAT KIND OF PROBLEMS CAN I SOLVE WITH CARTEGRAPH AND ARCGIS?

Maps aren't just for your GIS team: they're so much bigger than that. Maps guide the public works team to necessary repairs. They show council the potential impact of a natural disaster. They tell citizens when their street is closed.

Maps connect our communities—and they create a better world. As you start your journey to high-performance government, here's a few examples of the questions you'll be able to answer with the help of your Cartegraph and ArcGIS data.

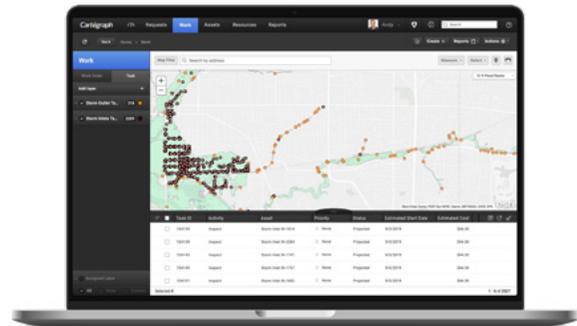


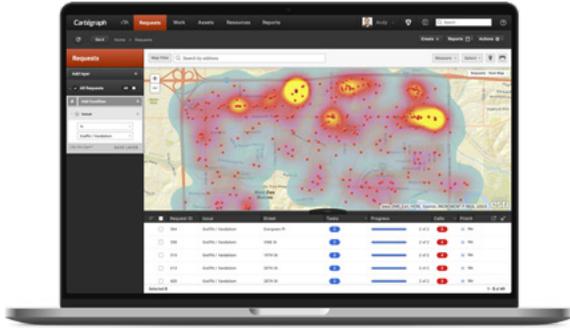
WHAT CAUSED MY 8" PVC SEWER PIPE TO FAIL BEFORE IT WAS PREDICTED?

Analysis of the soil bed the pipe is laid in revealed a montmorillonitic soil type, prone to expansion.

HOW DO WE PREPARE OUR SYSTEM FOR A POTENTIAL FLOOD EVENT?

Establishing a proactive response plan that covers every asset in the floodplain ensures work will be generated to prepare all assets to perform at an optimal level.



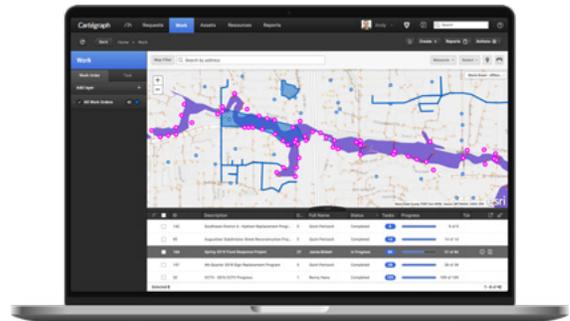


WHY ARE THERE SO MANY GRAFFITI REMOVAL REQUESTS ON THE WEST END OF TOWN?

Analysis of street lighting infrastructure highlights an insufficient amount of lights within this location. Lack of nighttime lighting is a potential cause of increased graffiti vandalism.

WHAT'S THE POTENTIAL FINANCIAL IMPACT OF THE FORECASTED HURRICANE?

Spatial analysis of the assets in the impacted area, layered with the anticipated work data, provide an estimate of the fiscal impact to the community.



SHOULD WE SPREAD OUR PAVEMENT BUDGET ACROSS DISTRICTS EQUALLY?

Visualizing condition data, the roadway conditions in District 8 are significantly better than District 9. Budget dollars should be allocated equitably—instead of equally—to improve the overall city.



CASE STUDY 03:
AUBURN, WA

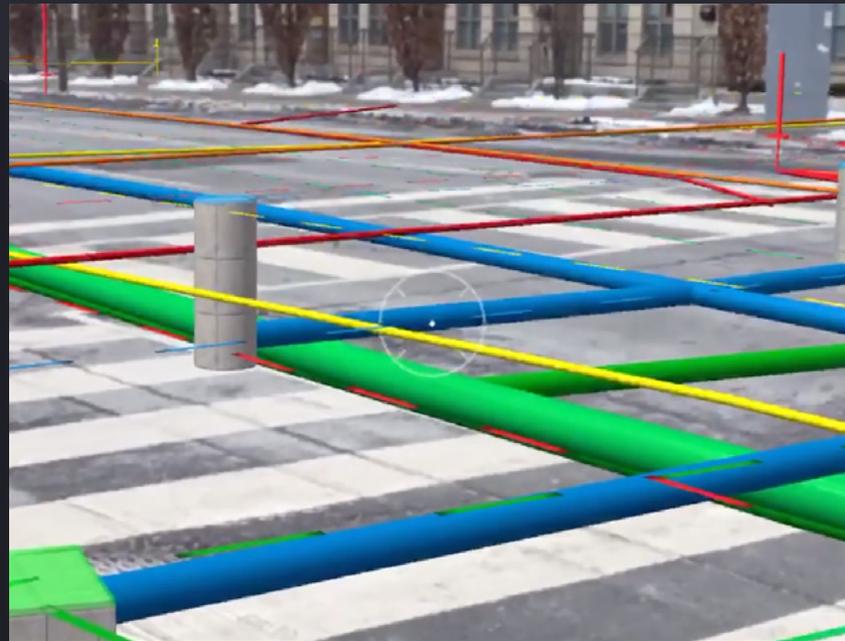
AUBURN IS TESTING X-RAY VISION FOR INFRASTRUCTURE ASSET MANAGEMENT

Move over, Superman. Superheroes aren't the only ones with X-ray vision anymore. The City of Auburn, WA is testing high-performance government technology to help their public works employees "see" and interact with below-ground infrastructure assets.

Projects like these support City of Auburn Assistant Information Technology Director Ashley Riggs' idea that innovation is a mindset, a continuous process of finding substantive improvements, and not a one-time undertaking.

By pairing Cartegraph's work and asset management software, ArcGIS, and an augmented reality application called vGIS, Auburn is on their way to better tracking and maintaining the water, sewer, storm, traffic, and communication assets that lay beneath their city. Whether they're in the field or the office, staff can see and interact with underground assets without lifting a shovel.

This futuristic tech is expected to open the door to more dynamic council presentations, easier remote or confined-space inspections, and preventing the expensive repairs and significant project delays that come with unintentionally digging up critical assets.



"Innovation is a mindset, a continuous process of finding substantive improvements, not a one-time undertaking."

HOW'S THIS ALL WORK?

4 STAGES OF A SUCCESSFUL IMPLEMENTATION

Building a high-performance government—and staying there—means that you the right tools and ongoing monitoring to keep your operation at peak levels. It also means choosing the right partners, like Cartegraph and Esri, to help navigate the road ahead.

A partnership is more than just a software purchase. It's the start of a new way to do business, and our industry experts will help you set and achieve your high-performance goals. At Cartegraph, we're just as invested in your journey as you are, which is why we offer a thorough combination of training, support, coaching, and consulting. Remember, high performance is a journey—not a destination. And, as your partner, Cartegraph will be with you every step of the way.

1. COLLECT DATA FROM EXISTING RECORDS.

We'll help you pull together asset data from spreadsheets, legacy systems, and GIS—and make sure it's up to date. Our team will whiteboard with you to build a framework for the asset inventory you want to track and define critical data fields for each asset.

Data categories you'll want to track in your system include the following:

- **Identifying information:** name/type of asset, manufacturer, serial number, bar code
- **Location:** mapping, street address, placement within facility
- **Status:** installation date, condition, life expectancy
- **Activities and tasks:** repair, maintenance and inspection history, and schedules
- **Cost:** value/replacement cost, associated labor, and materials

As a best practice, 10 to 15 data points are tracked for each asset. The records will be configured to deliver whatever information you will want to retrieve later. Each asset record can include file attachments such as repair manuals, warranty info, receipts, and photos—a huge benefit when it comes to FEMA-related reporting.

2. AGGREGATE AND CLEAN UP DATA.

When thousands of citizens are counting on you, data hygiene is no joke. This is why our team will perform an initial data health check to ensure your Cartegraph and ArcGIS software are “speaking the same language.” From then on, the productized integration takes care of it for you: ensuring your recordset types and feature classes are aligned, and that you have matching field lengths, field types, and a unique ID per record.

To make your life even easier, Cartegraph comes with pre-defined asset relationships. The system will automatically help you identify redundancies and gaps in your existing data. When it finds an error, it will let you know and offer resolution tips.

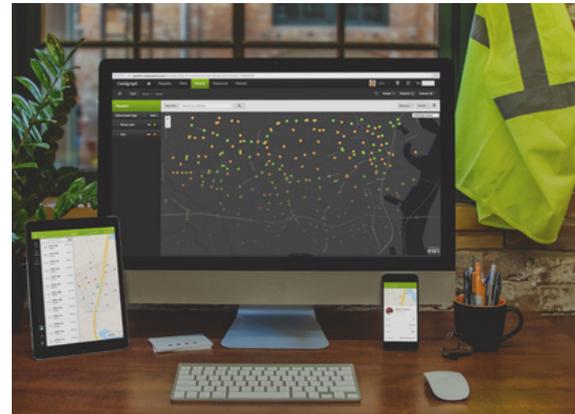
3. CONFIGURE YOUR SYSTEM.

With an out-of-the-box integration, you don’t have to worry about getting into the weeds. We’ll make sure everything is set up correctly, then train you on the power of using the tools together. You’ll learn how to leverage lookup libraries—cities, streets, departments, activities, asset types, and more—to ensure consistent data entry and make searching a breeze.

To answer the age-old question, “How much is this costing me?” you’ll need to track your resources, resource rates, and tasks that use those resources. Our team will help you configure those labor, equipment, and material records, including each rate associated with those resources. Once these resource records and rates are set up, the workers simply need to document who worked on the task, what equipment and materials were used, and the costs will automatically calculate.

4. MANAGE AND MAINTAIN YOUR ASSETS.

You’ll quickly see how Cartegraph streamlines your day-to-day operations and long-term planning. Your asset data will be cleaned up—no more redundancies, inconsistencies, or gaps. Paperwork will be virtually eliminated, and you can get on with the business of capturing data, analyzing it in both Cartegraph and ArcGIS, and preparing for the future.



INTEGRATION NATION

Cartegraph integrates with multiple ArcGIS data sources; a mix of ArcGIS Online, Portal for ArcGIS, and ArcGIS for Server environments can be used. The most common integration path connects asset records in the Cartegraph database with asset features in ArcGIS.

The Cartegraph user can view and edit asset geometry and attribute information in Cartegraph, with those changes automatically updating the corresponding records in ArcGIS. Conversely, a GIS user editing the feature data in ArcGIS has their changes automatically made in Cartegraph.

CARTEGRAPH CAN MANAGE THESE ASSETS AND MORE

Pavement to parks, water to waste: the gangs all here! We have tons of standard asset types available for various departments. Plus, with our custom asset management tool, you can add any asset. We can build it for you or show you how to make it yourself.

- ADA Ramps
- Athletic Space
- Bench
- Bridges
- Electrical Generator
- Facility
- Facility Lighting
- Fence
- Fire Protection
- Flood Gates
- Flood Generators
- Flood Pumps
- Floodwalls
- Guardrails
- HVAC Equipment
- Landscape Area
- Levee Embankments
- Light Fixtures
- Markings
- Park
- Park Amenity
- Park Structure
- Pavement
- Pavement Areas
- Playground
- Playground Equipment
- Plumbing Fixture
- Preemption
- Pump Stations
- Roofing System
- Sewer Cleanouts
- Sewer Facilities
- Sewer Force Mains
- Sewer Laterals
- Sewer Mains
- Sewer Manholes
- Sewer Pumps
- Sidewalk
- Signs
- Signal Cabinets
- Signal Controllers
- Signal Heads
- Signal Monitors
- Signalized Intersections
- Storm Basins
- Storm Channels
- Storm Culverts
- Storm Facilities
- Storm Inlets
- Storm Manholes
- Storm Outlets
- Storm Pipes
- Storm Pumps
- Supports
- Traffic Cameras
- Traffic Detectors
- Trees
- Water Backflows
- Water Facilities
- Water Hydrants
- Water Laterals
- Water Mains
- Water Meters
- Water Pumps
- Water Storage Tanks
- Water Valves

READY TO GET STARTED?

7 THINGS TO THINK ABOUT:

Cartegraph will help you build data-driven operations that are more effective, efficient, and productive for your citizens. Once you're up and running, we'll focus on your continued success and help you overcome the challenges you once had. As you start on your high-performance journey, here are a few things to start thinking about.

1. Have you thought about what kind of implementation experience you want?

On-site or remote

Through the vendor or outsourced to a 3rd party

2. Who are the key players that will use, manage, and approve your system components?

FULL NAME	TITLE	DEPARTMENT	INTEREST AREA

3. What does your team expect to get out of your Cartegraph and Esri system integration?

4. What essential system requirements do you have in the following areas: asset management, work management, resource tracking, reporting, and analytics?

5. Are you using ArcGIS Enterprise, ArcGIS Online, or a combination of both?

6. Do you currently have or plan to build your asset inventory in GIS?

7. Who needs access to your asset and work data?
What specific data points do each of those individuals need?

FULL NAME	DEPARTMENT	DATA POINTS

***IF YOU LIKED BUILDING HIGH-PERFORMANCE
GOVERNMENT, YOU'LL LIKE THESE GUIDES:***

ABOUT CARTEGRAPH

Cartegraph is in the business of building high-performance government. They offer software solutions that help local government agencies manage their physical assets and associated operations. With Cartegraph, users optimize the life of their infrastructure, deploy maintenance resources efficiently, and increase productivity.

To build high-performance governments, Cartegraph uses a comprehensive, three-pronged approach that combines success coaching, expert consulting, and state-of-the-art software solutions for asset, work, and resource management to help agencies capture data, analyze it, and prepare for the future. For more information, visit cartegraph.com.