# Up to Speed on LCRR/LCRI Inventory?

Texas Water 2024, April 2024

Fort Worth, Texas

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City of Irving, Texas – Water Utilities Department

# Lead and Copper Inventory

Background

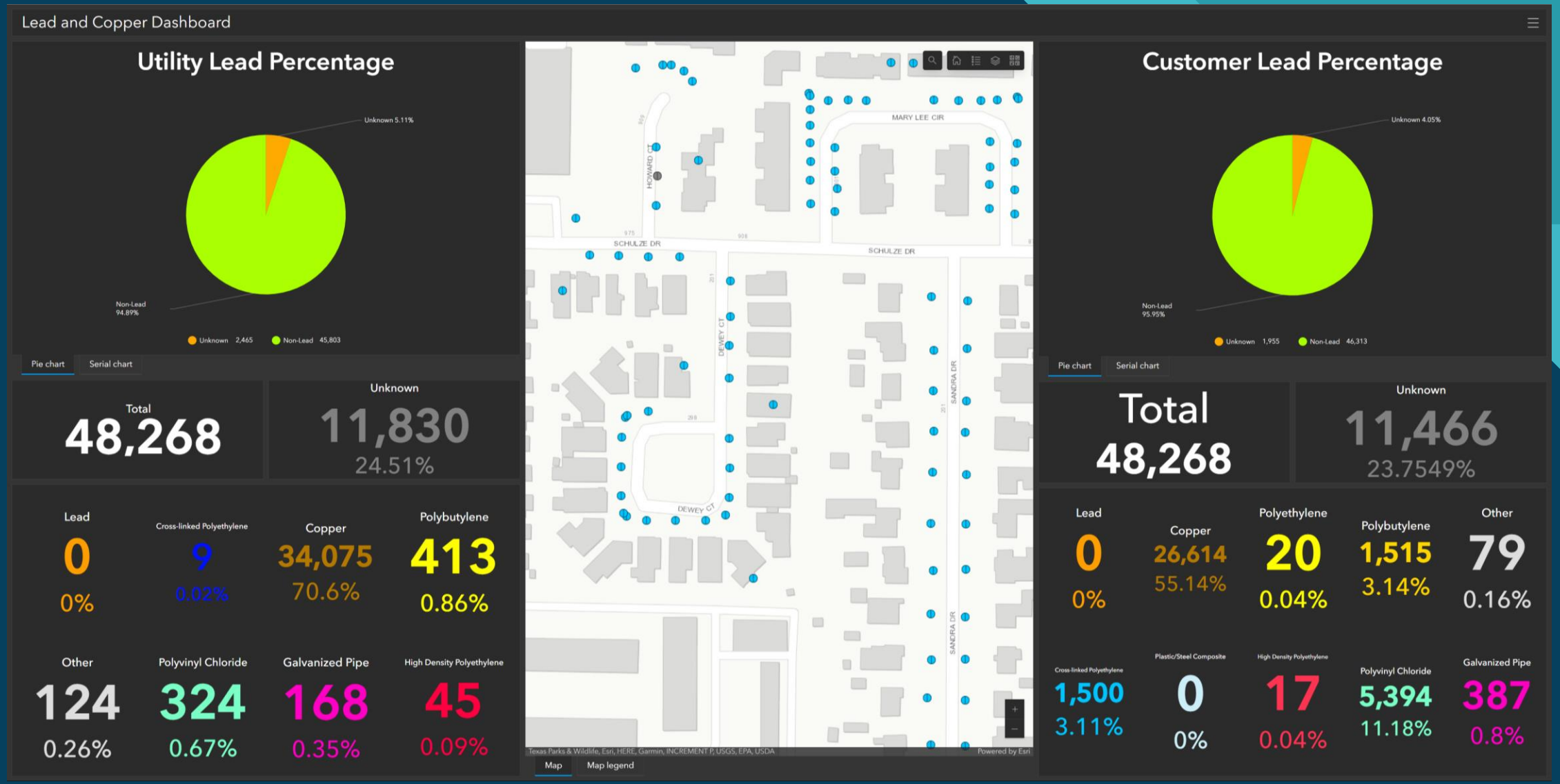
# Background

- EPA's Lead & Copper Rule - Identify and reduce the number of lead lines in a system
- Collect, organize, and maintain your inventory
- Follow guidance from EPA and TCEQ
  - Lead and Copper Rule Revisions
  - Lead and Copper Rule Improvements
- Share findings with community stakeholders and public

# Project Scope

- How to collect and maintain your data?
- Utilize existing solutions?
- Third-party vendors/applications
- Tracking progress
- Data at a glance

# Lead and Copper Dashboard



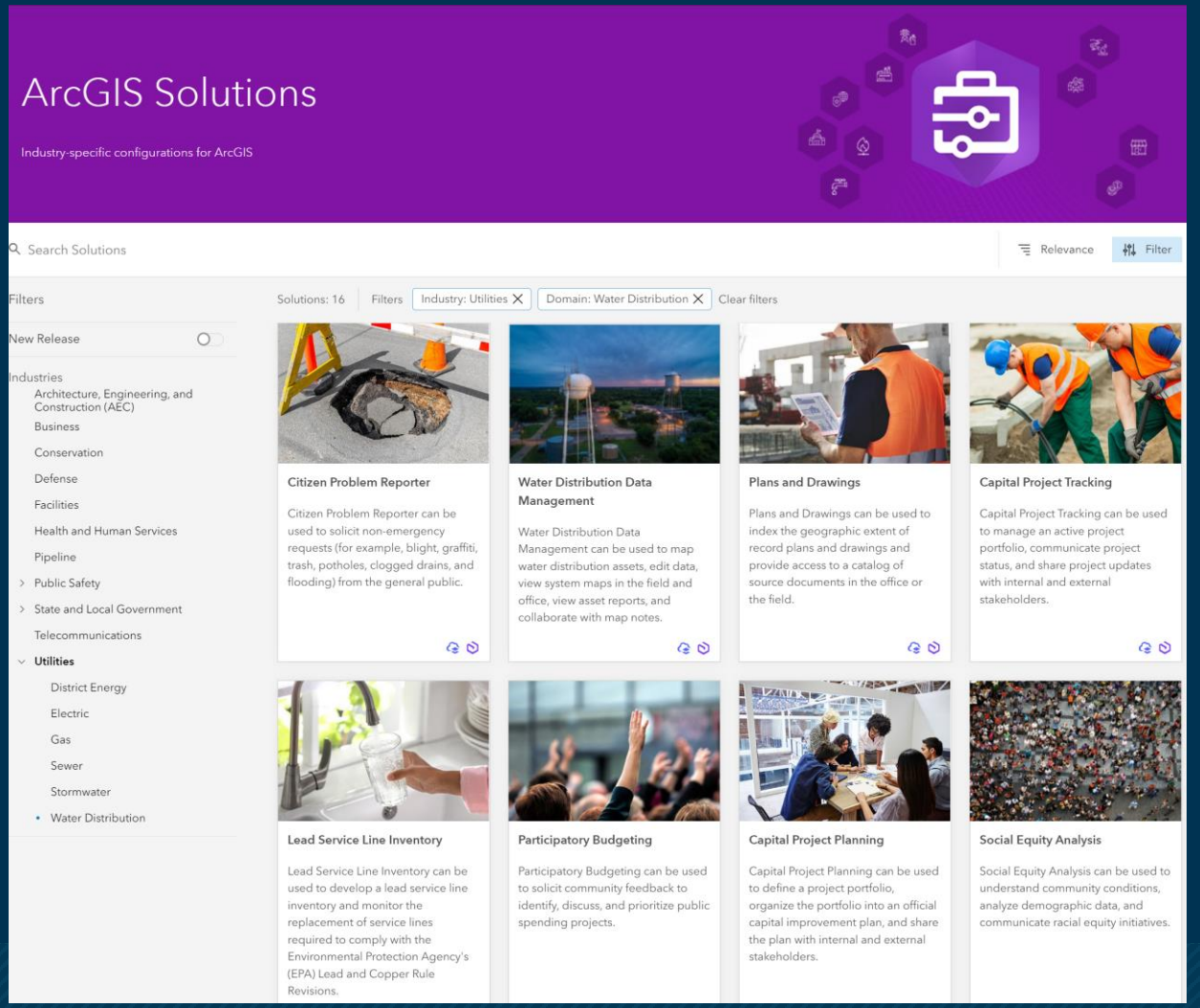
# The GIS Viewpoint

- Where is your data…
  - In the real world?
  - Within your organization?
- What data sets are we maintaining?
- Connecting to outside systems
- Centralized data location

# ESRI’s ArcGIS Solutions

Lead Service Line Inventory

# ArcGIS Solution – Lead Service Line Inventory



# ArcGIS Solution – Lead Service Line Inventory

**A configurable, out-of-the-box application**

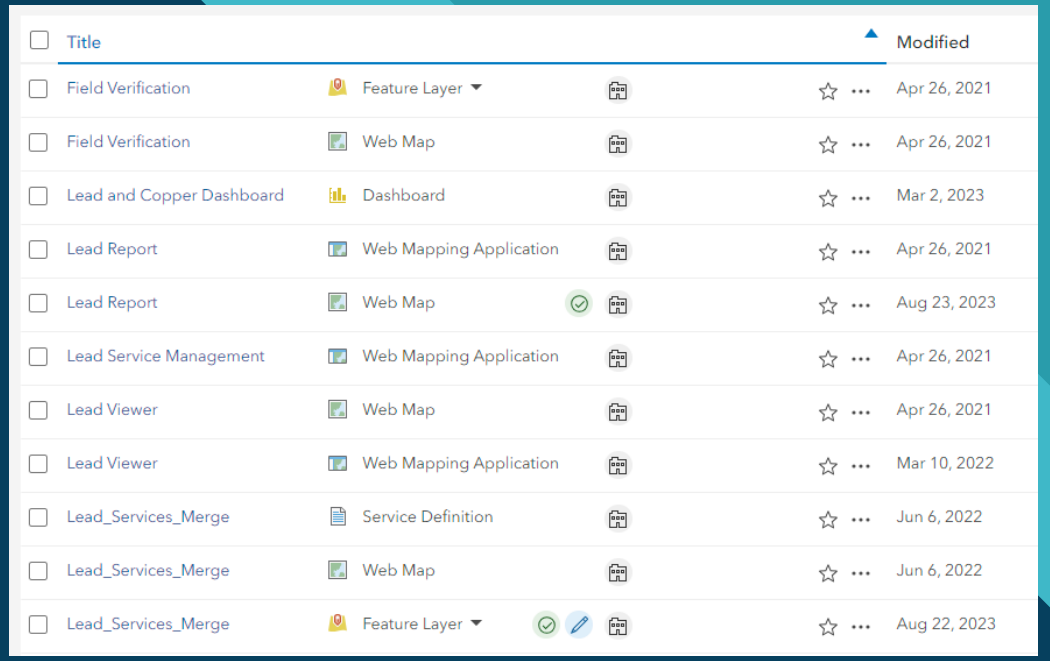
- Deployed in minutes
  - ArcGIS Online
  - ArcGIS Enterprise
- Built-in maps, layers, tools, and applications
  - Dashboard
  - Story Maps
  - Survey123 forms
- Free to use (with your ESRI Maintenance Agreement)

**Allows organizations to:**

- Streamline service line inventories
- Comply with regulations
- Optimize replacement programs
- Inform the public

# Post-solution Deployment

- Understanding your new workload
- Select maps/apps that you'll use
- Conform your data to the solution
  - Append existing data to new schema
  - Change GIS data types
  - Add/remove fields



# Solution Configuration

- How do you make your data fit?
- Comes with points, we need lines
- Fill in gaps by connecting to other systems, i.e., appraisal district data, work order management systems, and customer information systems
  - Common Fields
  - Geoprocessing
  - Python Scripting

```
# Purpose:     Queries 'Lead and Copper' workorders from Cityworks and
#              pushes data into the hosted feature layer for Lead and Copper
#              inspection.
#-------------------------------------------------------------------------------

import cwLogon
import accountHelper
import requests
import json, time, datetime
import datetime as dt
import string, smtplib, os, sys
import pandas as pd
from getpass import getpass

#           Search Cityworks for Lead and Copper WorkOrders Between Init Dates
#-------------------------------------------------------------------------------

def cwSearchWorkOrder(myToken):
    print("Starting Search")
    myDomainId = '3'
    myApplyToEntity = 'WTRSERVICELINE'
    myAssetGroup = 'Water Distribution'
    myDescription = 'SERVICE MATERIAL INVENTORY'
    myCanceled = 'False'
    myInitDate = '2022-05-31T00:00:00'
    myEndInitDate = '2022-06-30T00:00:00'

    myURL = r'https://irving.newedgeservices.com/Cityworks/services/Ams/WorkOrder/Search?data=' \
            '{"Description": ["' + myDescription + '"], "AssetGroup": ["' + myAssetGroup + '"], ' \
            '"ApplyToEntity": ["' + myApplyToEntity + '"], "InitiateDateBegin": "' + myInitDate + '", "InitiateDateEnd": "' + myEndInitDate + '", ' \
            '"Canceled": "' + myCanceled + '", "DomainId": [' + myDomainId + ']}&token=' + myToken + ''

    jres = requests.post(myURL).json()
##    print(jres)
##    print(jres['Value'])
    myWorkOrderIDs = []
    for wo_key in jres['Value']:
        data = str(wo_key)
        myWorkOrderIDs.append(data)
##        print(myWorkOrderIDs)

    if jres['Status'] == 0:
        myStatus = 'OK'
    else:
        myStatus = jres['Message']

##    myWorkOrderIDs = ['1279540','1266826','1273256']
##    myWorkOrderIDs = ['1266826']
##    myWorkOrderIDs = ['1279703']
    return myWorkOrderIDs
```

# GIS at the Center

Field Data Collection

DCAD Data

Work Order Management System

GIS

Centralized Data Repository

Customer Information System

# GIS at the Center

- Application Programming Interfaces (API's) and Python
- Access to work orders for field verification
  - Performing inspections
  - Identifying pipe materials
- Access to CIS for water service accounts
  - Active meters
  - Contact information

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# GIS at the Center

- Query meters from CIS
- Geocode meters by service address
- Import meter data to GIS hosted feature layer
- Draw in service lines
- Service type, location, account ID, meter number

| Display Name | Field Name | Type |
|---|---|---|
| OBJECTID | OBJECTID | ObjectID |
| Utility Install Date | UTILINSDAT | Date |
| Utility Lead | UTILLEAD | String |
| Site Address | SITEADDRES | String |
| Customer Install Date | CUSTINSDAT | Date |
| Customer Lead | CUSTLEAD | String |
| Account ID | ACCOUNTID | String |
| Customer Material Source | CUSTSOURCE | String |
| Utility Material Source | UTILSOURCE | String |
| Utility Material | UTILMAT | String |
| Customer Material | CUSTMAT | String |
| Residential Year Built | RESYRBLT | Double |
| GlobalID | GlobalID | GlobalID |
| Facility ID | FACILITYID | String |
| Work Order ID | WorkOrderID | String |
| Facility ID | FACILITYID_1 | String |
| METER_NUMBER | METER_NUMBER | String |
| ZIPCODE | ZIPCODE | Double |
| LAT | LAT | Double |
| LONG | LONG | Double |
| SERVTYPE | SERVTYPE | String |
| *Photos And Files* | Photos And Files | Attachment |

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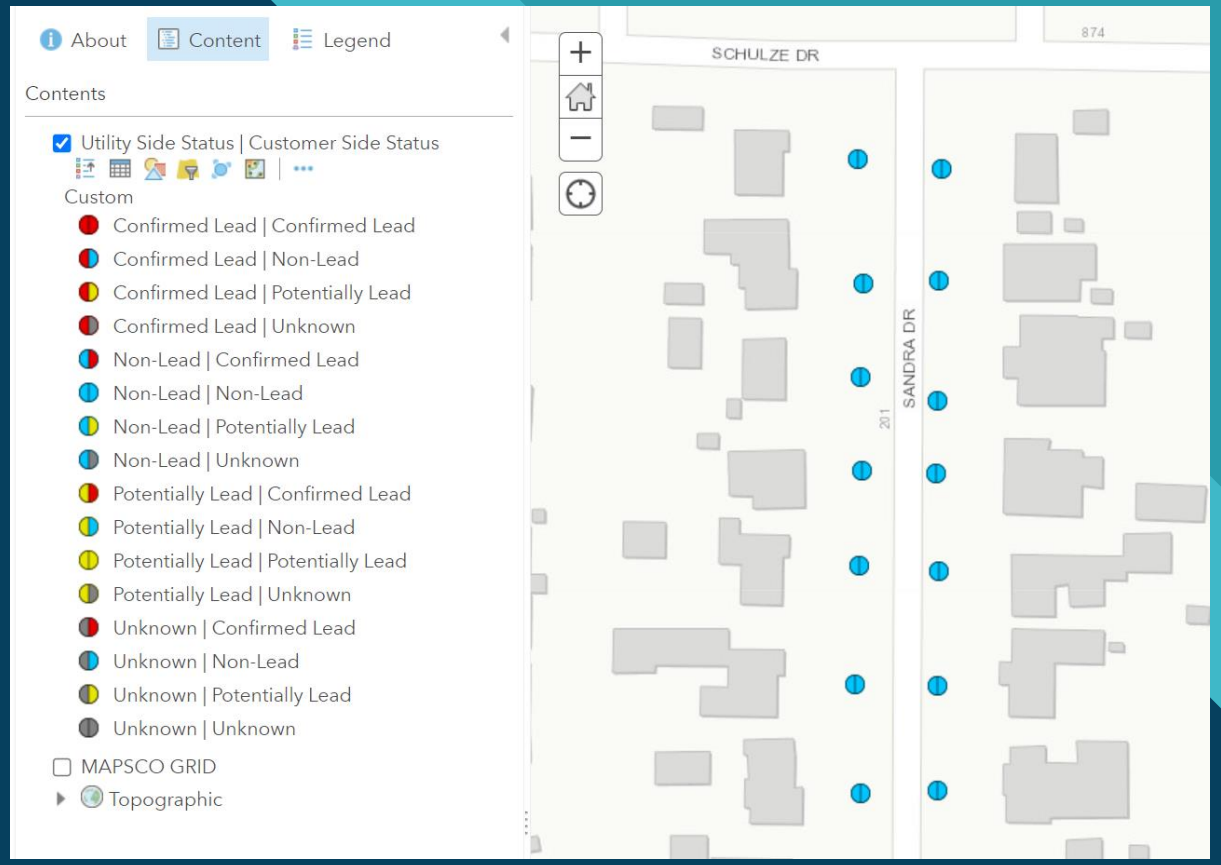
# GIS at the Center

- Dallas Central Appraisal District
  - Provides ‘year built’ data
- Start your inspections



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# GIS at the Center

- Create service line inspections in WO system
  - Captures customer and city sides of service line
- Query WO's related to service line inspections
- Python transmits important details and attachments from WO to GIS hosted feature layer

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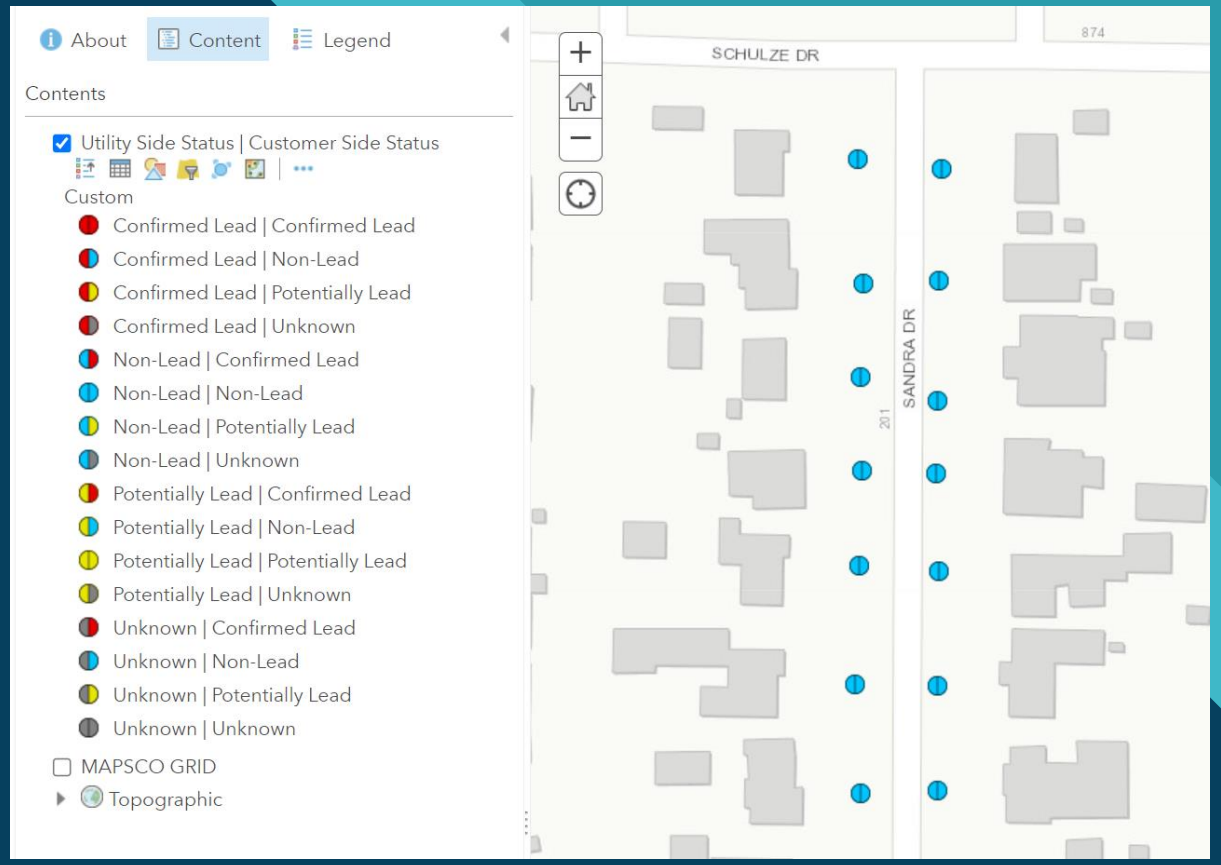
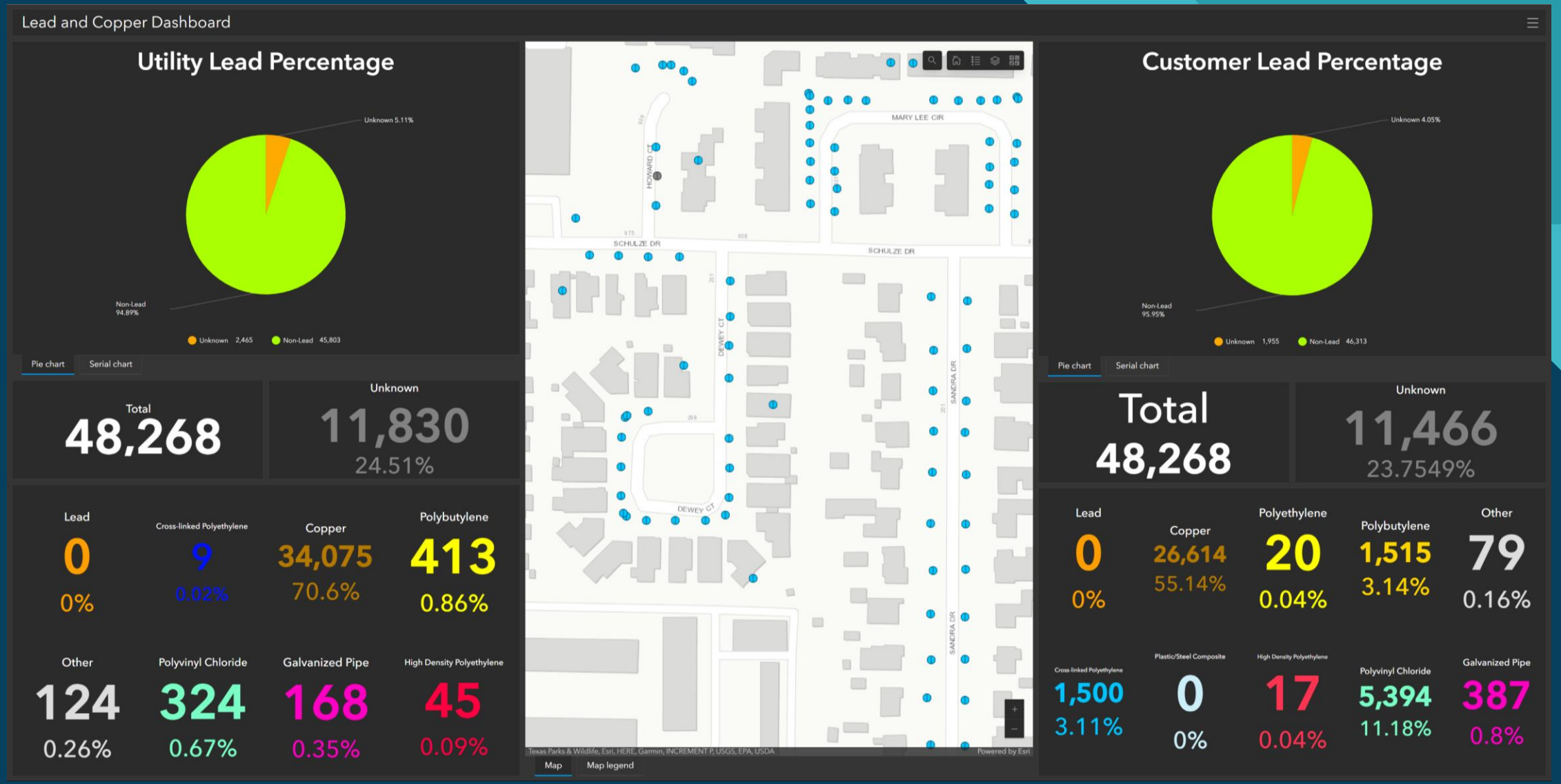
# GIS at the Center

- Third-party data collection
- Import data into the hosted feature layer
- Methods may vary



# Lead and Copper Dashboard



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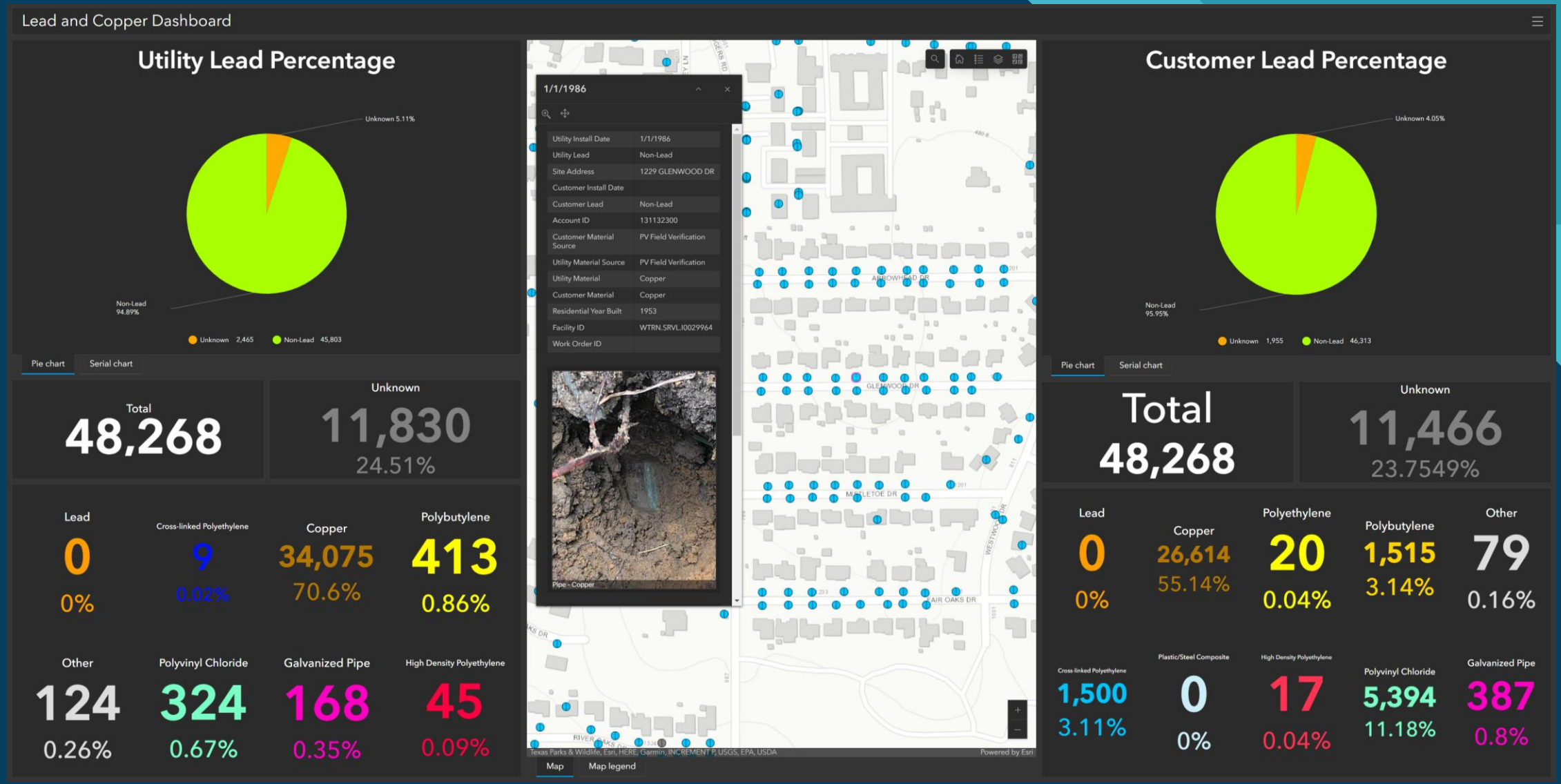

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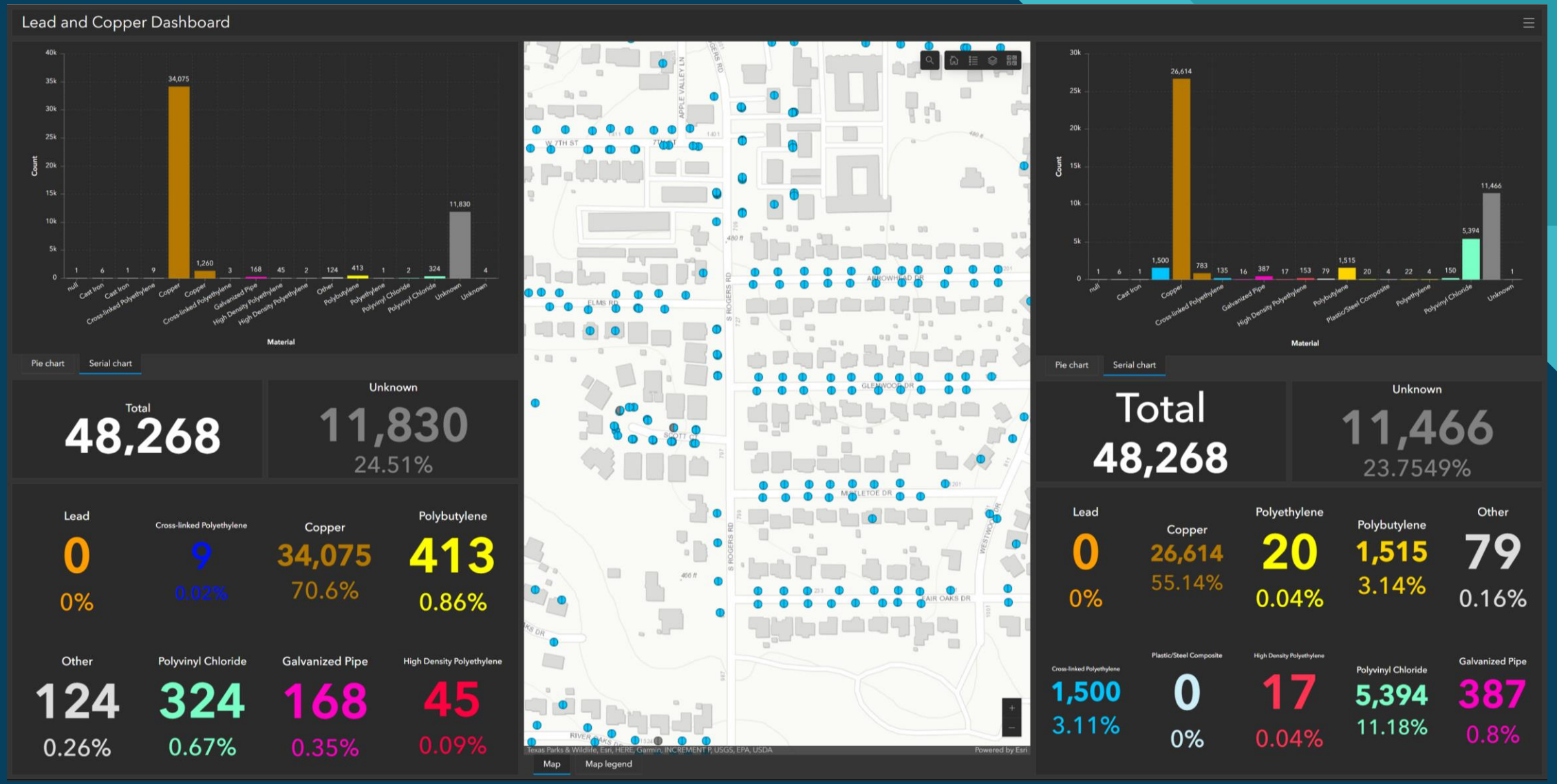
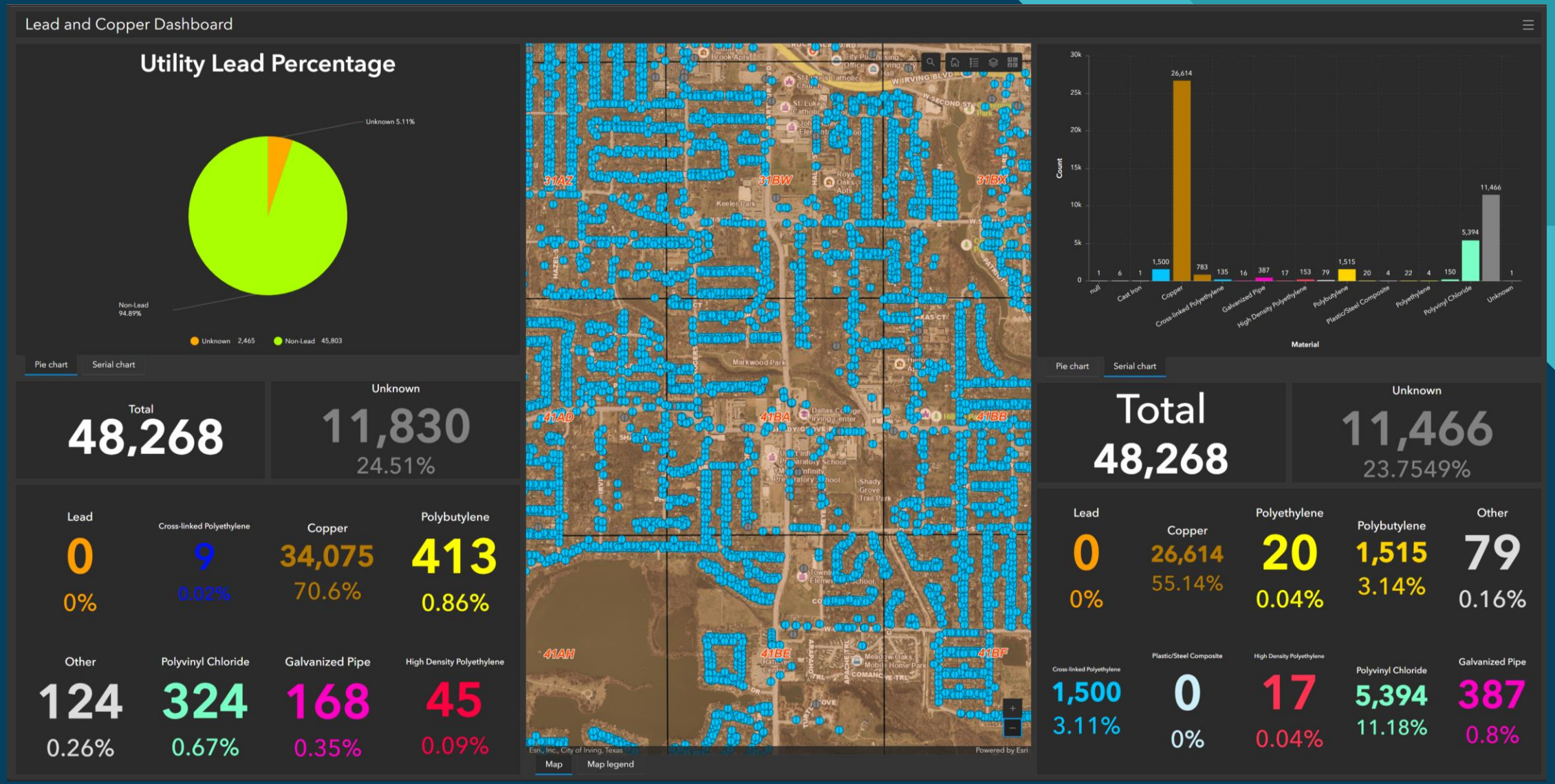


# Lead and Copper Dashboard

- Solution deployed to ArcGIS Online
  - Cloud hosted
  - Web based
  - Data storage consumes credits
- Accessible to staff and contractors
- See your progress
- Easily configurable for public use

# Lead and Copper Dashboard



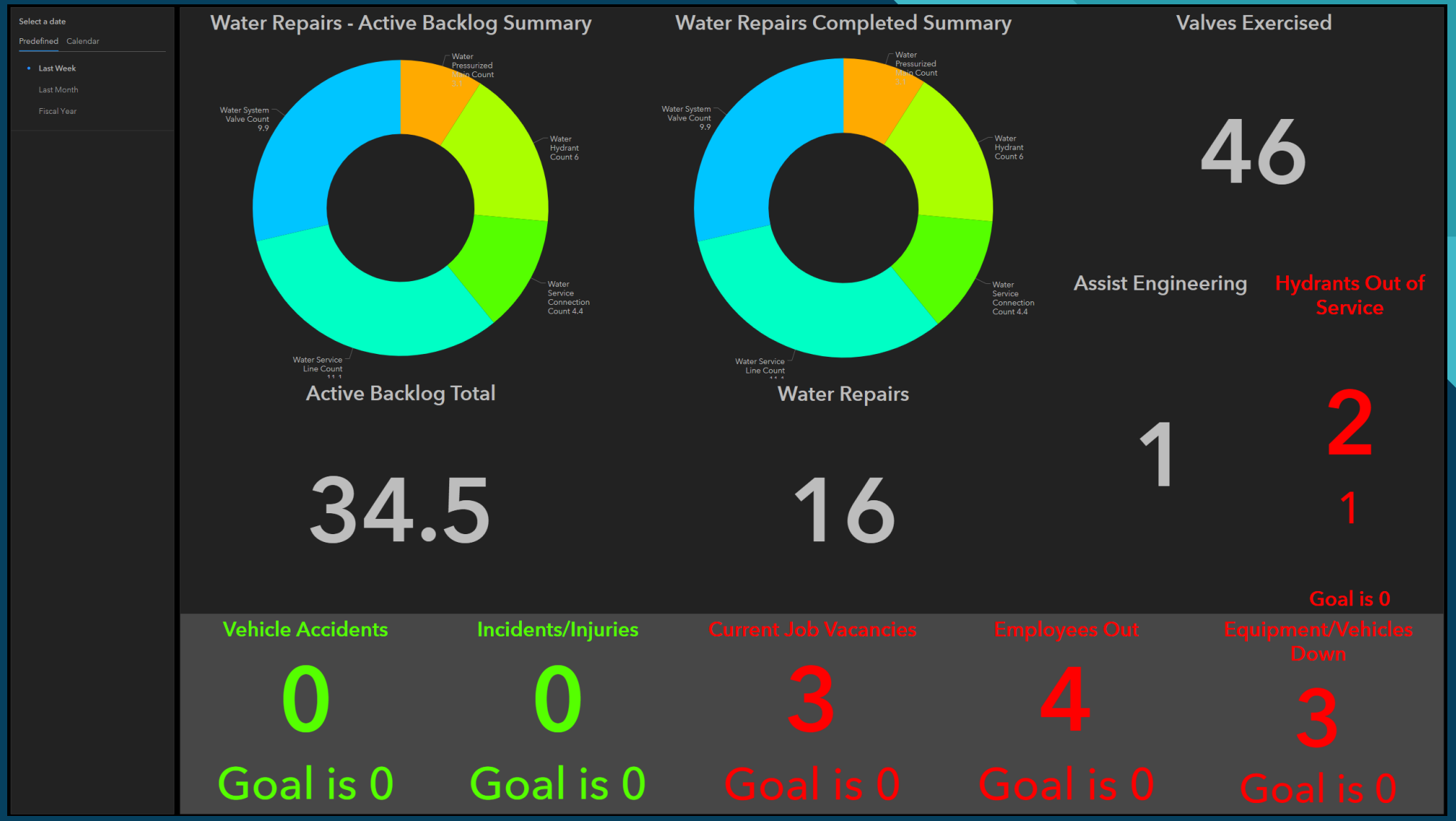
# Lead and Copper Dashboard

- Further analyze your data
  - Targeted internal field inspections
  - 65 field inspections/week > 25 field inspections/day
- Dynamic application
  - Layers can be added/removed
  - Application can change with project needs
  - Compatible with other ESRI products
- Feeds future public facing application

# Other GIS Applications for Water Utilities

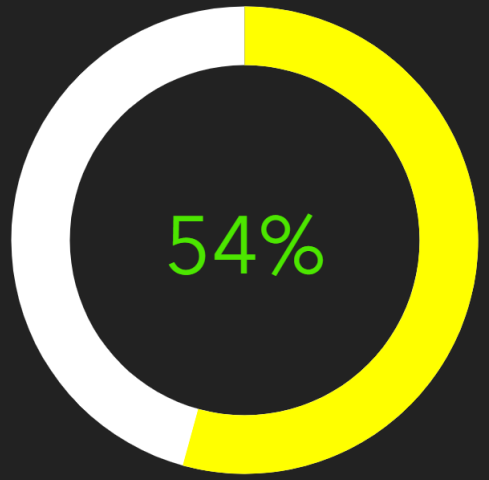
- Water/Wastewater Repairs
- Discharge Point Inventory and Inspections
- Sanitary Sewer Overflows
- Water Flush Points
- Fire Hydrant Inspections
- *Any asset that has location information*

# Water Repairs Dashboard



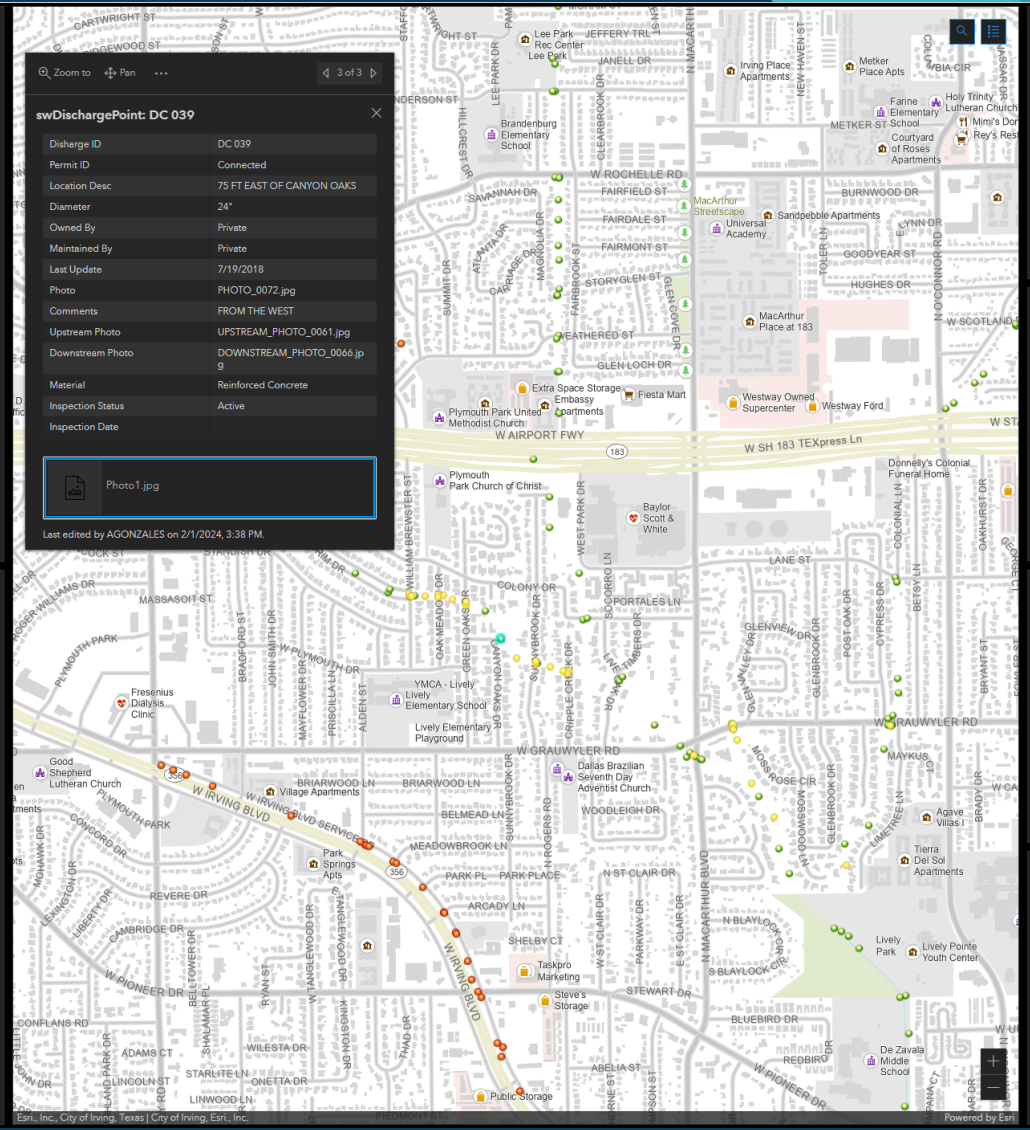
# Discharge Point Inventory and Inspections

**DW Screens Completed of Original Total**




**DW Screens Left to Inspect**

362




**DW Screens Completed in FY 2023-2024**

64

**DWFS This Week**

0

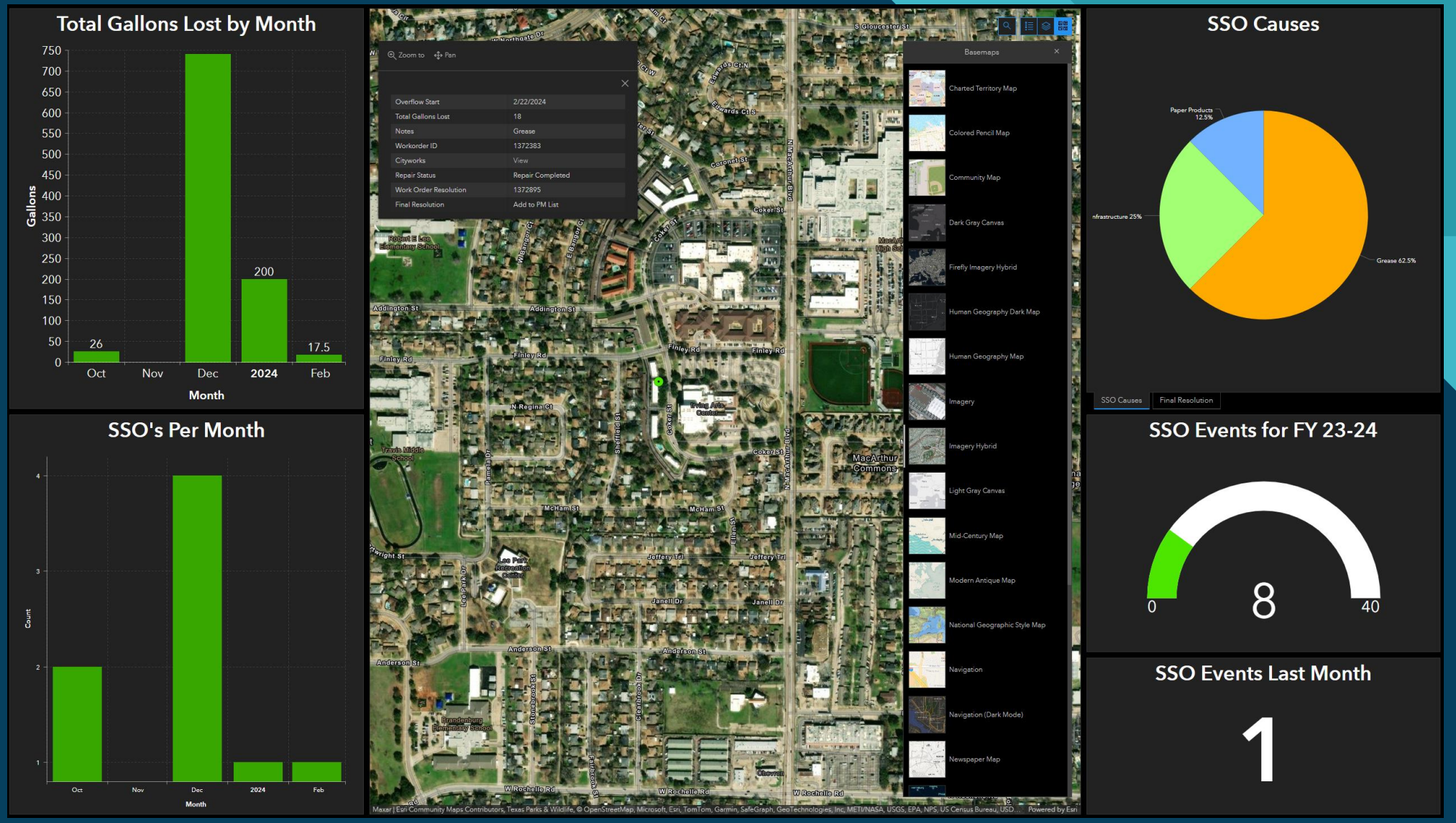
**DWFS Last Week**

0

**DWFS This Month**

0

# Sanitary Sewer Overflows



# Water Flush Points

Total Flush Points

688

2-inch Flush Points

188

Automatic Flush Points

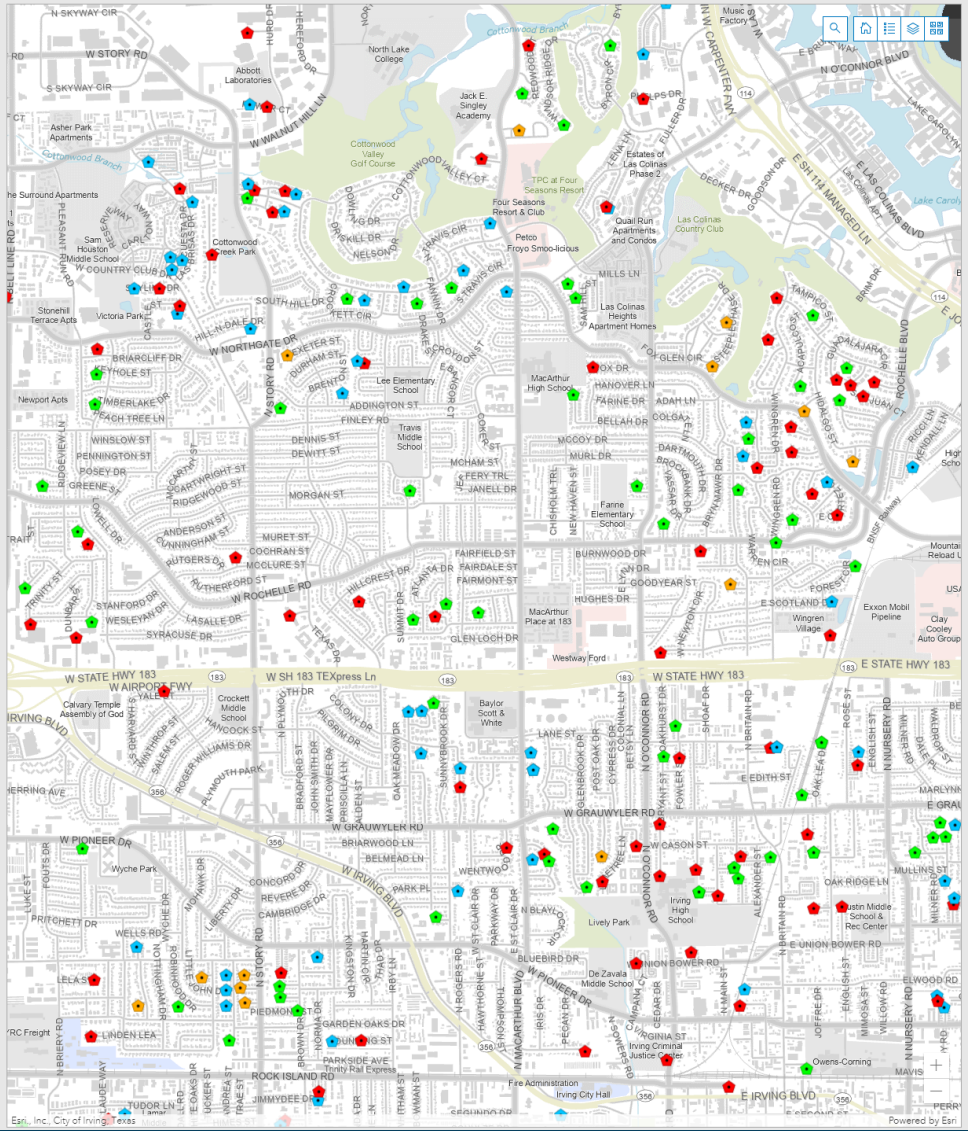
48

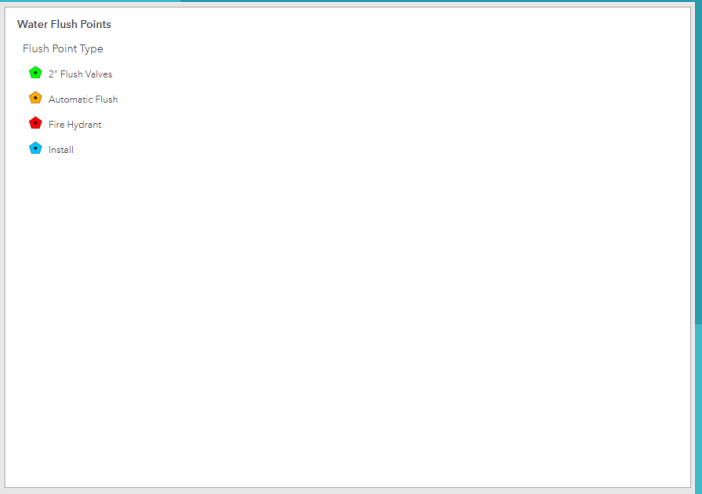
Fire Hydrant Flush Points

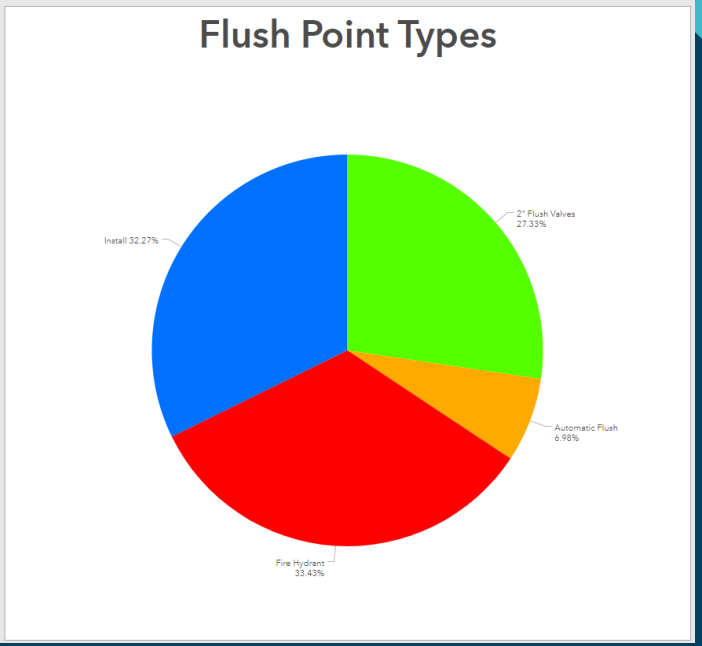
230

Install Flush Points

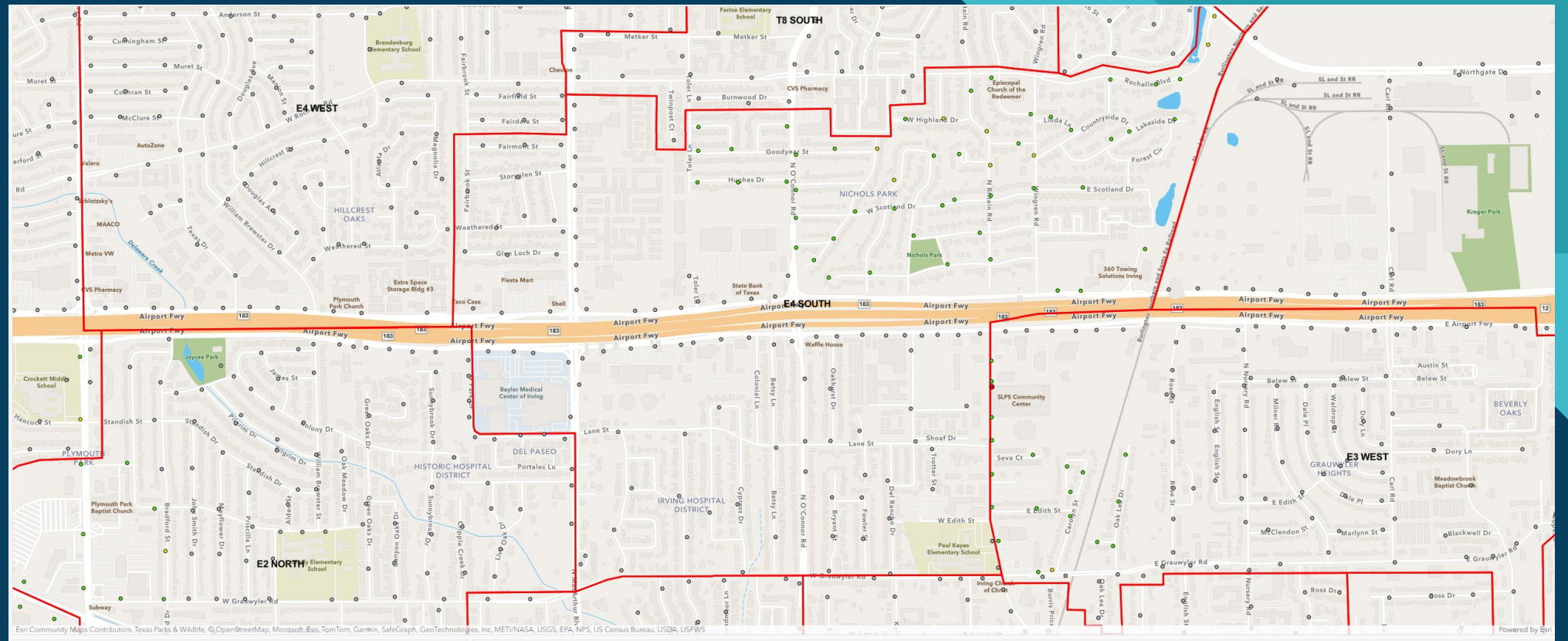
222

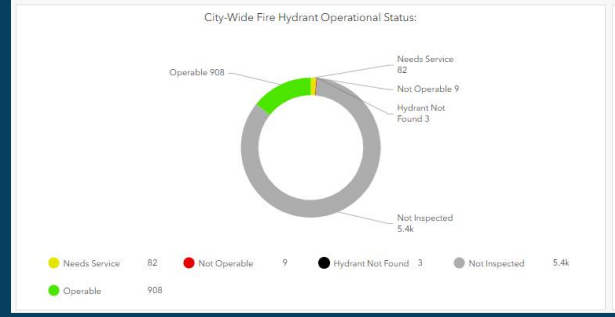


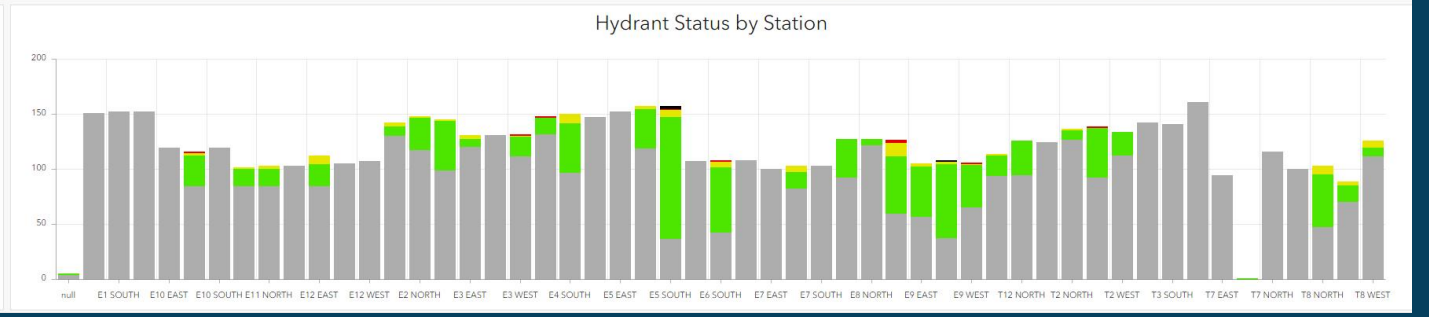



# Fire Hydrant Inspections



# Things to Consider

- Access to GIS professionals
- Organization goals
- Timelines
- Access to ESRI solutions/tools
- Other applications/software used by organization
- Consistent access to dashboard
- Good data in > good data out

# Questions

# Thank You