



Light



Gas



Water



2025 UTA Conference GIS Uses at MLGW

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Agenda

- ❑ Introduction to GIS
- ❑ MLGW Overview
- ❑ Importance of GIS in Utility
- ❑ GIS Applications at MLGW
- ❑ Challenges and Future Directions
- ❑ Q&A

What is GIS?



MAPS ARE EVOLVING

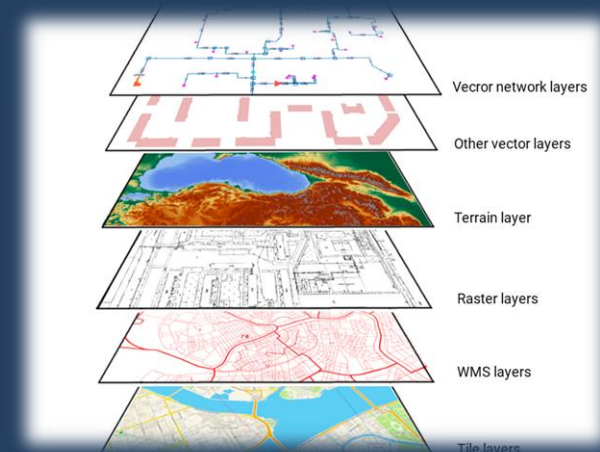
The central text "MAPS ARE EVOLVING" is displayed in a bold, white, sans-serif font within a black rectangular box. This box is superimposed on a collage of four images that represent different types of maps and data visualizations. The top-left image shows a world map with landmasses in green and oceans in black. The top-right image is a satellite view of a city with various colored overlays. The bottom-left image is a world map with landmasses in yellow and oceans in black. The bottom-right image is a street map of a city with various colored overlays.

GIS – Geographical Information Systems



GIS is a technology that is used to create, manage, analyze, and map all types of data.

- GIS connects data to a map, integrating location data (where things are) with all types of descriptive information (what things are like there).
- This provides a foundation for mapping and analysis that is used in science and almost every industry.
- GIS helps users understand patterns, relationships, and geographic context.
- The benefits include improved communication, efficiency, management, and decision-making.



Memphis Light, Gas and Water(MLGW)



MLGW is the nation's largest three-service municipal utility, serving more than 440,000 customers. Since 1939, MLGW has met the utility needs of Memphis and Shelby County residents by delivering reliable and affordable electricity, natural gas and water service.

Electricity

MLGW is supplied with electricity by the Tennessee Valley Authority (TVA), a federal agency that sells electricity on a nonprofit basis. MLGW is TVA's largest customer, representing 11% of TVA's total load. There are nearly 431,000 electric customers.

Gas

Natural gas is the most popular means of residential heating in the MLGW service area. MLGW provides natural gas to nearly 320,000 of its customers in Shelby County.

Water

MLGW operates one of the largest artesian well systems in the world. It is through this system that MLGW taps into the aquifer and delivers water to more than 257,000 customers. MLGW operates 10 water pumping stations and more than 175 wells throughout Shelby County.

MLGW ensures the quality and safety of its water by filtering, adding chlorine, and conducting more than 38,000 tests every year.



Importance of GIS in Utility



Asset Management

GIS technology assists in effectively managing utility assets, ensuring optimal resource allocation and maintenance.

Service Planning

GIS aids in servicing our customers by analyzing geographical data, improving service reach and response times.

Outage Response

GIS provides critical data for efficiently responding to outages, enhancing customer service and operational efficiency.

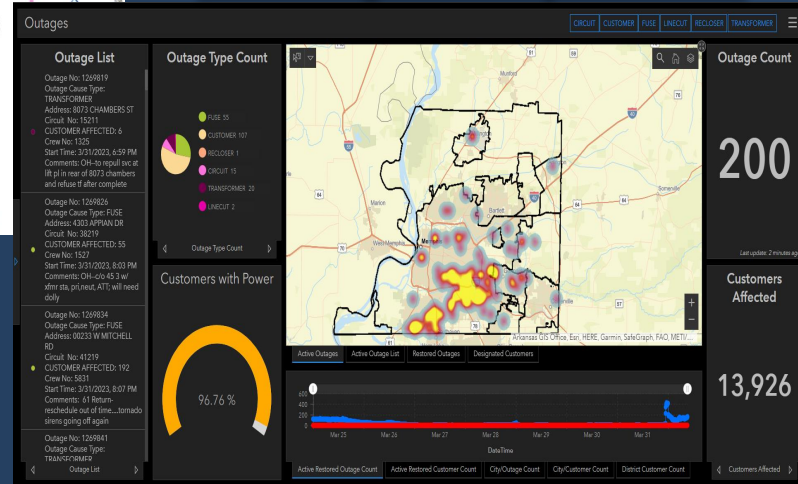
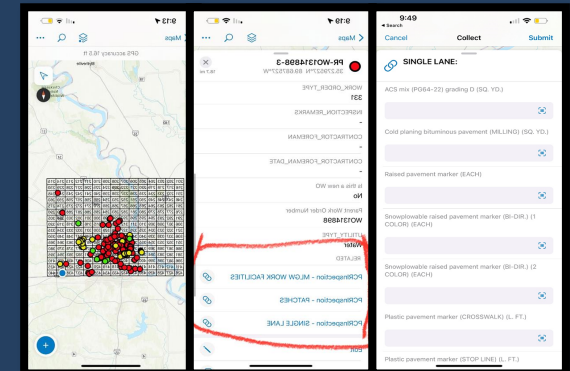
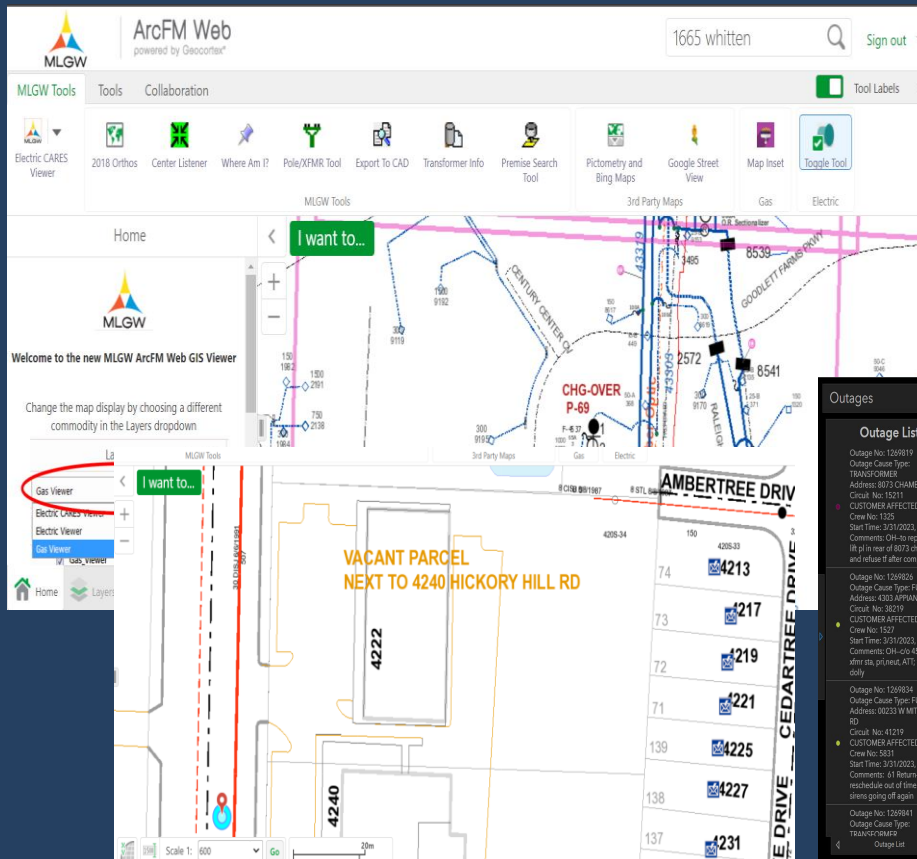
Strategic Decision-Making

GIS supports strategic decision-making with data visualization, leading to improved utility management and planning.

Enterprise GIS Apps at MLGW



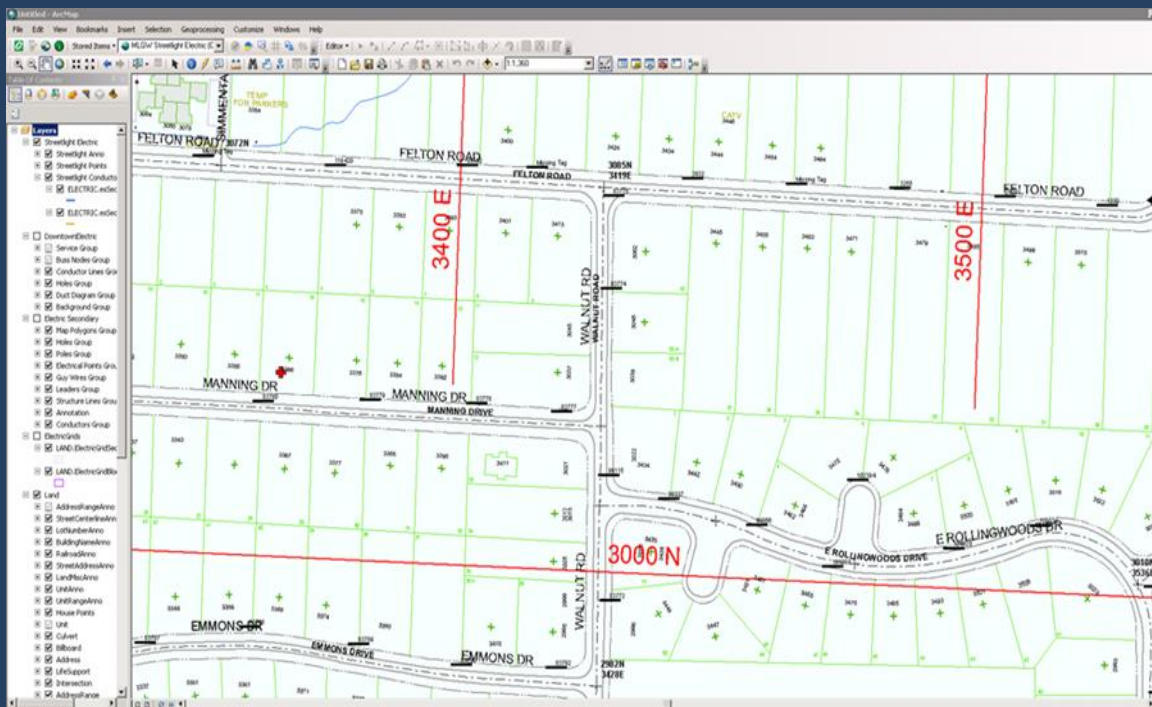
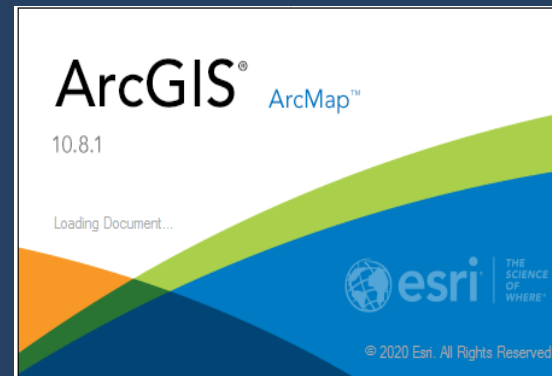
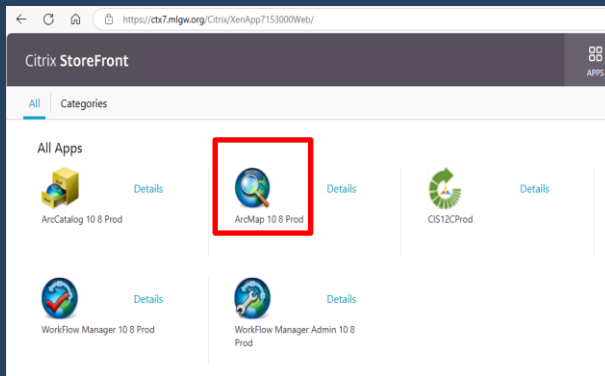
- Addressing Authority and Landbase Data for Shelby County. Provide data to 911, Emergency agencies(Police, Fire) & Postal Service
- Map Utility Data – Electric, Gas and Water (ESRI ArcMap with ArcFM)
- Design new subdivision with ArcMap data in AutoCAD.
- Special Maps & Dashboards created for Executives or Customers
- Web and mobile applications for Employees and customers.



ESRI ArcMap & Schneider ArcFM



ESRI ArcMap – Available as a Citrix Application



ArcMap – uses

- Mapping
- Querying
- Analyzing
- Plotting
- Editing
- Network Tracing
- Clearance Orders

about ~50 users

Electric Primary, Secondary, Downtown, Transmission, Water Engineering, Gas System Integrity & Engineering, Telecom Engineering, Land & Mapping, Property Management, Sysops (Gas & Water)

Esri Workflow Manager (JTX/WFM)



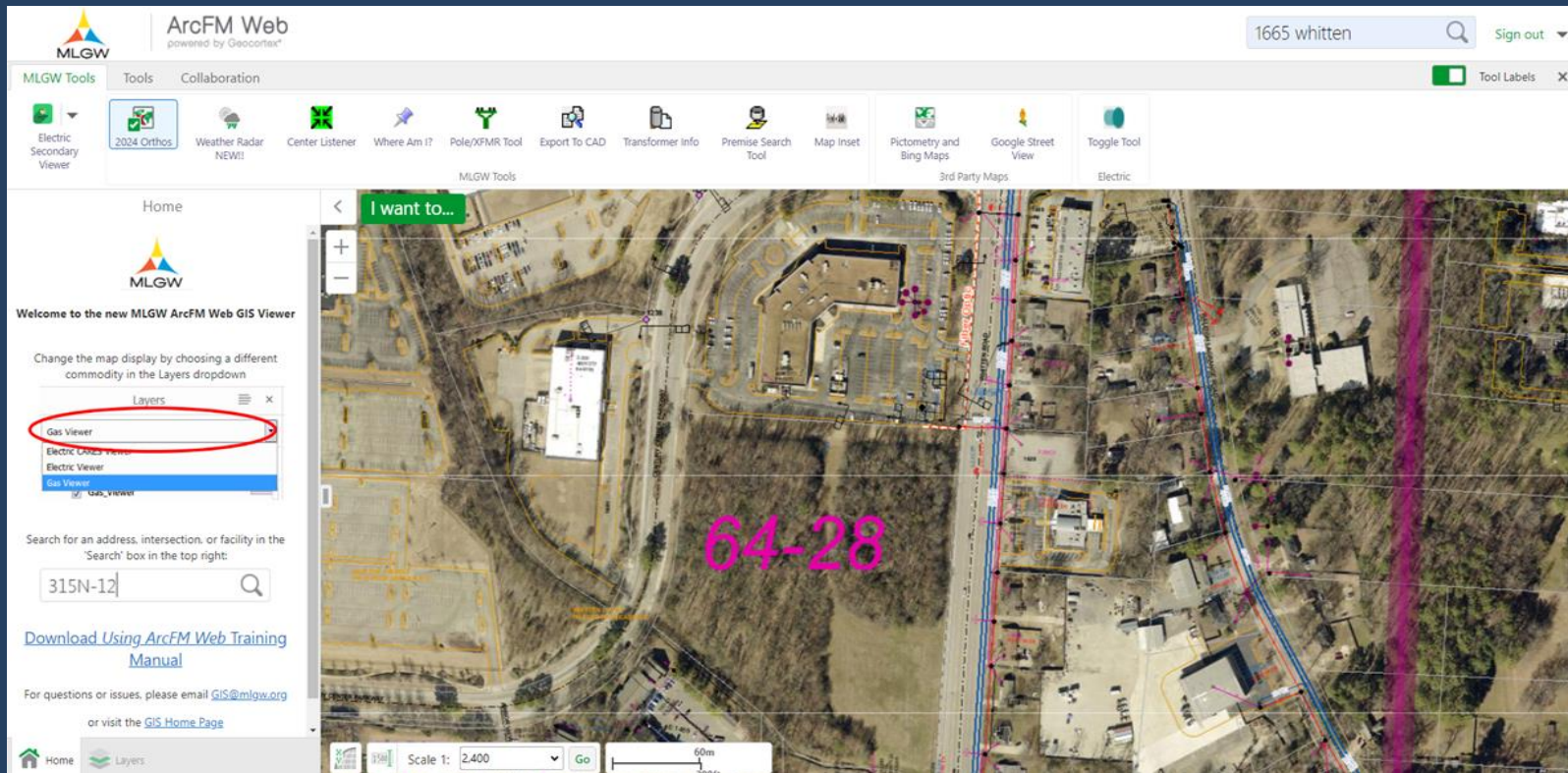
The screenshot displays the ArcGIS Workflow Manager (JTX/WFM) interface. On the left, a 'Jobs' pane lists various query types: Public Queries (General, Completed, In Progress, On Hold, Unassigned), Group Queries, Personal Queries, and User Queries. The main area is divided into two panes. The top pane, 'Job Query Results - List View', shows a table of jobs with columns for Job ID, Job Name, and Job Description. The bottom pane, 'Job Workflow', displays a flowchart for the 'Address Assignment' process. The flowchart includes steps such as 'Clerical Support', 'Log Work Into The Department', 'Email Address Assignment', 'Define AOI', 'Have All Info?', 'Assign Addresses', 'Check Version', and 'Create Version'. A 'Drafts I/II' box is also visible. The bottom status bar shows the user 'Skeie Perry' and the job count '4297 jobs found'.

Job ID	Job Name	Job Description
1	Semmes and CarringtonJOB_1	Address assignment for ATT equipment
6944	Starks S/D Resub Part Lot 1 of Crawford S/DJOB_6944	STARKS S/D COMM JOB REF#6944
6945	786 N GERMANTOWN PW / CVS PHARMACY	786 N GERMANTOWN PW / CVS PHARMACY
6946	1125 E SCHILLING BL SUITE 101 JOB_6946	1125 E SCHILLING BLVD/INDIVIDUAL ADDRESS ASSIGNMENT
6950	4435 Summer AveJOB_6950	Commercial address for Lease Outdoor Lighting
6954	1183 Minna PlaceJOB_6954	Minna Parking Place Expansion
6955	5492 MALONE RD BFI Waste Systems of North America, LLC JOB_6955	Landfill modifications
6957	North Parkway / Jackson / Danny Thomas.	Land Corrections in the area of North Parkway / Jackson / Danny Thomas.
6959	1140 IIS Highway A1 JOB_6959	Commercial job for 1400 S Third St

Powerful tool that allows, manages, and enforces a version structure; enables the enforcement of user roles; and facilitates the tracking and management of editing jobs. .

- Creating a Job
- Assign a Job
- Work a Job
- Generate Reports
- Post a Job via GDBM

ArcFM Web Internal Viewer



Utilized for:

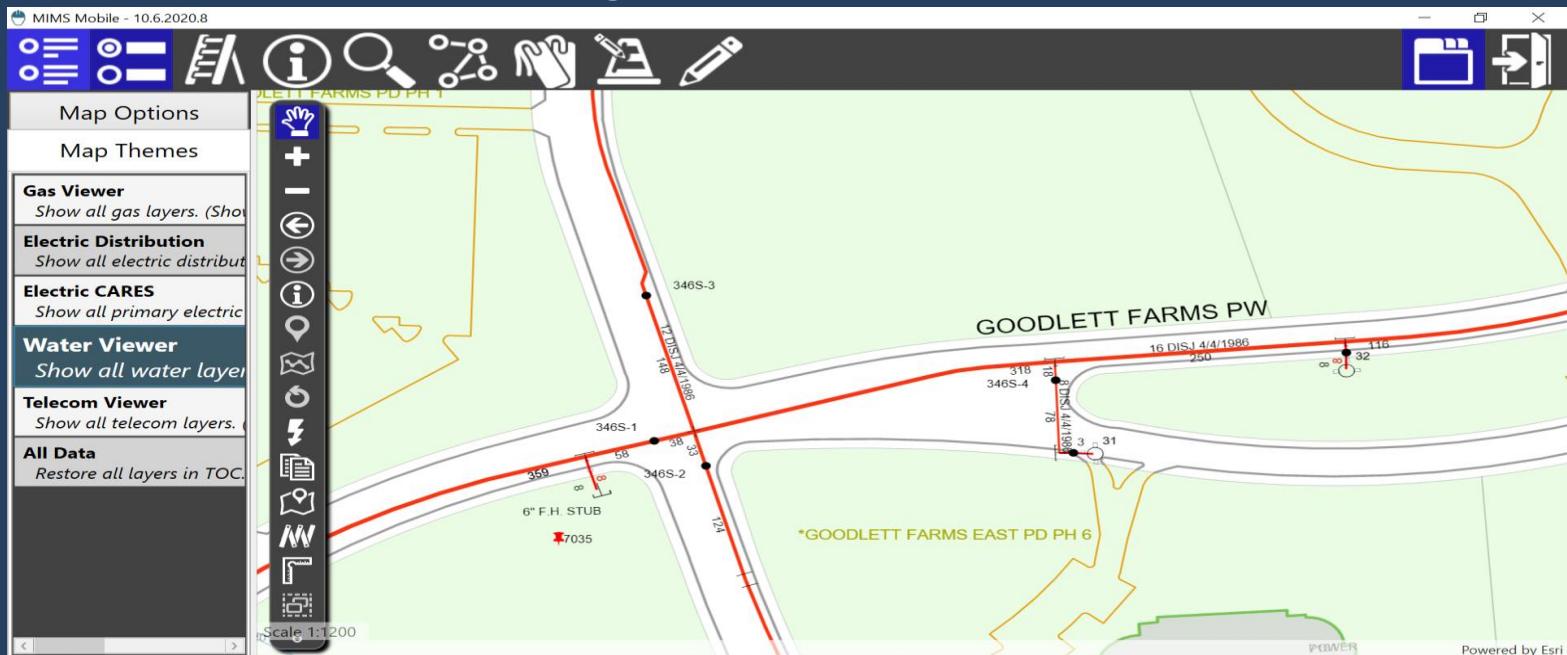
- Address Search
- Exporting to AutoCAD
- Detail information of a feature like pole, valve, transformer
- Tracing –Simulates the flow of electric, gas and water
- Interfaced with CIS and Cares Outage System
- View Pictometry Imagery and Google Street View
- Used by CARES Operators, Dispatch, Construction, Office personnel.



MIMS Mobile Viewer



The MIMS application utilized by 311 crews. Runs in Disconnected mode.
Panasonic Toughbooks –CF31, CF33 & FZ40 are used.

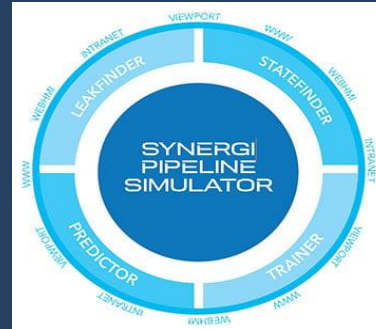


- ☐ Identify underground cables, valves, switchboxes, and pipelines in the field and verify their attributes
- ☐ MIMS mobile will enable electric crews and locators to navigate and route to assets more easily.
- ☐ It is common for gas corrosion field crews to use color-coded anode rectifier maps to identify the correct anode lines on rectifiers.
- ☐ Gas Construction also look for Gas Service Records (GSRs)
- ☐ Navigating to assets and utilizing them in the field is made easier for the crew.
- ☐ Electric crews use MIMS for Failure and Damage Reporting (DA) assignments and inspections, which are designed to digitize the manual failure and damage reports completed by construction workers on paper.
- ☐ Using the MIMS application, water crews use redlines to track the installation of steel plates.

Integrations with GIS



CYME software is used for the analysis and planning of electrical distribution networks. It helps utilities and consultants to model, analyze, and optimize their electrical systems, ensuring reliable and efficient operation.



Synergi Pipeline Simulator is a comprehensive software solution used for the simulation and analysis of gas and liquid pipelines. It helps pipeline operators and engineers to model, analyze, and optimize the performance of their pipeline systems, ensuring safe and efficient operation.



InfoWater is a hydraulic modeling software used for the analysis and management of water distribution systems. It helps utilities and consultants to model, analyze, and optimize their water systems, ensuring reliable and efficient operation.



FME (Feature Manipulation Engine) is a powerful data integration platform used for transforming, converting, and integrating spatial data.



Oracle SOA (Service-Oriented Architecture) is a middleware suite that enables organizations to build, deploy, and manage service-oriented architecture solutions. Integrate Oracle EBS to GIS and CIS with this technology



CrescentLink is a network management software used for the analysis and management of fiber distribution systems. It helps utilities and consultants to model, analyze, and optimize their telecom and fiber systems, ensuring reliable and efficient operation.

ArcGIS Enterprise



ArcGIS Apps

Support Many Types of Workflows and Engagements



*Empowering Everyone . . .
... In Your Organization and Beyond*

ArcGIS Enterprise is the foundational software system for GIS, powering mapping and visualization, analytics, and data management. It is the backbone for running the Esri suite of applications and custom applications. ArcGIS Enterprise is integrated with ArcGIS Pro for mapping and authoring and connects with ArcGIS Online to share content between systems.

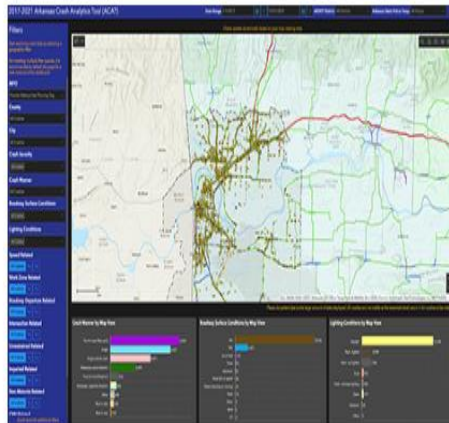
Collaboration and flexibility are central to ArcGIS Enterprise, allowing you to organize and share your work on any device, anywhere, at any time.

ESRI ArcGIS Dashboards



Dashboards are for everyone

There are many types of dashboards you can build with ArcGIS Dashboards. From all levels within an organization to the public, anyone can use them. Explore the many types below.



Strategic

Strategic dashboards help executives track key performance indicators (KPIs) and make strategic decisions by evaluating performance based on their organization's goals.



Tactical

Tactical dashboards help analysts and line-of-business managers analyze historical data and visualize trends to gain deeper understanding.



Operational

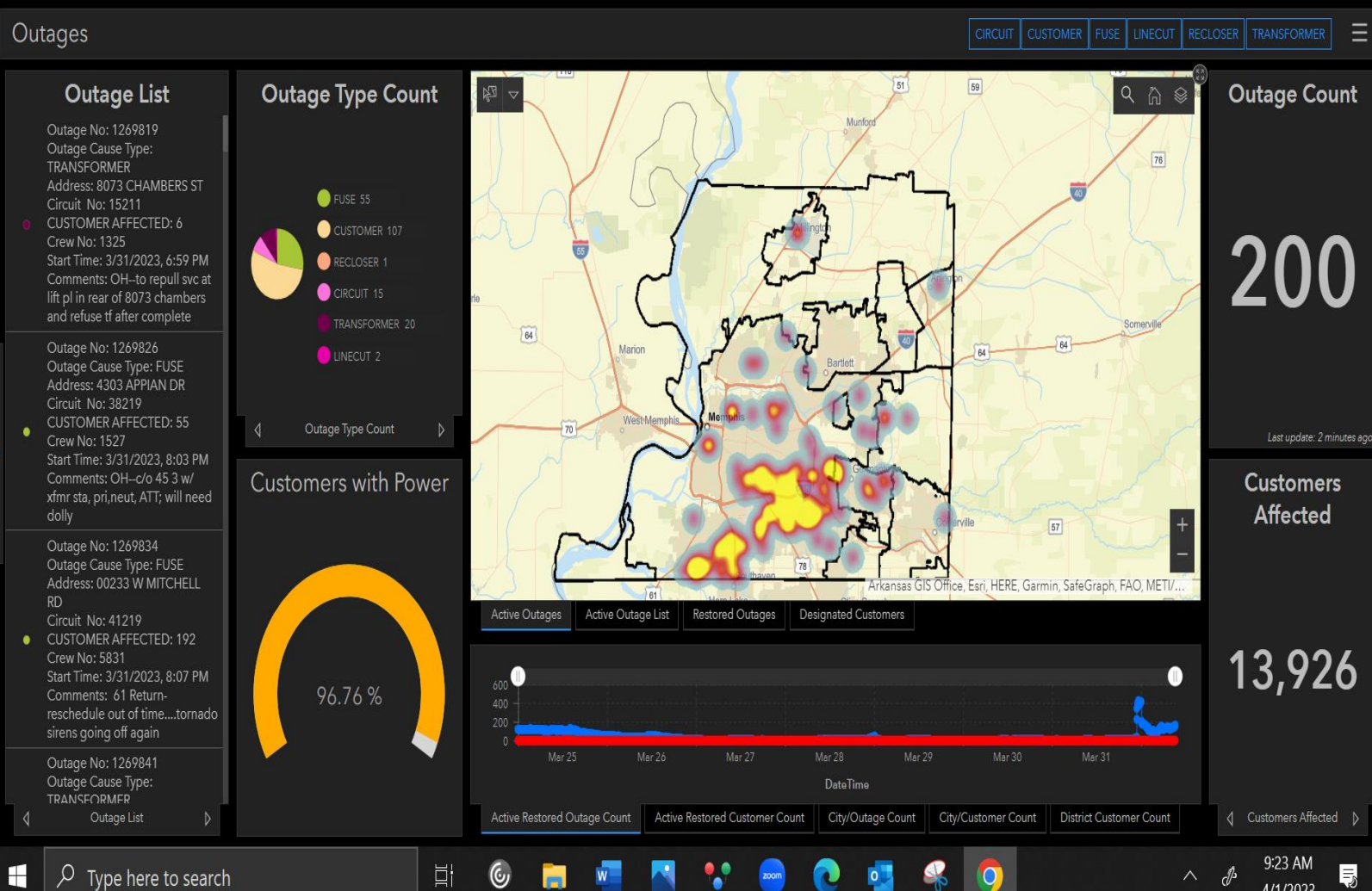
Operational dashboards help operations staff understand events, projects, or assets by monitoring their status in real time.



Informational

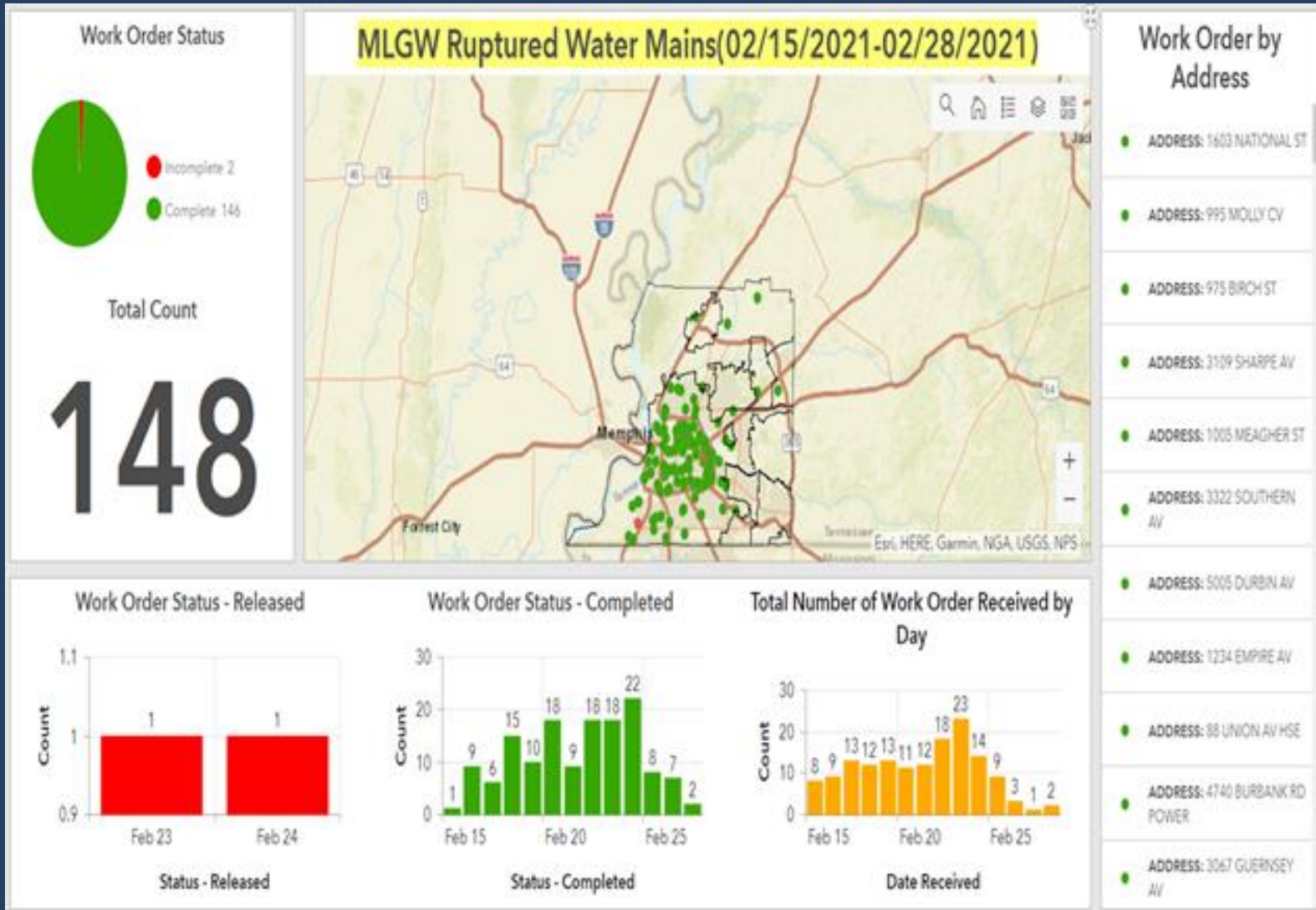
Informational dashboards help organizations inform and engage their audiences through community outreach.

Executive and Crisis Team GIS Dashboard

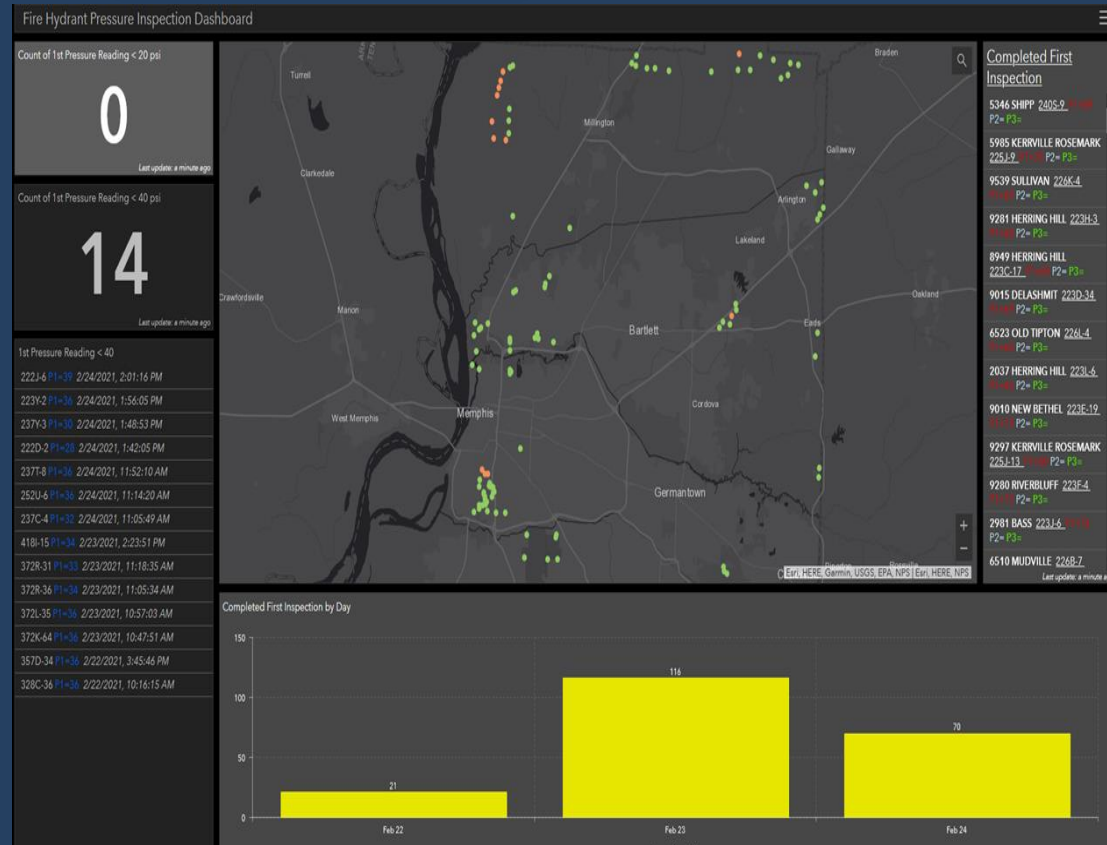
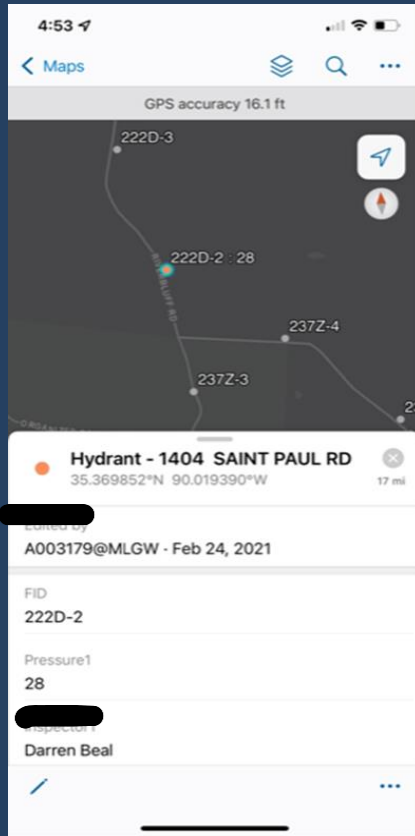


Used to view the outages based on type, #Customers affected, # Customers in City Council Districts/Municipalities.

Internal MLGW Ruptured Water Mains Dashboard



MLGW Fire Hydrant Pressure Dashboard

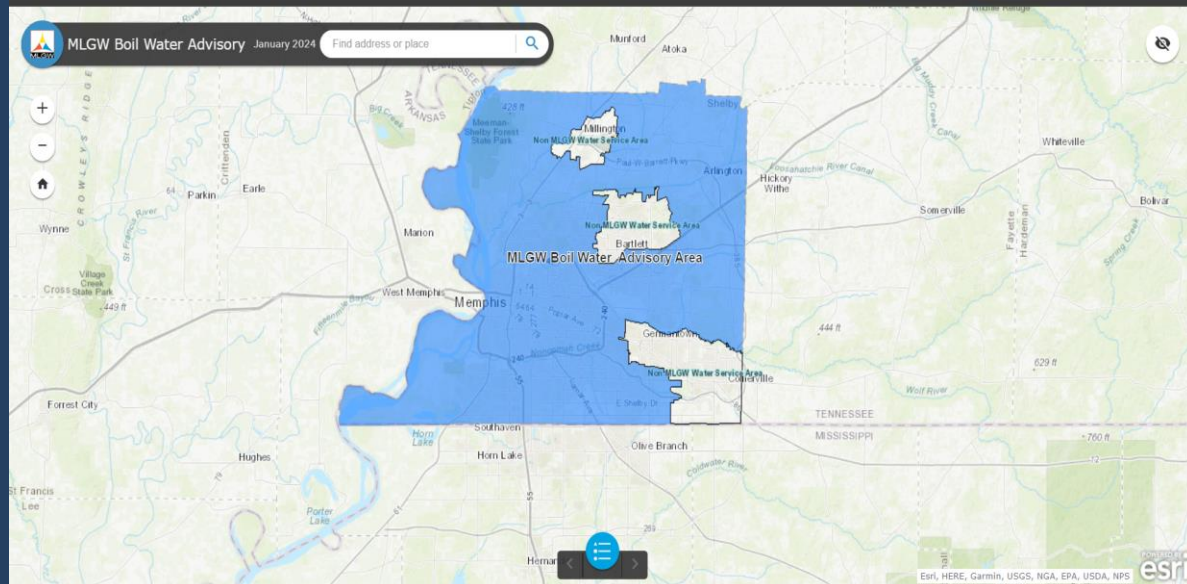


Used to view the collect pressure readings on fire hydrants in areas with low water pressure to determine a resolution.

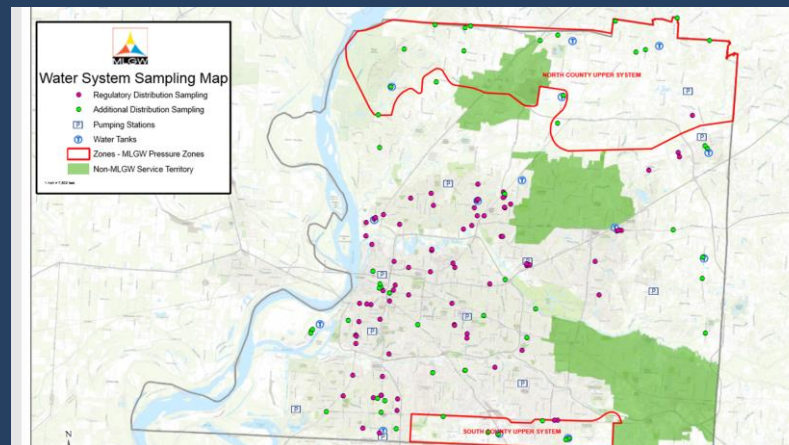
Boil Water Advisory Maps



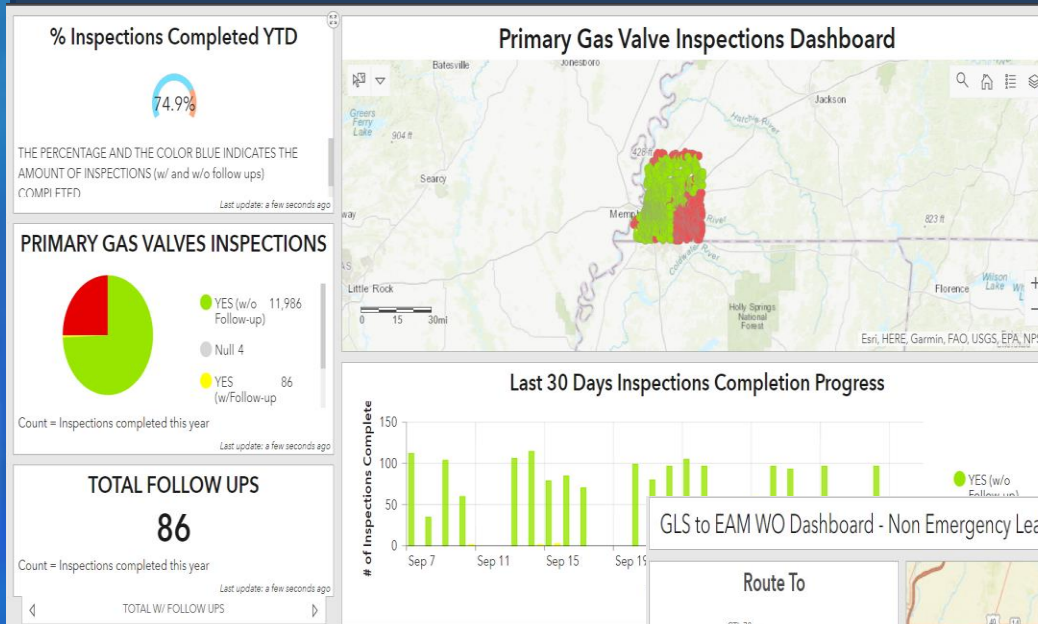
Public Interactive Web Map



Tennessee Department of Environment & Conservation (TDEC) Map



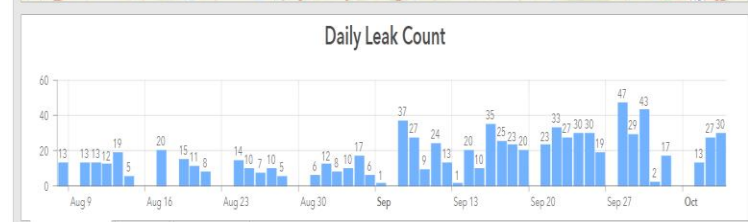
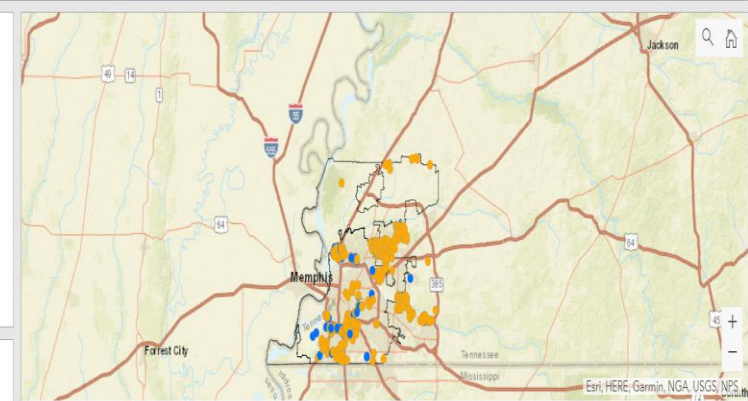
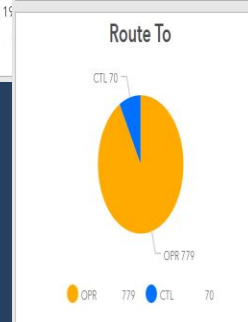
Gas Valve Inspections & Leak Survey Dashboards



Used to view status of Gas inspections and show which grids are completed or remaining.

Leak Survey shows location, and which work orders were created.

GLS to EAM WO Dashboard - Non Emergency Leaks



Public Tree Trimming Dashboard



2024-2025 Tree Trimming Efforts

Memphis Light, Gas and Water

Kendall Vegetation Services

532

Miles per Year

Lewis Tree Service, Inc.

453

Miles per Year

ABC Professional Tree

413

Miles per Year

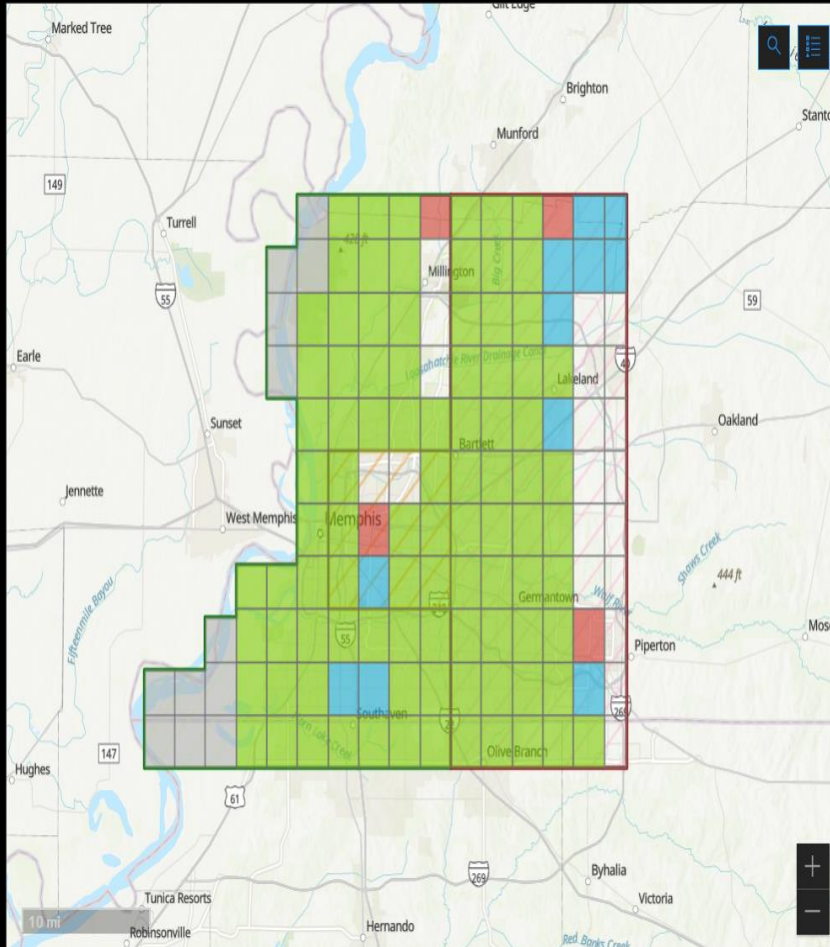
Tree Trimming 2024-2025 Status

2024-2025 Status

-  Work in Progress
-  Work Completed
-  Work Planned, Not Started
-  No Work Planned in 2025
-  No Electric Distribution

Tree Trimming Contractor Zones

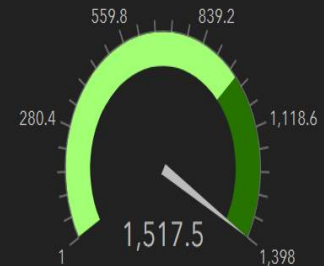
Grid Area



Esri, CGIAR, USGS | Arkansas GIS Office, Esri, TomTom, Garmin, SafeGraph, FAO, METI/NASA, USGS, EPA, NPS, USFWS | Michelle... Powered by Esri

2024 2023

Planned Miles Completed/Total Miles Completed from
September 1st, 2024 - August 31st, 2025



-  Represents the planned total number of miles to be trimmed to date (1,007.33)
-  Represents the actual total number of miles trimmed to date (1,517.50)

September 1st, 2024 - August 31st, 2025
% of Total Planned Miles Completed



108.55%

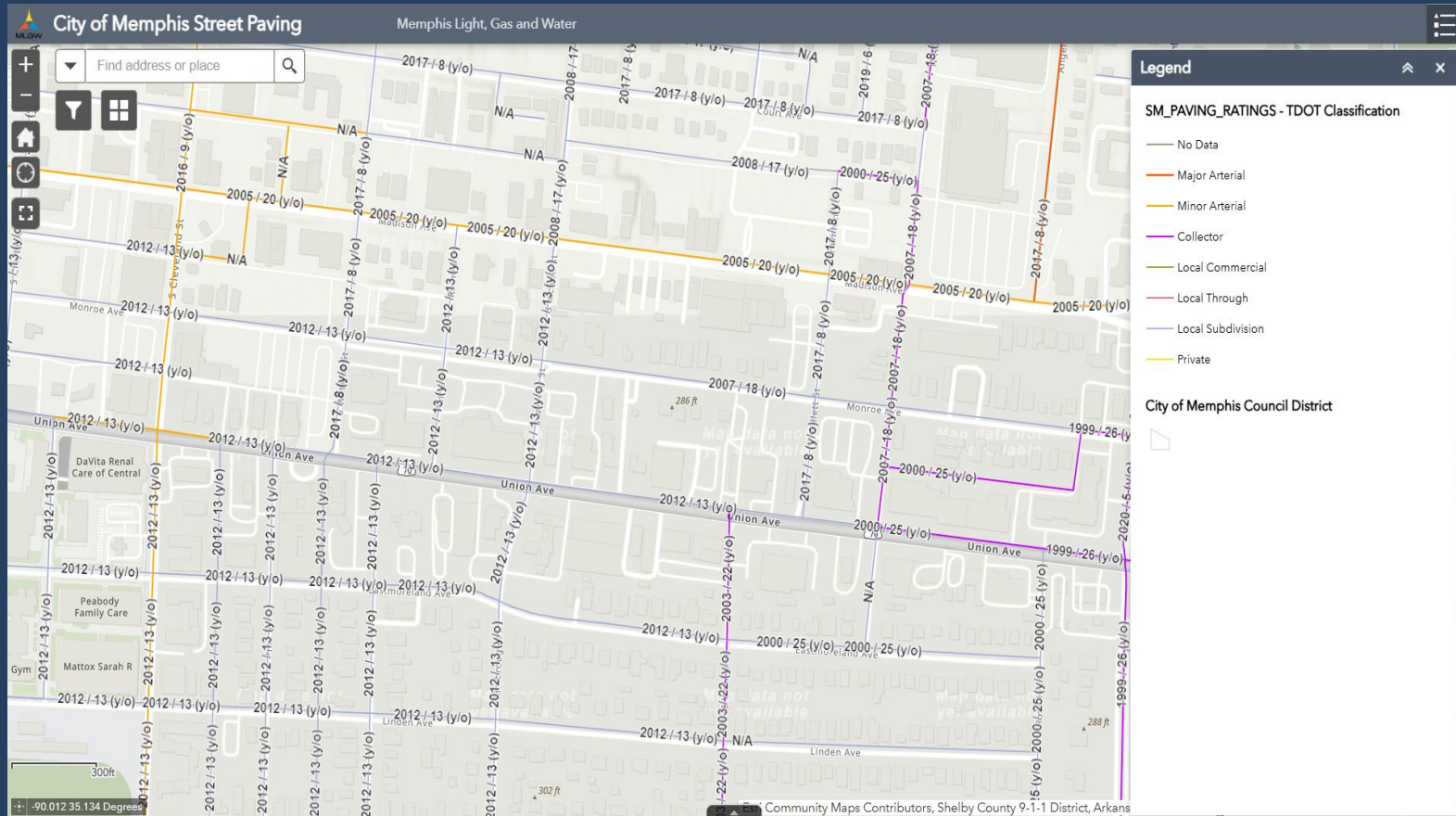
Last Updated Date: 5/16/2025, 1:15 PM

2024

2023

Public map for our customers know which areas are in progress, completed or planned. Charts show if we are on, ahead or not on schedule.

City of Memphis Street Paving Internal



Map shows when the year the street was last paved. If it is new, MLGW will need to do more for repairing the street to ensure it looks like new. Developer may incur more charges as well if they are building a new commercial or residential property .

Public Lead Replacement Interactive Map



Public Water Service Line Inventory



Self-Report



Directions

Español

Material Location Symbol

The left side of the symbol represents the portion of the service line that is owned and maintained by MLGW.

The right side of the symbol represents the customer-owned portion of the service line.

Users will need to zoom in to the street level in order to see the Material Location Symbols.



Symbol Colors

- Non Lead
- Galvanized
- Lead
- Unknown

Non MLGW Water Service Area



2024 Property Boundaries



Internal Lead Replacement Map



MLGW Revised Lead and Copper Rule Revision (LCRR) Internal Dashboard

[Internal Dashboard](#)[Community Explorer](#)[Water E. Internal](#)[MLGW Intranet](#)[EPA LCRR](#)[EPA Inventory Requirements](#)[MLGW Public Water Services Map](#)

Total Water Services:
309,316

Material Location Symbol

The left side of the symbol represents the portion of the service line that is owned and maintained by MLGW.

The right side of the symbol represents the customer-owned portion of the service line.

Users will need to zoom in to the street level in order to see the Material Location Symbols.



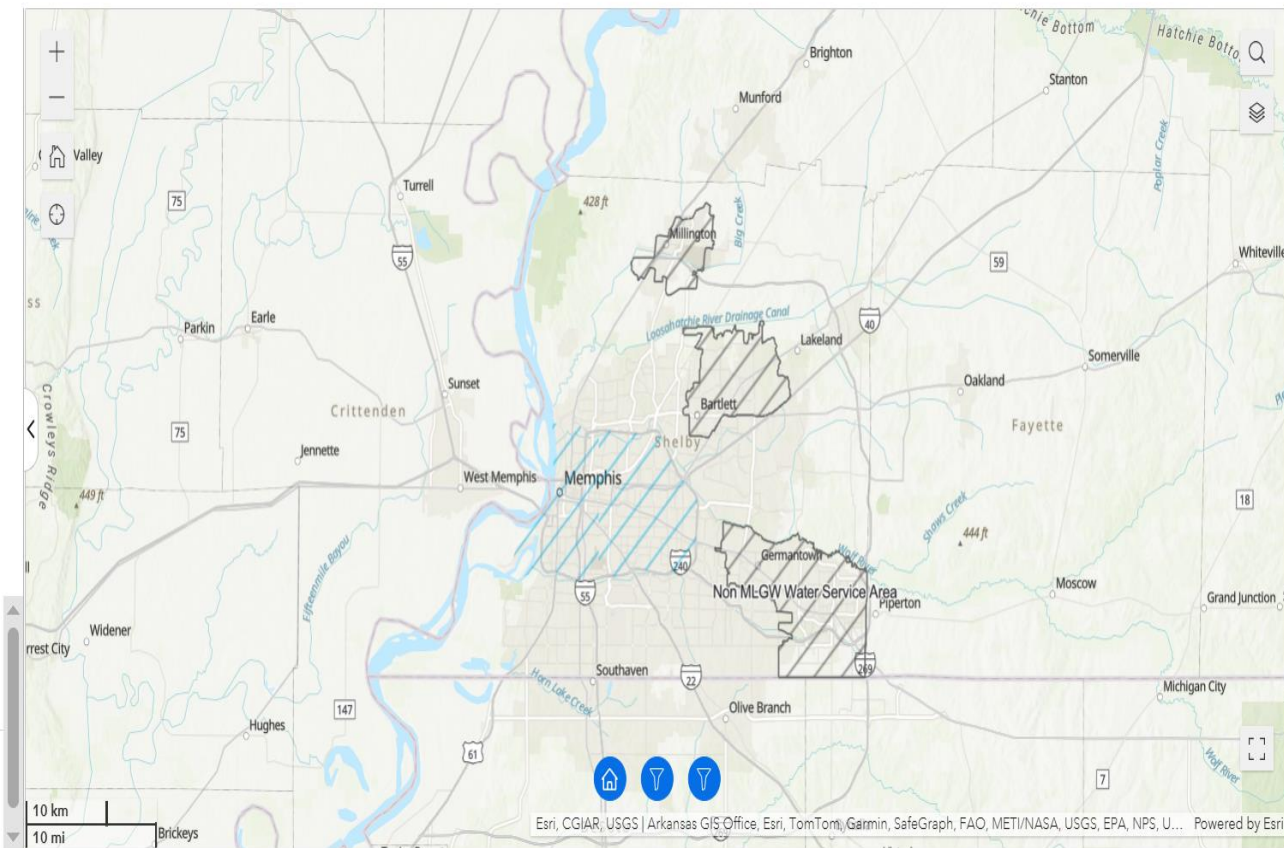
Symbol Colors

- Non Lead
- Galvanized
- Lead
- Unknown

Known Lead Area



Non MLGW Water Service Area



Internal Loss Prevention Dashboard



Revenue Protection Dashboard

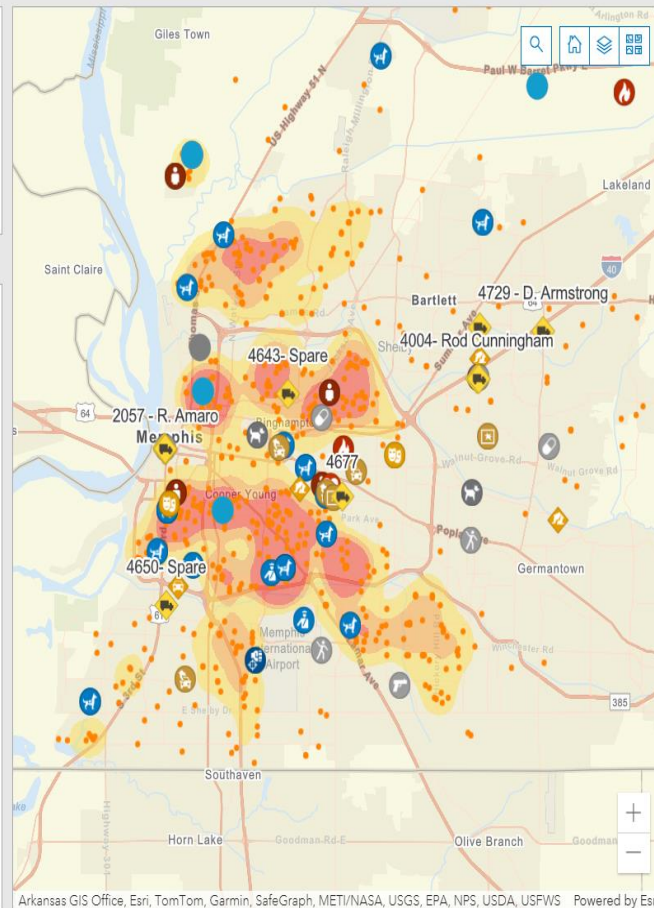
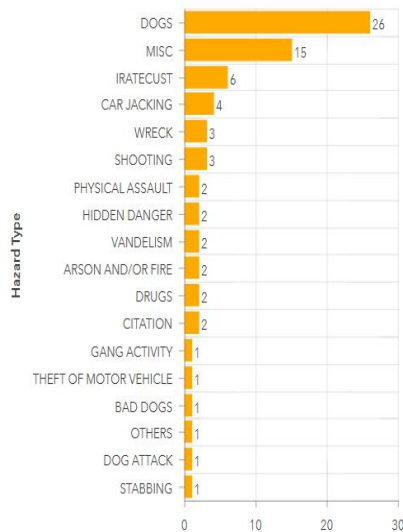
Total Fraud Location

754

Total Fraud Location

Total Hazard Location

Hazard Type



Crew Vehicles



Hazard Location

Hazard Type

- DOGS
- IRATECUST
- DRUGS
- ARSON AND/OR FIRE
- CAR JACKING
- CITATION
- DOG ATTACK
- WRECK
- VANDELISM
- THEFT OF MOTOR VEHICLE
- STABBING
- SHOOTING
- PHYSICAL ASSAULT
- HIDDEN DANGER

Map legend

Total Vehicle in High Theft Area

0

HighTheft

List

Total Vehicle in Medium Theft

1

MediumTheft

List

Total Vehicle in Low Theft Area

0

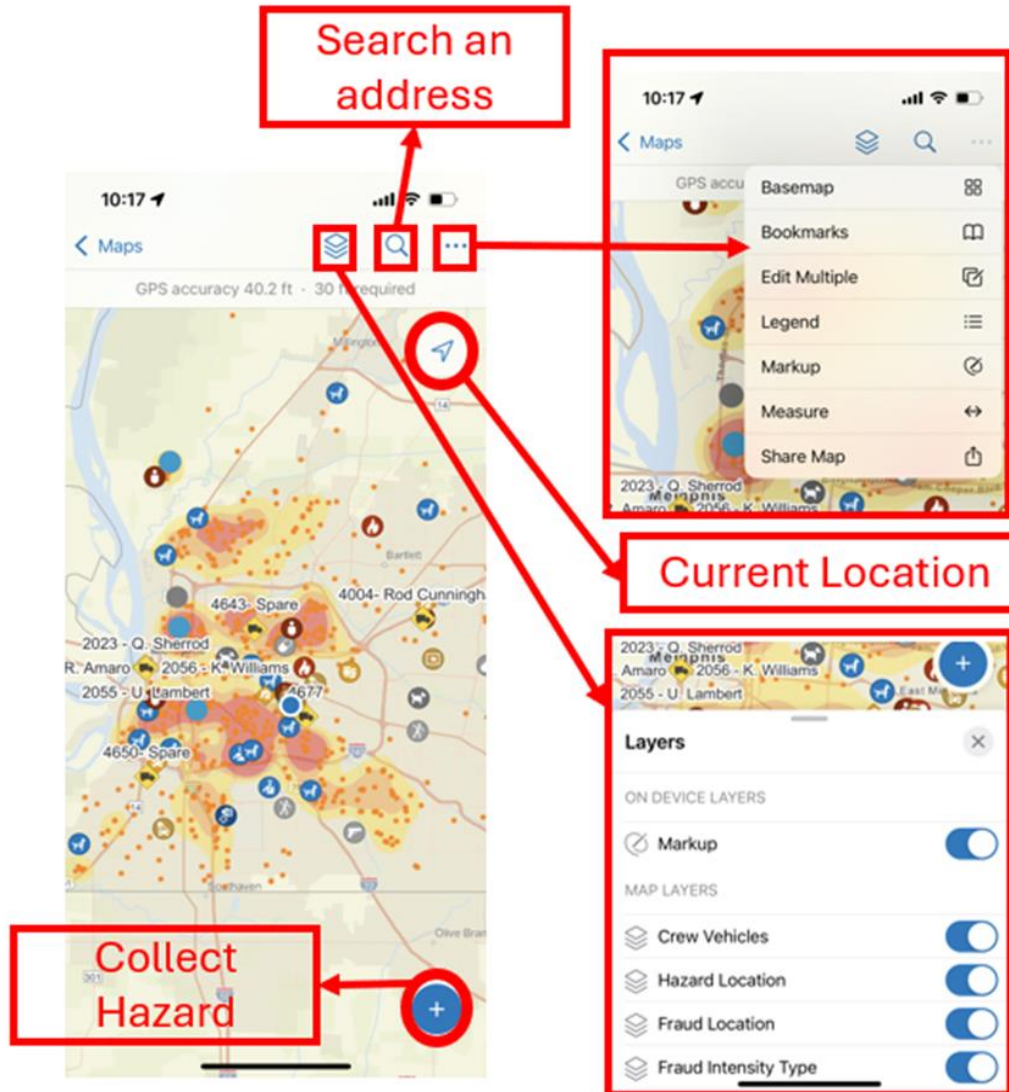
LowTheft

List

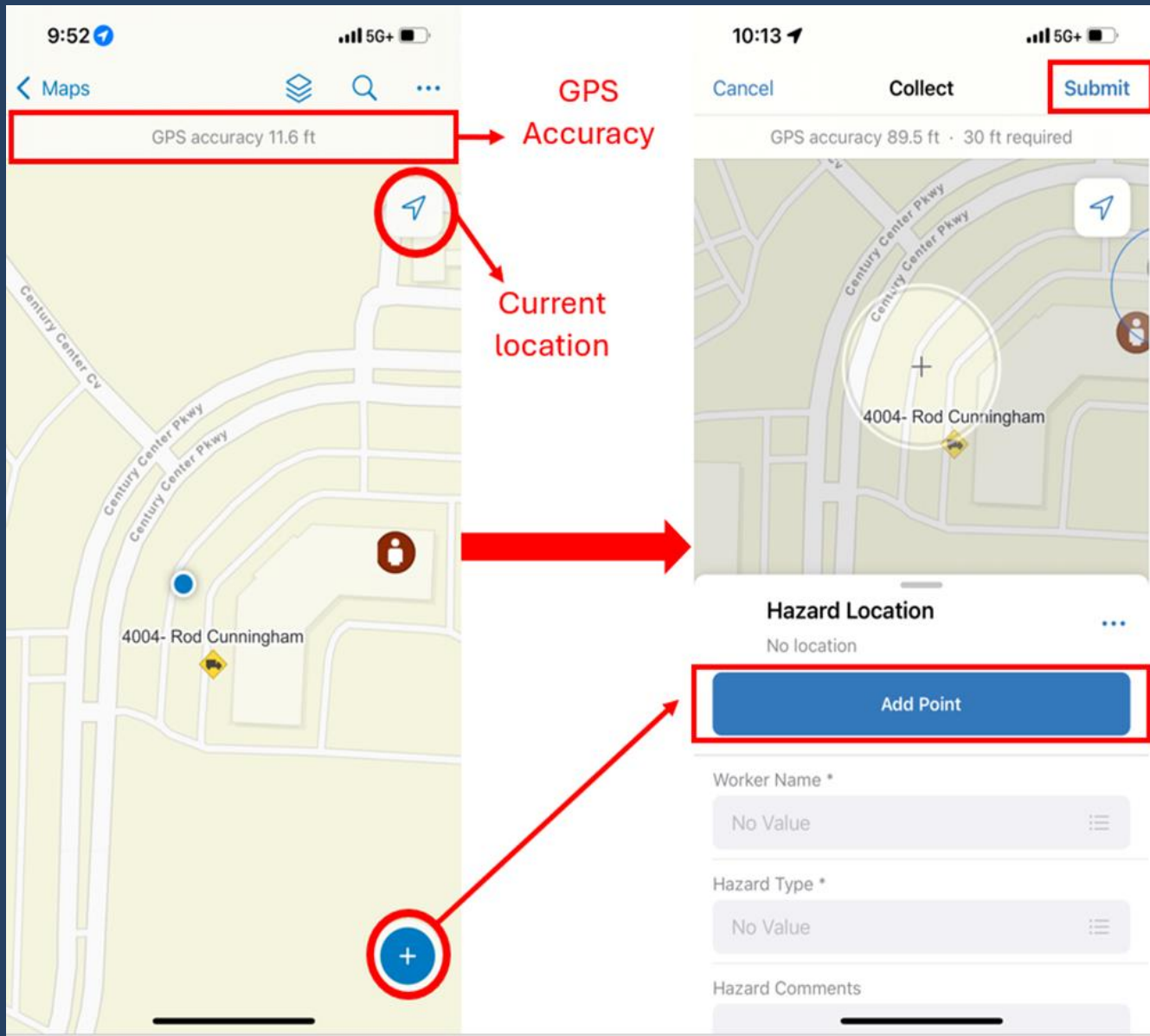
Arkansas GIS Office, Esri, TomTom, Garmin, SafeGraph, METI/NASA, USGS, EPA, NPS, USDA, USFWS Powered by Esri

ESRI Field Maps iPhone App

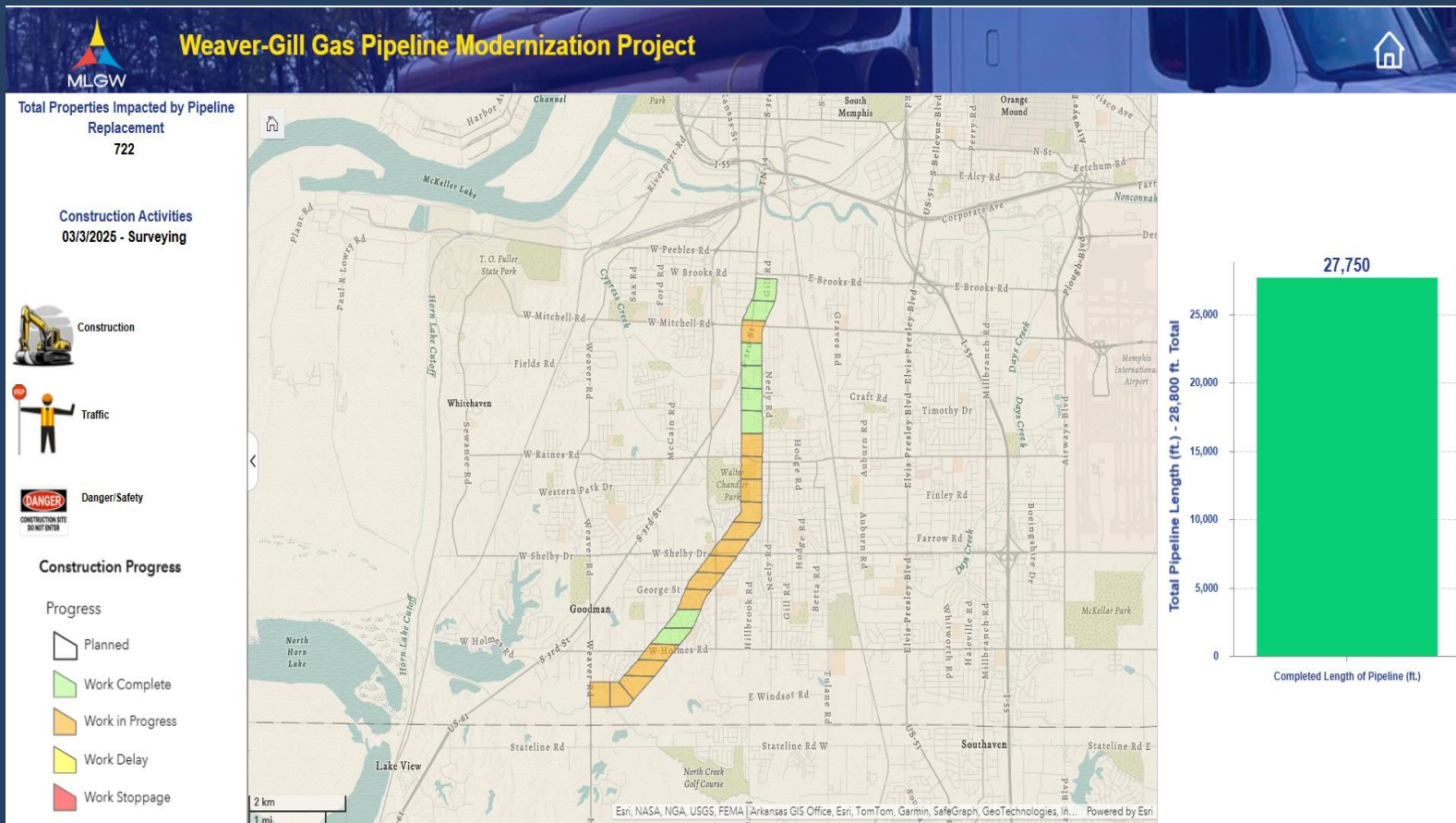
Loss Prevention



ESRI Field Maps iPhone App Loss Prevention



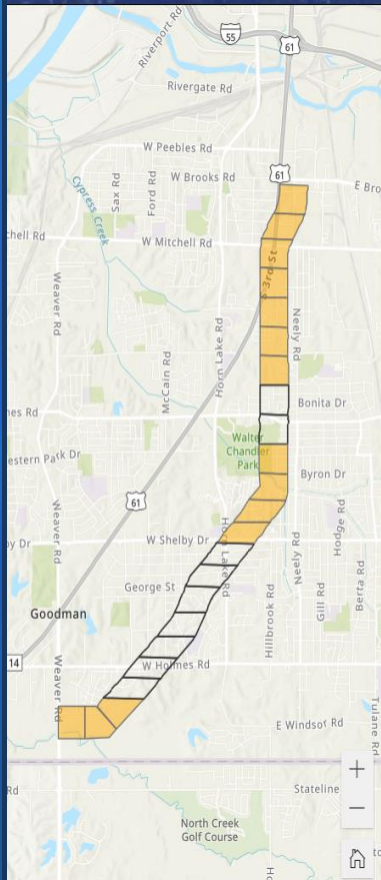
Public Weaver-Gill Gas Pipeline Modernization Map



Internal Weaver-Gill Gas Pipeline Modernization Editing App



Weaver-Gill Gas Pipeline Modernization Project Internal Editing Application



Construction Sections Progress - BASE DATA

Sheet	Total Length ...	Completed Inst...	Progress	Heavy equipme...	Stay clear of wo...
4	600	100	Work in Progress	Yes	Yes
5	800	40	Work in Progress	Yes	Yes
6	1,100	50	Work in Progress	No	No
7	1,000	0	Planned	No	No
8	1,400	0	Planned	No	No
9	1,400	0	Planned	No	No
10	1,500	0	Planned	No	No
11	1,400	0	Planned	No	No
12	1,200	0	Planned	No	No
13	1,100	0	Planned	No	No
14	1,400	100	Work in Progress	No	Yes
15	1,500	300	Work in Progress	Yes	Yes

Completed I...

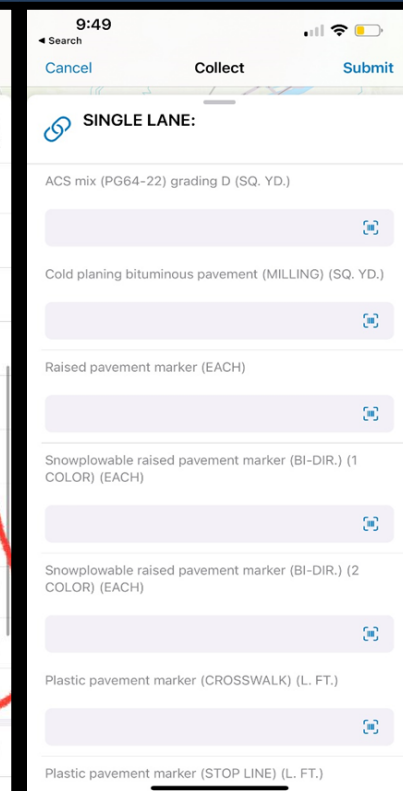
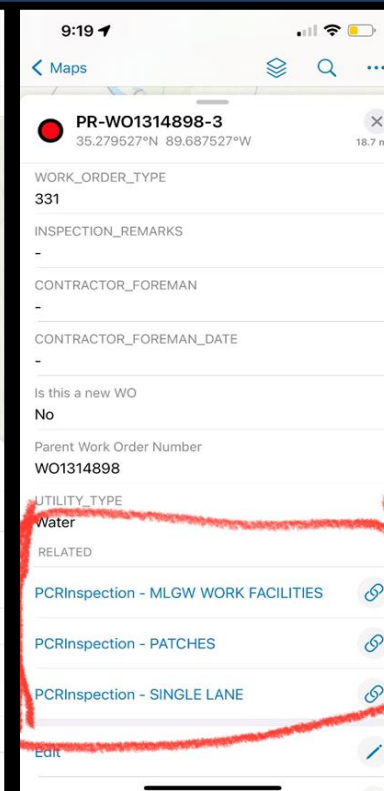
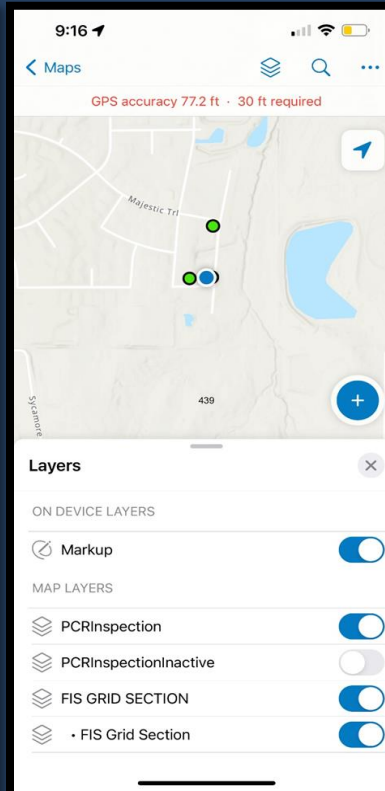
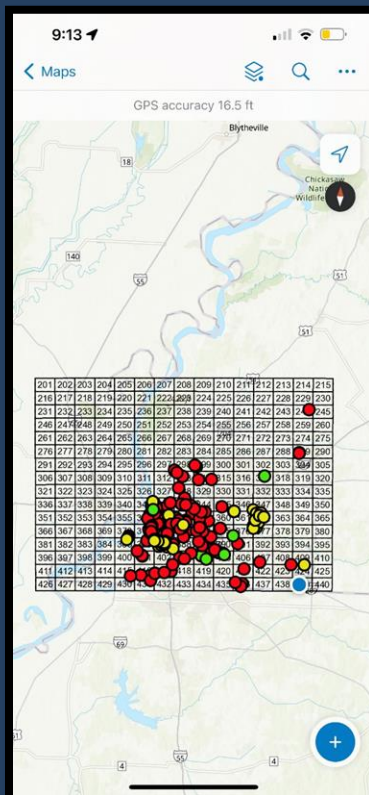


Total Length of Gas Pipeline (ft.) - 28,800 ft. Total

Pavement & Concrete Repair Field Map App



- Pavement Replacement Work Orders (PRWOs) are sent from Oracle EAM to GIS
- Inspector updates Active or Inactive PRWOs with inspection information
- Data is sent back to Oracle EAM to Autogenerate invoices with line items
- Clerk verifies and pay Contractor. Clerk does not have to type any information
- Financial records are updated



Survey 123 Apps

Employees can take pictures during a crisis and they would be saved in one location

11:02

Done

survey123.arcgis.com

AA

Incident Report

Quickly report an incident. Include a photo, severity level, and other pertinent information.

Incident Date*

Oct 30, 2024

Caption*

Description

600

Incident Photo*

1 Drop image here or select image (number of files allowed: 1 - 10)

Incident Location*

Press to set location



No geometry captured yet.

Submit

Powered by ArcGIS Survey123

Lead Self-Report Form

 **MLGW Water Service Line Self Report Form**

This form is to help Memphis Light, Gas and Water (MLGW) identify the water service line material for MLGW water customers who know what their service line material is. Please be as thorough as possible when filling out the form. The more information you provide, the easier it is for us to approve the claim. MLGW reserves the right to accept or deny self report form entries.

This form is not for the water pipes inside your house. This form is for the water pipes in your yard from the water meter to the foundation of your house.

Customer Information:

MLGW Account Number:

This is not a required question, but it can help us locate your service line much faster.

Name:

Phone Number:

Email Address*:

This is a required question. You will receive an email with your submitted answers for your records.

Address*:

Please provide the address for which you are submitting the self report form.

City*

Please select--

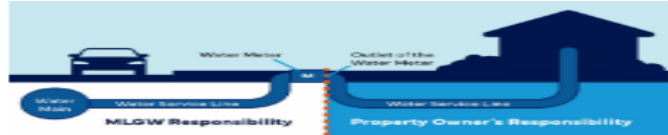
Do You Rent or Own the Property?*:

This is a required question.

Please select--

Identifying Your Service Line

Please provide as much information as possible in your answers. The MLGW's Service Line Material or MLGW's Responsibility is from the water main to the water meter. The Property Owner's Service Line Material or the Property Owner's Responsibility is from the water meter to the foundation of the building.



Property Owner's Service Line Material*:

This is a required question to submit the Self Report Form.

Please only provide this information if you know this full water service line was replaced from the water meter to the foundation. If only a section of the water line was replaced, there could be other types of material making up your service line.

This form is not for the water pipes inside your house. This form is for the water pipes in your yard from the water meter to the foundation of your house.

Please select--

Technical and Data Management Challenges



Data Volume Management

MLGW encounters difficulties in managing the vast amounts of data generated by Geographic Information Systems (GIS). Efficient handling of this data is essential.



Data Accuracy Importance

Ensuring data accuracy is crucial for effective GIS operations, as inaccurate data can lead to poor decision-making.



Data Maintenance Practices

Regular maintenance of GIS data is essential to ensure its reliability and effectiveness in operations and analysis.

New and Upcoming Technology in GIS for Distribution Utilities



Artificial Intelligence - automated feature extraction



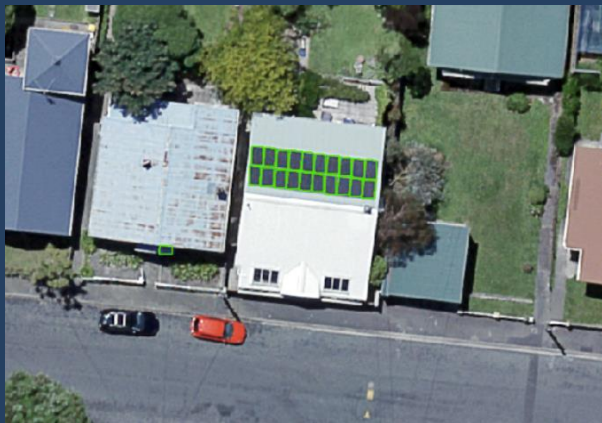
Asset Inspection, auditing

GIS applications:

- Real time mapping
- Location accuracy
- Data completeness

Machine Learning

Aerial/satellite imagery, LiDAR



Esri Deep Learning Models

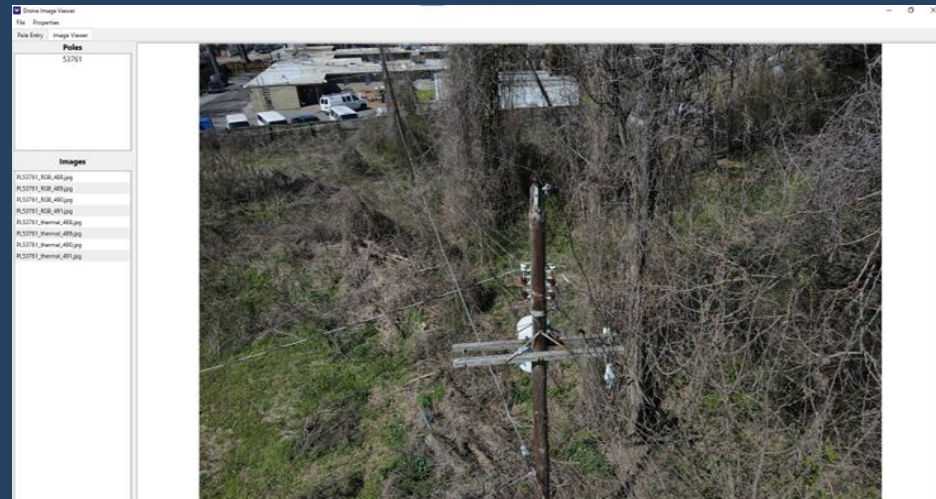
- Solar Panel Detection
- Power Line Classification
- Tree Detection

Orange Mound Drone Inspection Project



Why Orange Mound?

- ❑ Most frequent outages in Memphis
- ❑ Dense pole network needing inspection for preventative maintenances



What We Did

- ❑ Inspected **12,000+ poles** using drones
- ❑ Drones used for faster, safer, smarter inspections
- ❑ Partnered with **PrecisionHawk** and **TVA**, who completed their first large-scale drone-based distribution inspection

Results

- ❑ High-resolution images
- ❑ Faster maintenance response
- ❑ Better data for long-term upgrades (Historical Records)
- ❑ Identified approximately 2200 maintenances
- ❑ Of the maintenances, 817 were pole replacements

In-House Drones: OMNI Quality Assurance

BEFORE



AFTER



Questions?



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