*Case Study*

esri Partner Network Silver

# ArcGIS Online Launch for Utilities

GEO Jobe GIS CONSULTING

We've published a lot of blog posts on the vision, value proposition and best practices around ArcGIS Online. To showcase the value of embracing these ideas, we wanted to provide an overview of an **ArcGIS Online launch** for a client. Central to our philosophy at GEO-Jobe is a platform first mentality to solving problems for clients. We have a proven process for this that's comprised of the following key components:


The following outlines the result of implementing this process in partnership with **Gibson County Utility District (GCUD)** to support their *inspection workflows*.

# Problem

GCUD is responsible for the distribution of natural gas to 13,000 customers via 580 miles of pipeline over a three county area in west Tennessee. Each facet of GCUD operations is overseen by regulatory authorities to ensure system integrity. Central to being compliant with these regulations is a rigorous set of ongoing preventative maintenance activities (inspections) executed by field staff and monitored by supervisors and management. These inspections are done on a wide variety of assets through varying intervals with varying information collected. Historically, these inspection activities were supported with a paper-based system. You can imagine the amount of paper that accumulated as a result.

This paper based approach to inspections has challenges from start to finish. To start, inspectors needed to locate assets in order to inspect them. While this information was mapped and stored in a GIS, it was not easily accessible. As a result, inspectors relied on their memory to locate them. Even for the most veteran of staff, it was impossible to know where all assets were located and better yet, know the most efficient way to navigate to them. For new staff, this was impossible and required a significant learning curve (investment) when training new inspectors. The result was, at best, inefficient location and navigation to assets, and at worst, overlooking assets and thus findings that could cause serious problems and consequences.

Once assets were located, the inspector was responsible for recording information about the asset being inspected and answer inspection questions. Aside from duplicate data entry, the process of writing information on a paper form can create problems downstream in the workflow, when information is transferred. This could simply mean that money is lost from wasted time or be more serious, such as misrepresenting information leading to action not taken at the proper time. In addition, inspectors were somewhat limited in the information they could capture to effectively communicate findings and drive timely and informed decision making downstream in the workflow.

While the previous inspection process is executed repeatedly throughout the course of the day, in-office personnel are in a holding pattern waiting on a stack of papers so they can continue their work. This inconsistent flow of information caused workflow delays, bottlenecks and ultimately a lack of timely decision making.

As inspection results made their way into the office, the challenges continued. While decision makers at all levels needed access to this information, it was not readily available. In addition, deriving critical data points from these forms to trigger action or to support informed decision making required a lot of time. As a result, simply from a lack of time, there were delays in action and decisions were made without the best information available.

To ensure compliance, inspectors from regulatory authorities would periodically visit GCUD to audit their inspection activities. These audits would consist of a variety of questions that had to be answered with documentation to prove inspection activities. The process of digging through stacks of papers was not only time consuming for all parties (i.e. expensive), but prone to user error simply because of the amount of information. In addition, because of the previous challenges described, there was risk of inspection information being misplaced, inspection activities being misrepresented and getting fined.

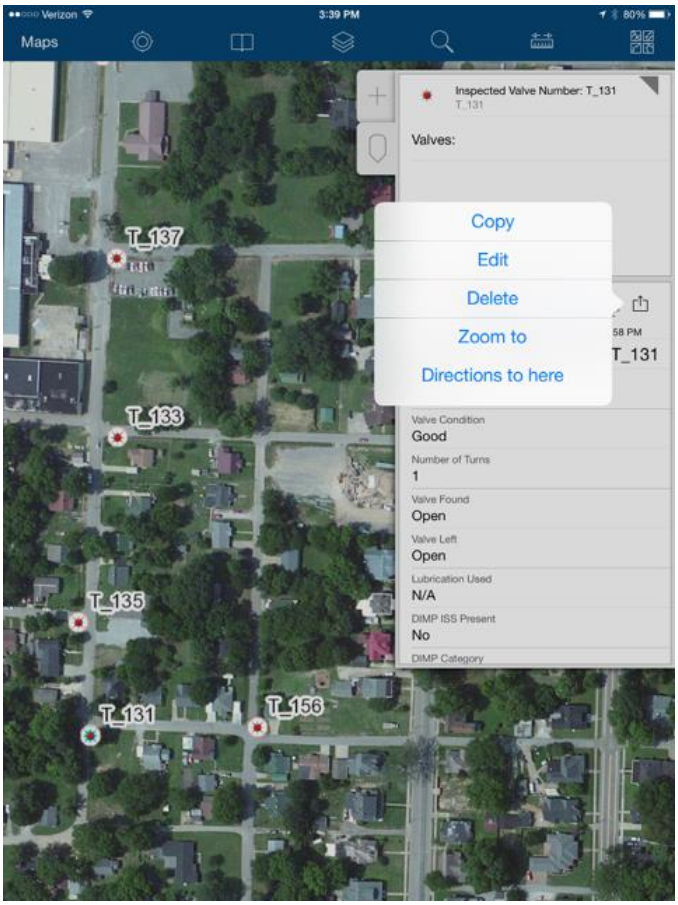
## Valve Inspection Report

| ValveNumber | ValveCondition | Turns | ValveFound | ValveLeft | LubricationUsed | DIMPISSPresent | DIMPCategory | Comments | Inspector | created_date |
|---|---|---|---|---|---|---|---|---|---|---|
| R_062 | Good | 1 | Open | Open | N/A | 0 | 9 | None | Skinner, Larry E. | 1/30/2014 5:37:58 PM |
| M_072 | Good | 3 | Open | Open | N/A | 0 | 9 | Turned gate valve 3 rounds | Blackburn, Steven C. | 4/8/2014 3:57:23 PM |
| K_120 | Good | 1 | Open | Open | N/A | 0 | 9 | None | Skinner, Larry E. | 1/24/2014 8:03:28 PM |
| D_024 | Good | 1 | Open | Open | N/A | 0 | 9 | None | Skinner, Larry E. | 2/3/2014 9:08:43 PM |
| K_074 | Good | 1 | Open | Open | N/A | 1 | 8 | Cleaned out valve box | Skinner, Larry E. | 1/24/2014 3:25:15 PM |
| K_068 | Good | 1 | Open | Open | N/A | 1 | 4 | Valve box to be repaired ( no top) | Simpson, Dennis R. | 1/23/2014 9:04:35 PM |

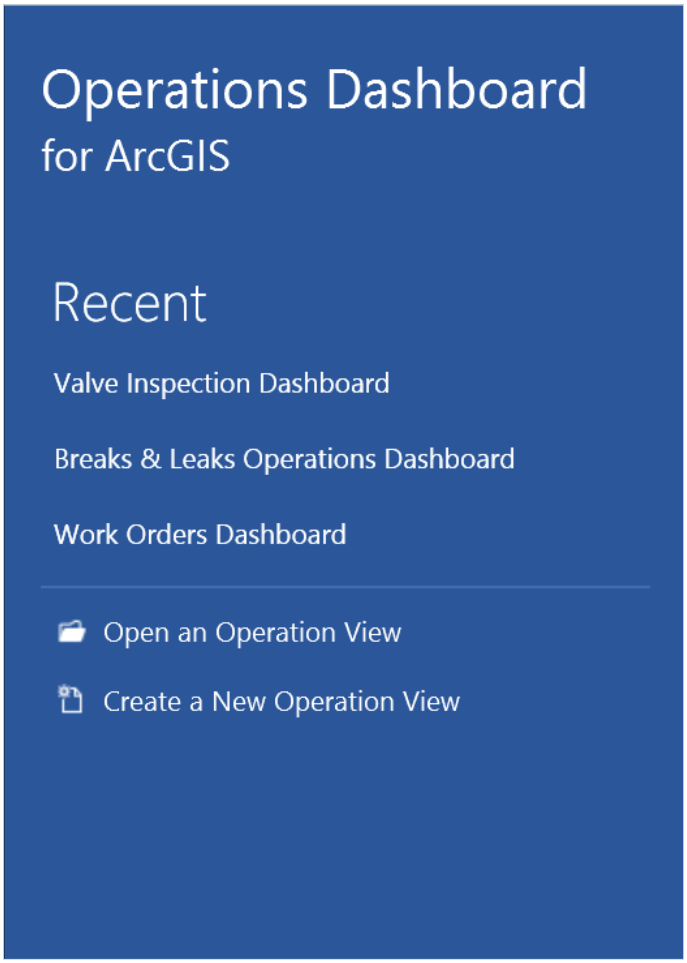
# Products

With a thorough understanding of the client's needs, we shifted to comparing these against what the platform was capable of doing. We settled on the following product combination to meet their needs.

- **Infrastructure**: Amazon Web Services
- **ArcGIS Server**: Used to expose GCUD information via ArcGIS Server services that are registered with and consumed via ArcGIS Online. Also supports a seamless bi-directional flow of data changes between an on-premises geodatabase supporting ArcGIS Desktop activities and a distributed geodatabase supporting ArcGIS Server services. The ArcGIS Server resources are extended to GCUD as a service via GEO-Jobe's GEOPowered Cloud – Named User Packages.




- **ArcGIS Online**: At its core, ArcGIS Online is acting as the geospatial content management system for inventorying, managing and securely sharing location-based information products across GCUD. More specifically, ArcGIS Online is used to author focused web maps that support specific elements of inspection workflows.

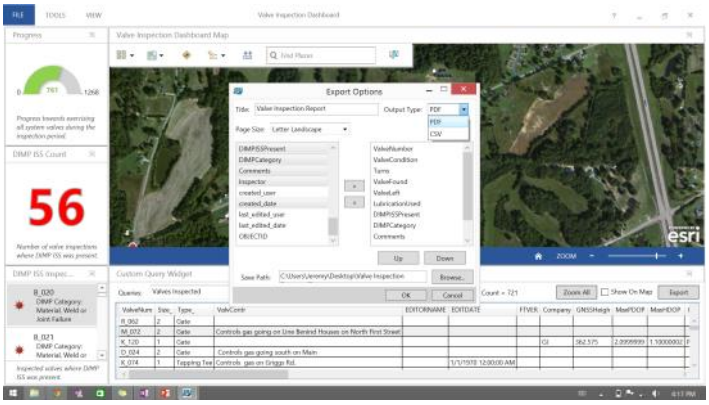



- **Collector for ArcGIS**: The Collector app is used to consume ArcGIS Online web maps and facilitate locating assets, navigating to assets, collecting information and transmitting information to the office.
- **Operations Dashboard for ArcGIS**: Operations Dashboard is used to present in-office stakeholders with focused, relevant information supporting various inspection activities. This information is presented via charts, graphs, counters, etc.
- **Custom Query Widget**: Extends the out of the box functionality of the Operations Dashboard to provide users with query and reporting capabilities.

# Solution

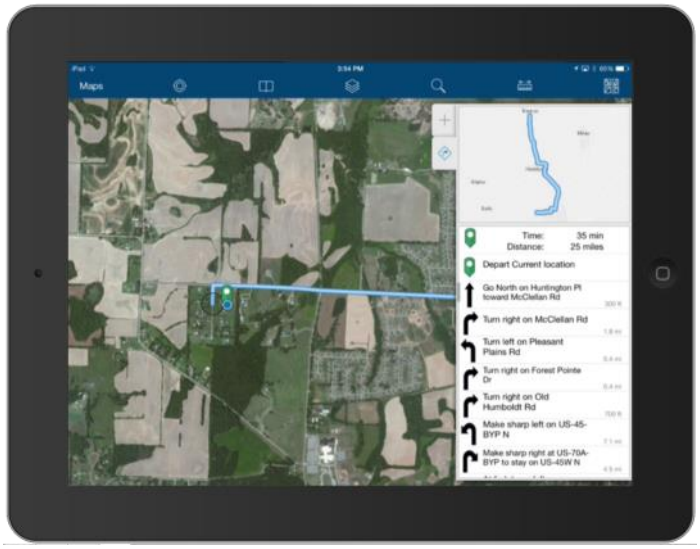
With the technology stack mentioned above, GCUD inspection workflows have been transformed.

As inspectors embark on the inspection process now, they are equipped with iPads running the Collector for ArcGIS app. Through focused web maps designed for each particular inspection, they only see information products that support their activities. These maps show where assets are located in relation to the inspector's current GPS location (blue dot). Eliminating the problems associated with reliance on memory to locate assets. Once a target asset is located on the map, the out of the box "Navigate To" function streamlines the process of locating it.

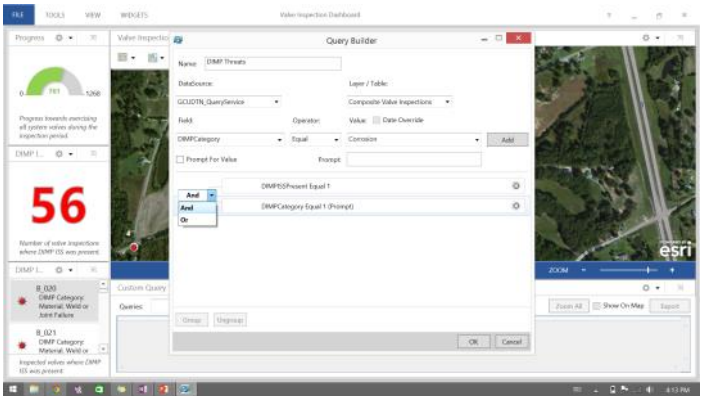



With the asset located, inspectors are able to capture all inspection information using digital forms. These forms are driven by dedicated inspection feature classes referenced in the web map and editable via the Collector app. Database domain and require field settings standardize the data entry process and minimize risk of user error. To add additional context to inspection findings, inspectors are able to take one or more photos of their findings (using the built-in camera) and associate them with the actual inspection point via feature attachment capabilities.

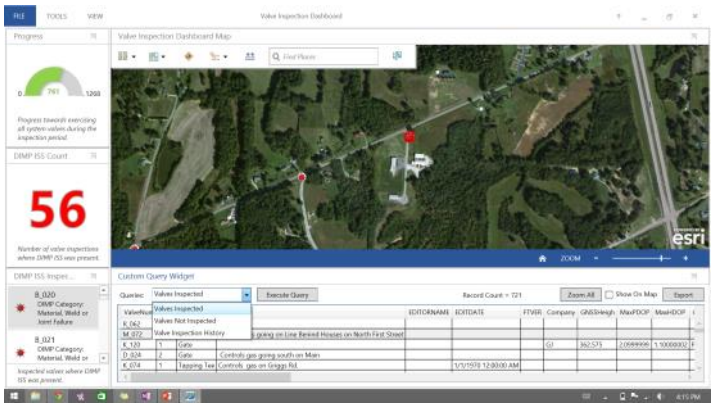

All inspection information is immediately transferred to the geodatabase and accessible to other users. This could be other inspectors or in-office staff. Since this just happens automatically, inspectors are saving the time associated with manual paper transfer and in-office staff have real-time information in which to proceed with their tasks. This streamlined means of information sharing eliminated delays and bottlenecks and increases productivity.

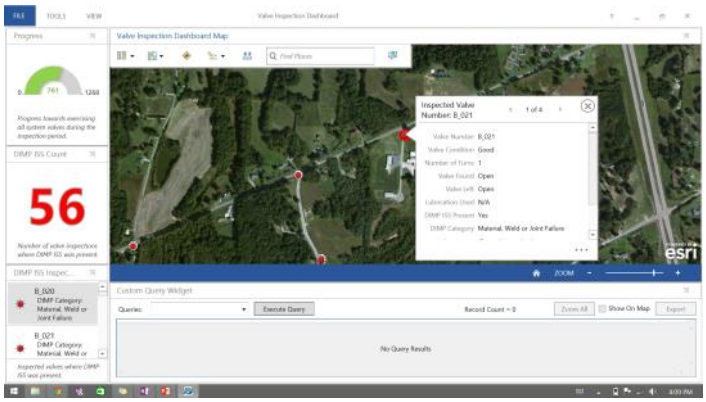



With information immediately available to in-office personnel, a new challenge had to be addressed. There was a massive amount of rapidly changing data in a focused window. Whether for monitoring productivity or triggering reactive workflows to deal with issues, simply having timely access to loads of information was not enough. Through the Operations Dashboard, GCUD was able to provide not only timely, but relevant information to in-office decision makers. Information tailored to answer the questions they needed to more informed decisions. Focused operation views were created that answered specific questions via real-time maps, graphs and charts. As information is captured in the field, the dashboard automatically updates, allowing for both timely and informed decision making at all levels.



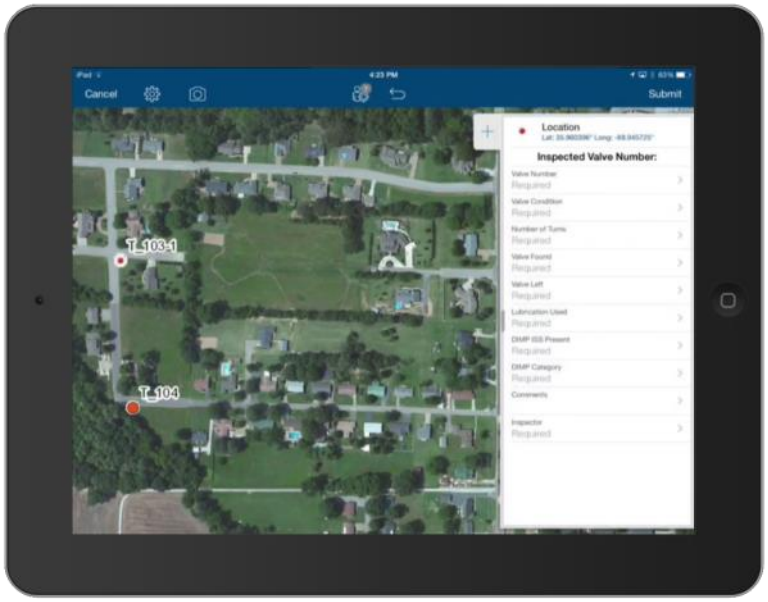
While GCUD had a centralized set of information that was easily accessible, there was still a need to generate reports to document regulatory compliance. These capabilities were not provided out of the box with the Operations Dashboard, so GEO-Jobe extended the platform and developed a custom query widget. This widget added value to existing focused operations views and allowed users to create and execute queries that answered specific regulatory compliance questions. Query results could be viewed in a table, on the map and exported to PDF for hardcopy report submission. This system driven process significantly reduces chance of user error and gives confidence to all stakeholders involved in the auditing process.




While GCUD's geodatabase isn't completely built out, it is full of timely information that can be used to perform spatial analysis on inspection findings. The results of this analysis can then be used to identify areas of risk within the system so preventative action can be taken.

Through the use of the ArcGIS Platform and the products mentioned above, GCUD was able to streamline their inspection activities, reduce probability of user error and provide decision makers with real-time information for informed decision making. All of this equates to time savings ($$), but most importantly higher safety and reduced risk for customers and operators.




*Richard Voss, GIS lead for GCUD, states "We are still in the process of implementing our ArcGIS Online inspection configurations, but we see it is not a fly-by-night whim and is going to stand the test of time. I don't think the basic field operator is ever going to find a better, more user-friendly platform than they have at their disposal right now."*

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Esri Partner Conference 2013 Award Winner
Organizational Use of ArcGIS Online

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