A Utility Perspective on Optimizing Vegetation Management

EVERSOURCE

A Partnership of UAA + Arbor Day Foundation

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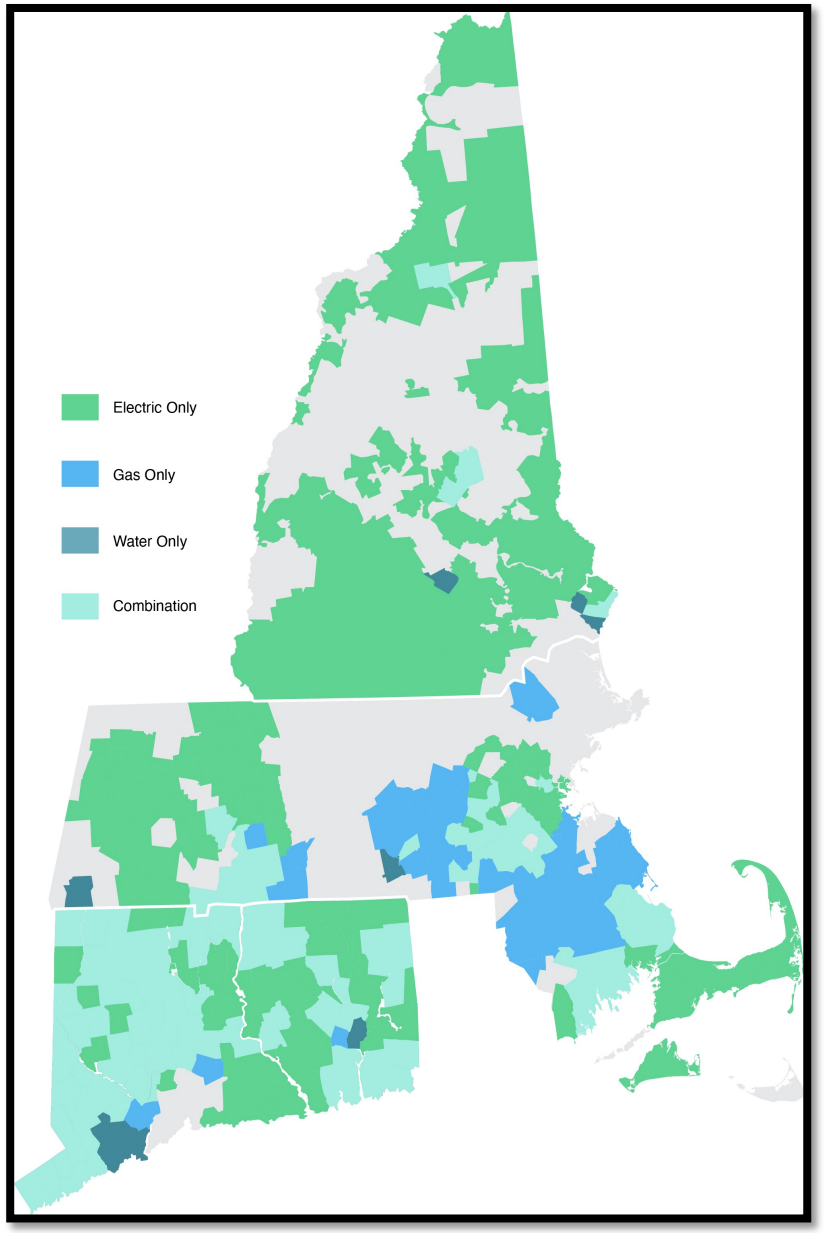
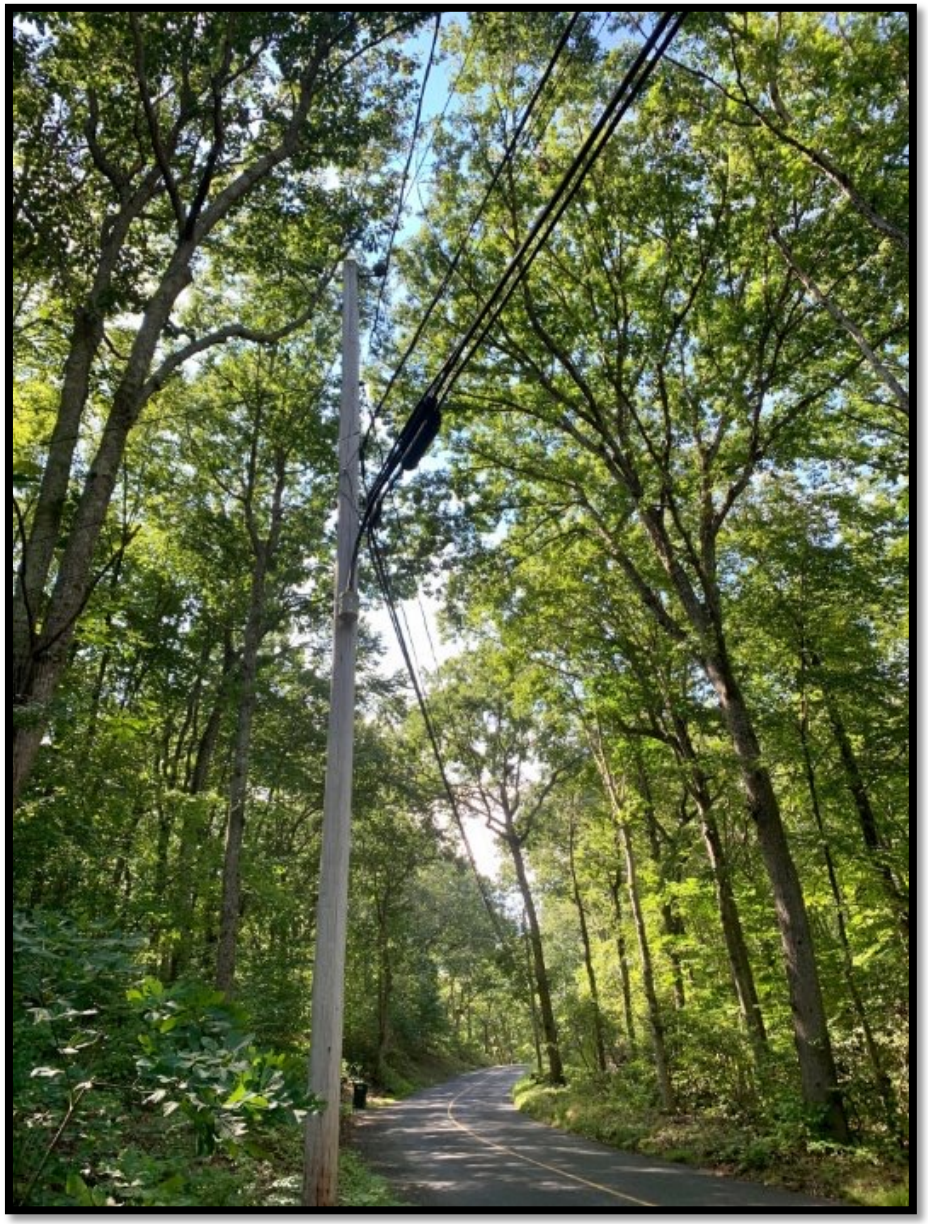
Who is Eversource?

- $8B Fortune 500 energy company
- 3.96 million customers
- 2,300 miles of transmission rights of way
- 40,000 distribution circuit miles

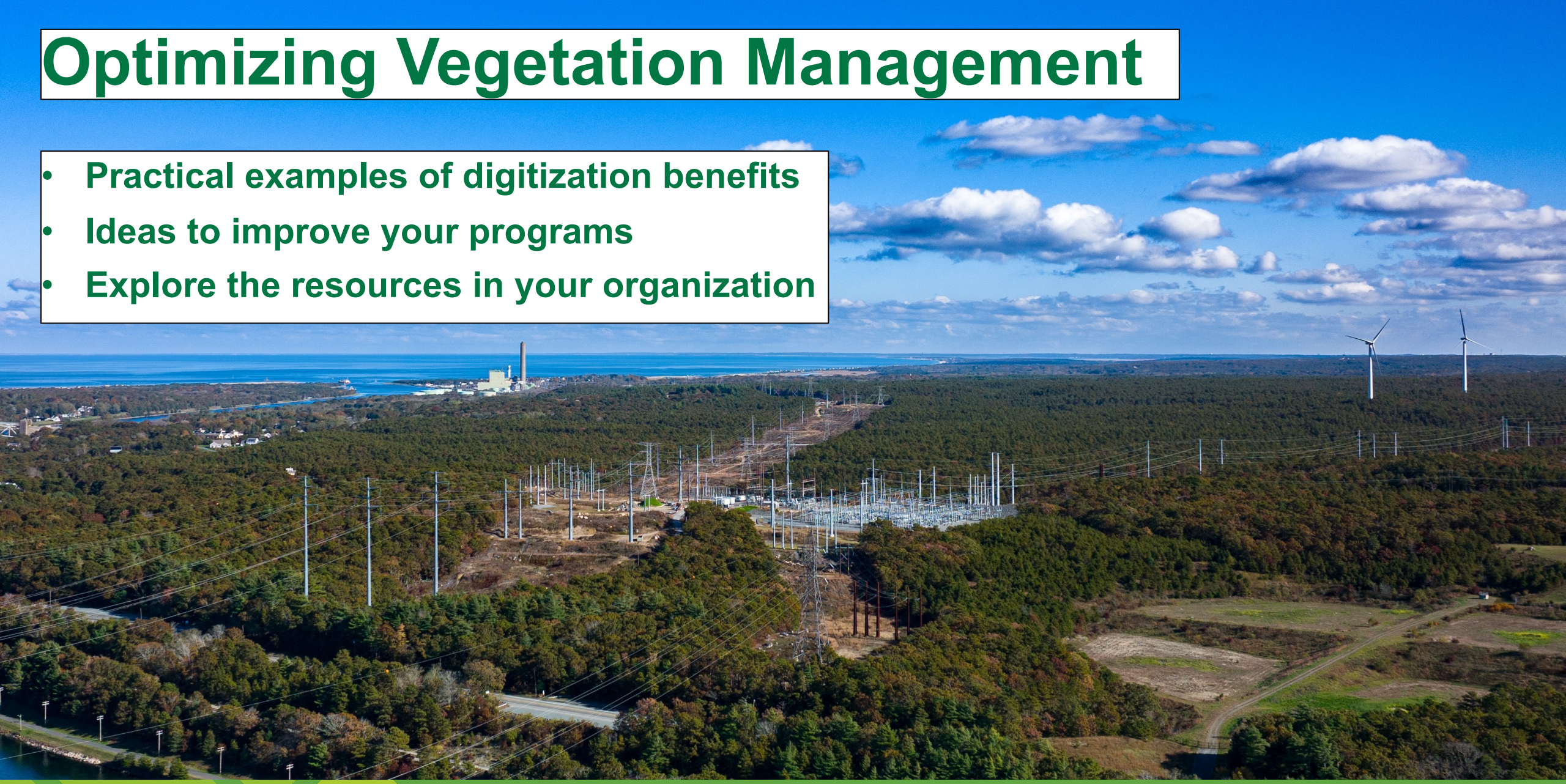




Google
Kent Rd
Image capture: Sep 2013 © 2023

Optimizing Vegetation Management

- Practical examples of digitization benefits
- Ideas to improve your programs
- Explore the resources in your organization



Digitization

Why is this important?

- Paperless is faster and more reliable
- Dynamic visualization tells a story
- Historical data is powerful

Environmental Systems Research Institute, Inc.

esri

ArcGIS Field Maps

The all-in-one app for fieldwork

ArcGIS Survey123

Smarter forms, smarter data collection

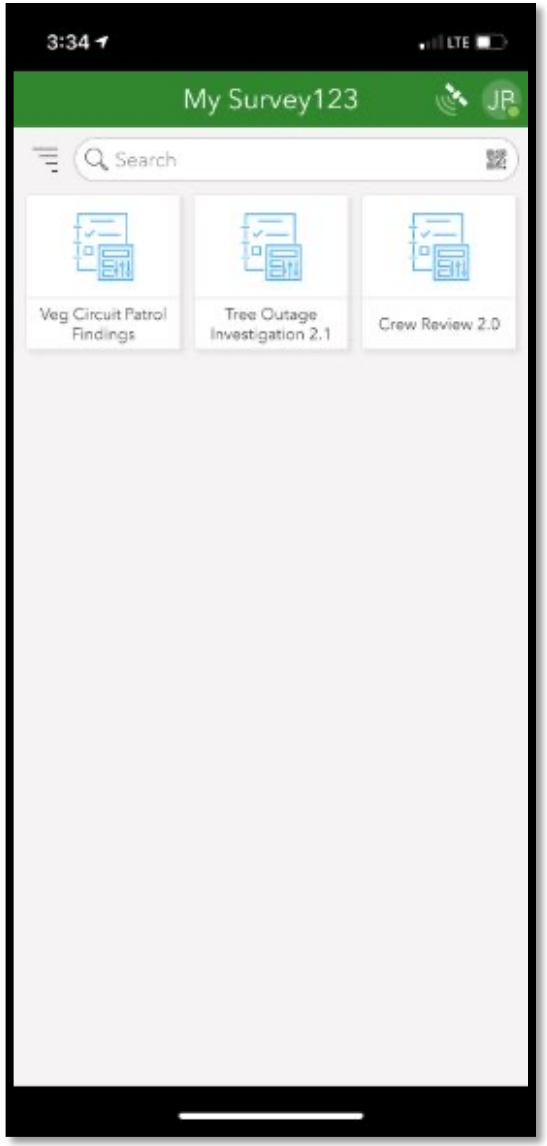
ESRI Digitization

Eversource Story

- Excel, Paper forms, and Binders
- GIS department, existing subscriptions/licensures, and the enterprise framework
- Started with form digitization in Survey123
- Development of Field Maps with collaboration with SME's in each state to capture need

Contractor:	CREW: General Foreman, Foreman & Team Members
Reviewer:	
Week ending:	
Location:	
Mark 1 if the crew complied Mark 0 if the crew did not comply Leave blank if no observation can be made. Mark 1 under Pass/Fail if all complied or 0 if any did not comply	
Date ▶	
Work Type	

SAFETY								Pass/Fail
Cones	# of Cones		Proper taper		Cone Spacing FT=MPH		Reflective tape	
Signs	# of Signs		Distance/ Spacing		Merging roads covered			
Flagger	If needed		Stop/Slow Paddle		Safe position/ Visible		Controlling traffic	
PPE	Hardhat		UL Chaps		Z87 Glasses		Hearing	
	Class II or III Hi-Vis Vest		Body Harness, Lanyard					
General Safe Working Practices Wheel chocks/outrigger pads, position of equipment, drop zone established, handsaw in bucket, 2 hands on saw, spotter, whistle	Job Briefing		MAD		Elevator 3' Rule		Operating Between Wires	
Safety Comments								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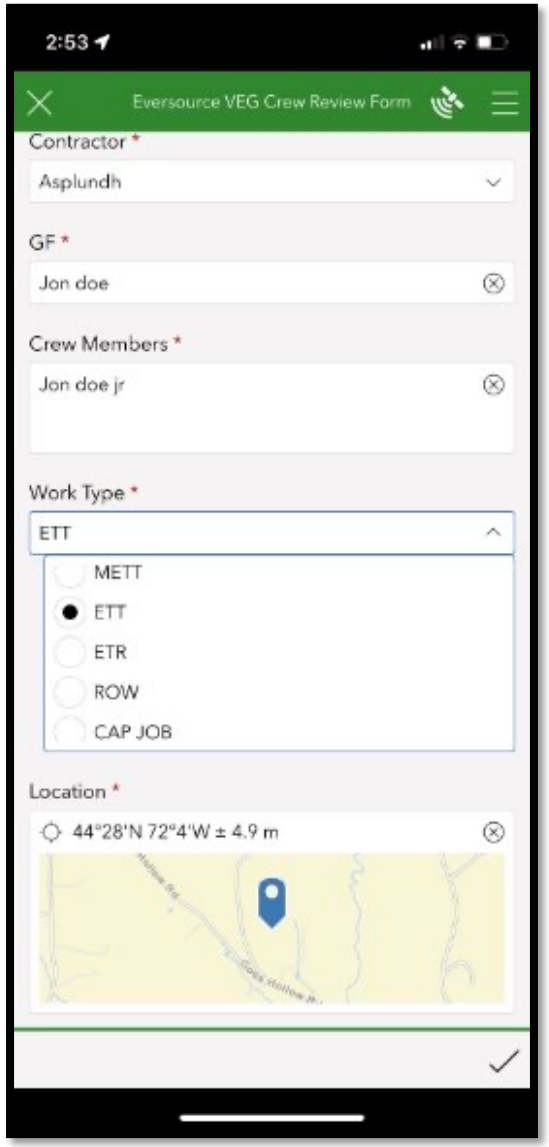
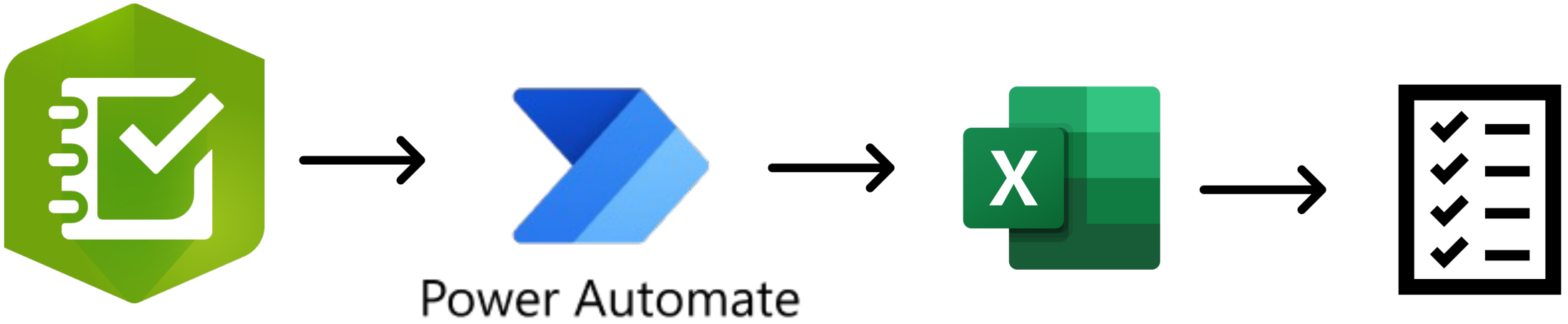
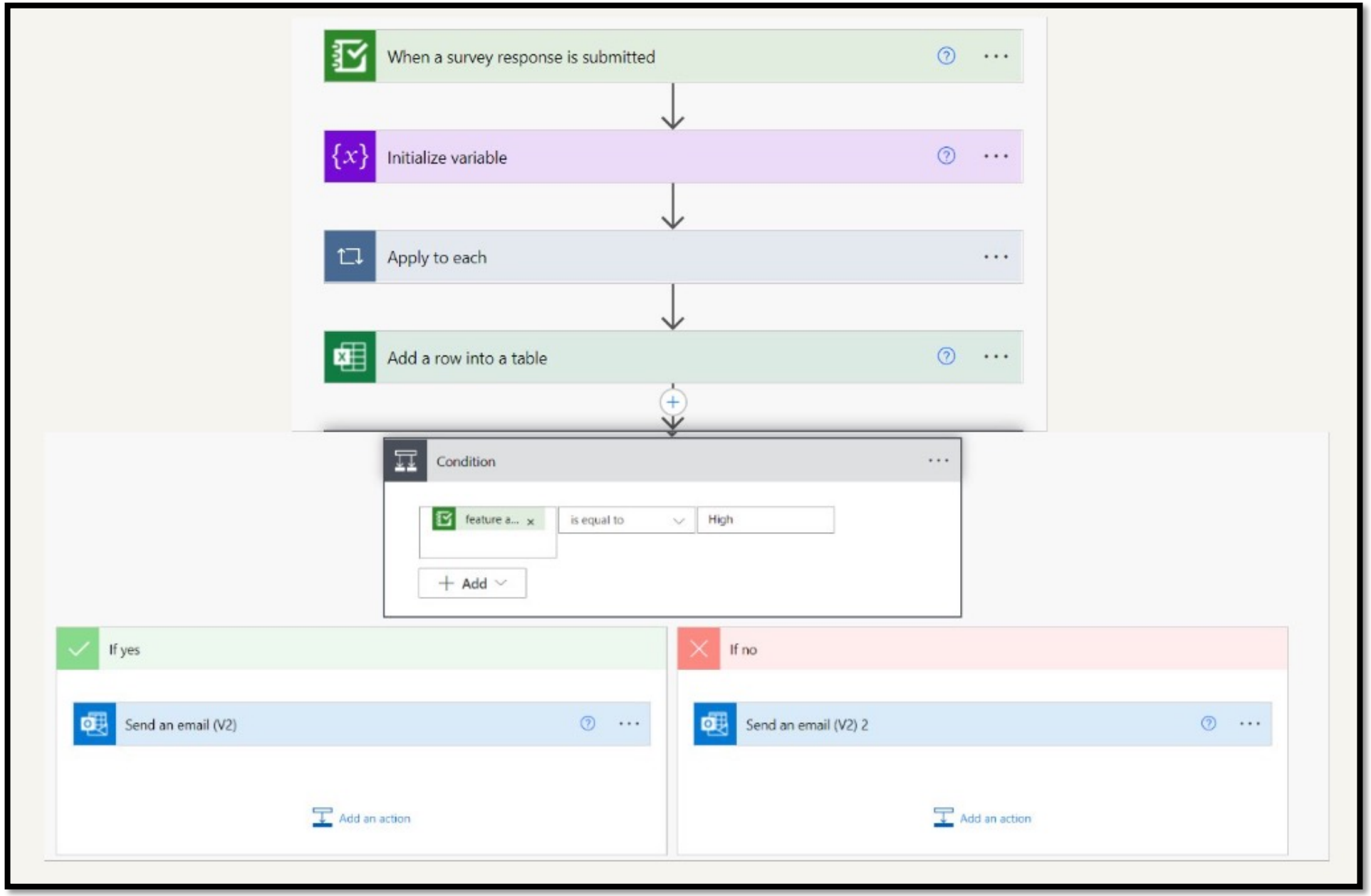
LTE
My Survey123
JR
Search
Veg Circuit Patrol Findings
Tree Outage Investigation 2.1
Crew Review 2.0


2:53
Eversource VEG Crew Review Form
Contractor *
Asplundh
GF *
Jon doe
Crew Members *
Jon doe jr
Work Type *
ETT
METT
ETT
ETR
ROW
CAP JOB
Location *
44°28'N 72°4'W ± 4.9 m

2:53
Eversource VEG Crew Review Form
Safety
Cones
Proper Taper; Spacing; Number; Type; etc.
Select Grade *
Pass
Fail
N/A
Signs
# of Signs; Distance/Spacing; Merging Roads Covered; etc.
Select Grade *
Pass
Fail
N/A
Flagging
Stop/Slow Paddle; Safe Position; Controlling Traffic; etc.
Select Grade *
Pass
Fail
N/A
PPE
Hardhat; UL Chaps; Z87.1 Eye Protection; Hearing Protection; Hi Viz, Body Harness; etc.
Select Grade *
Pass
Fail
N/A


Power Automate



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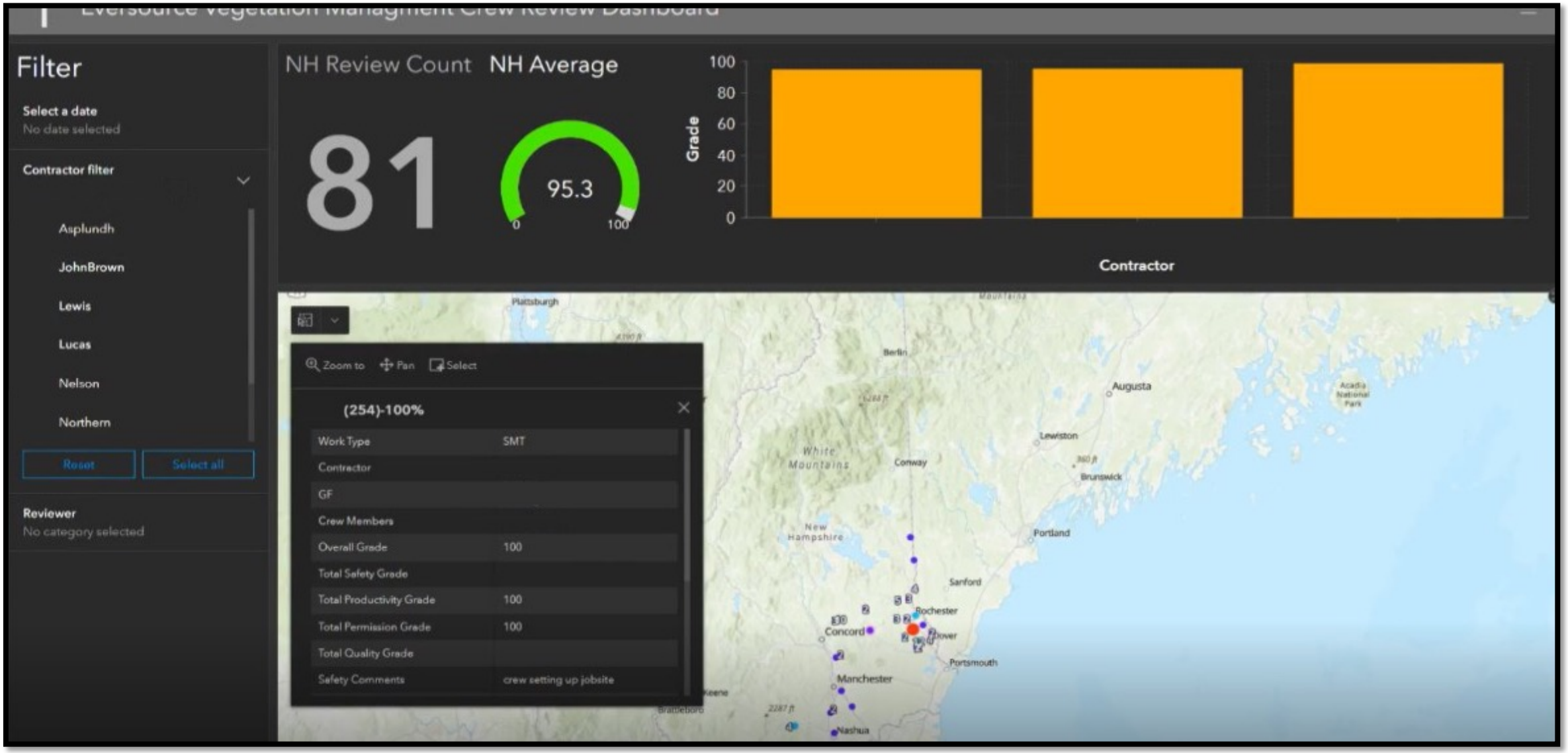

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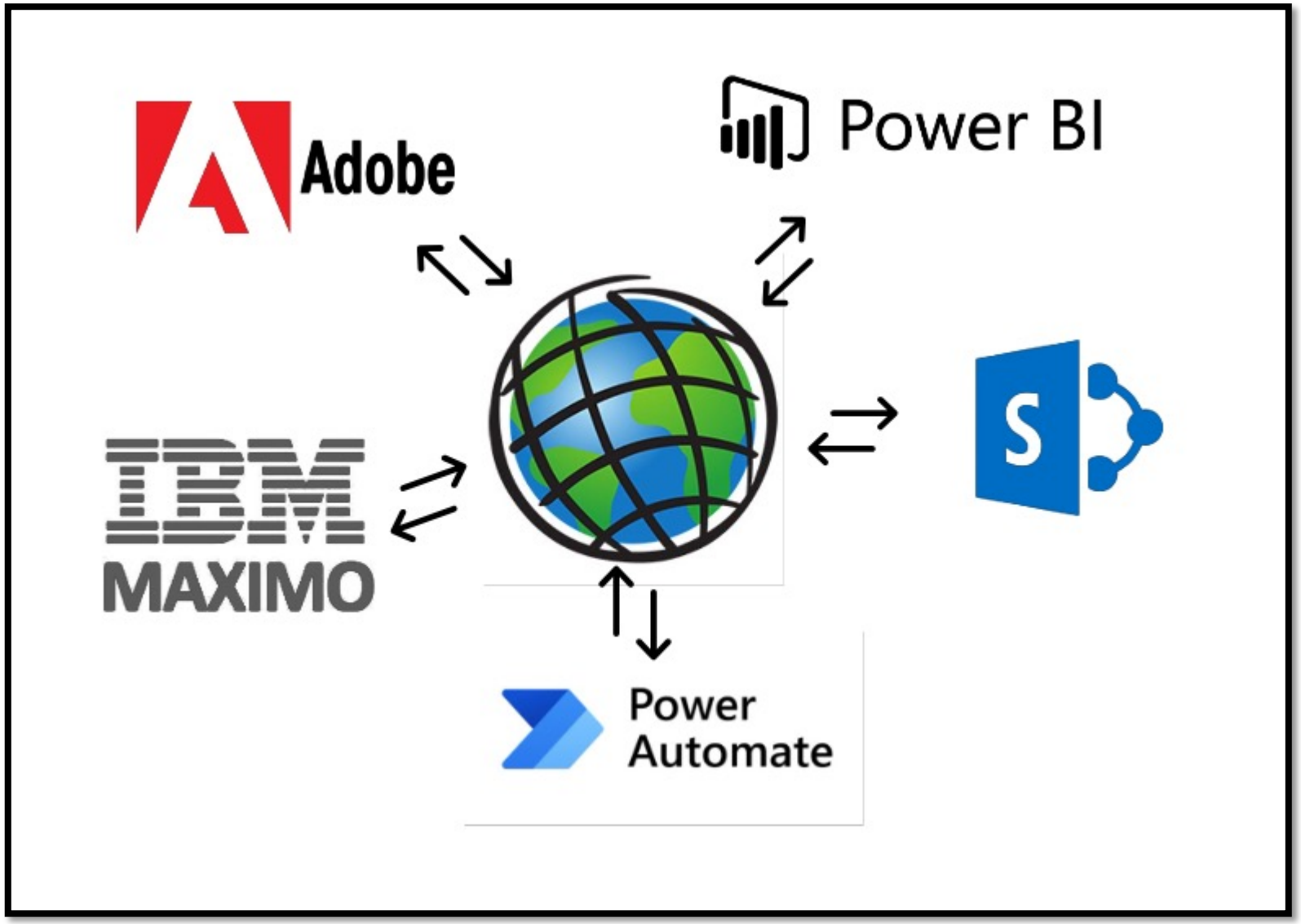
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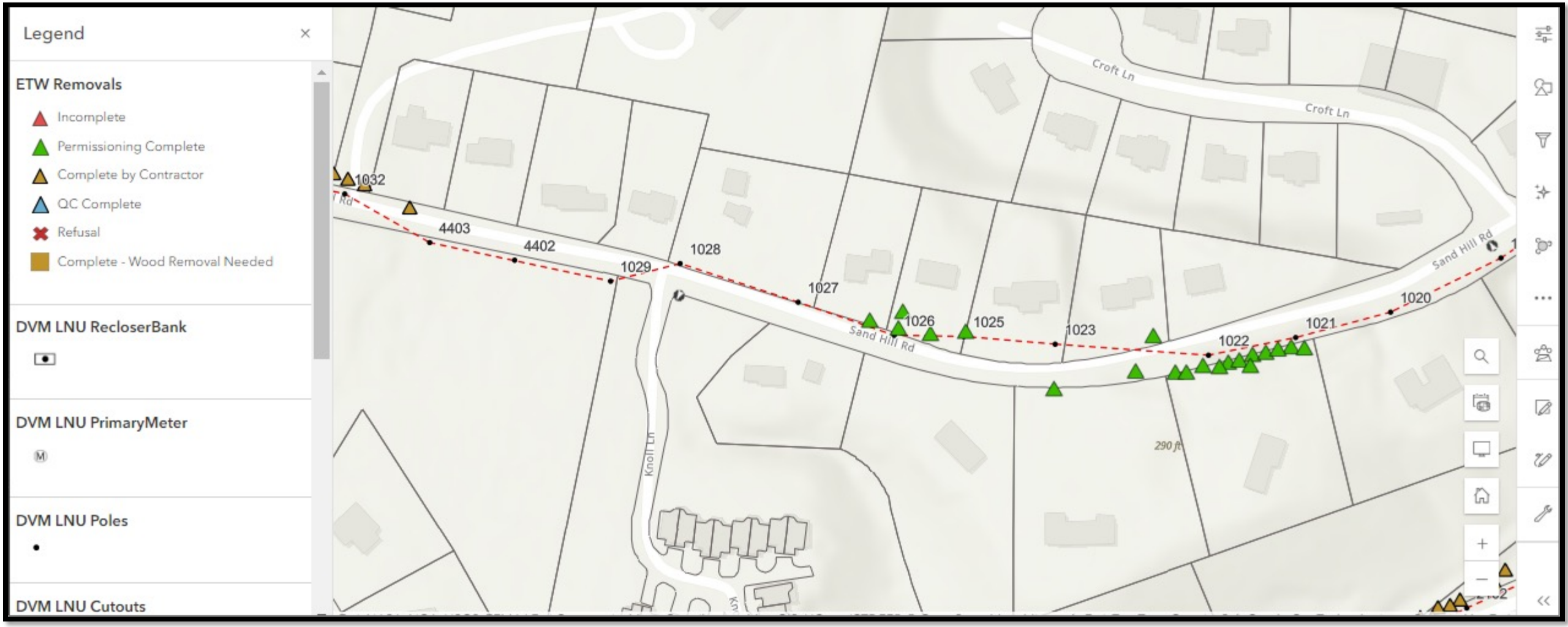
Power BI
IBM
MAXIMO
Power
Automate



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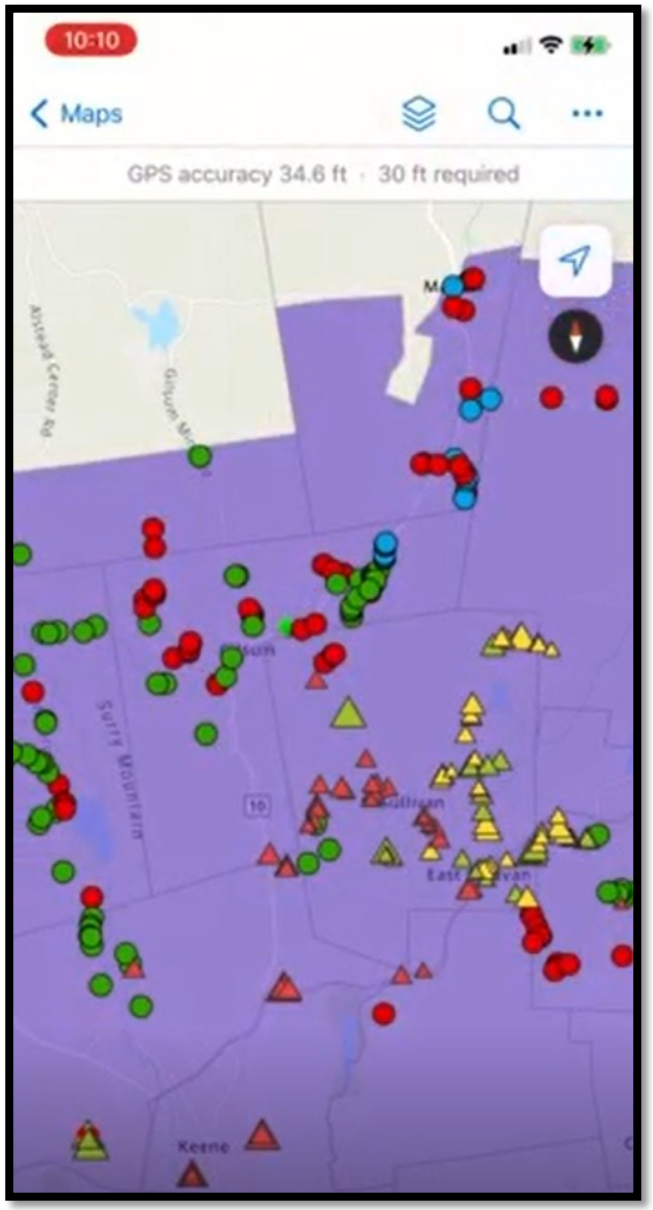
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Maps
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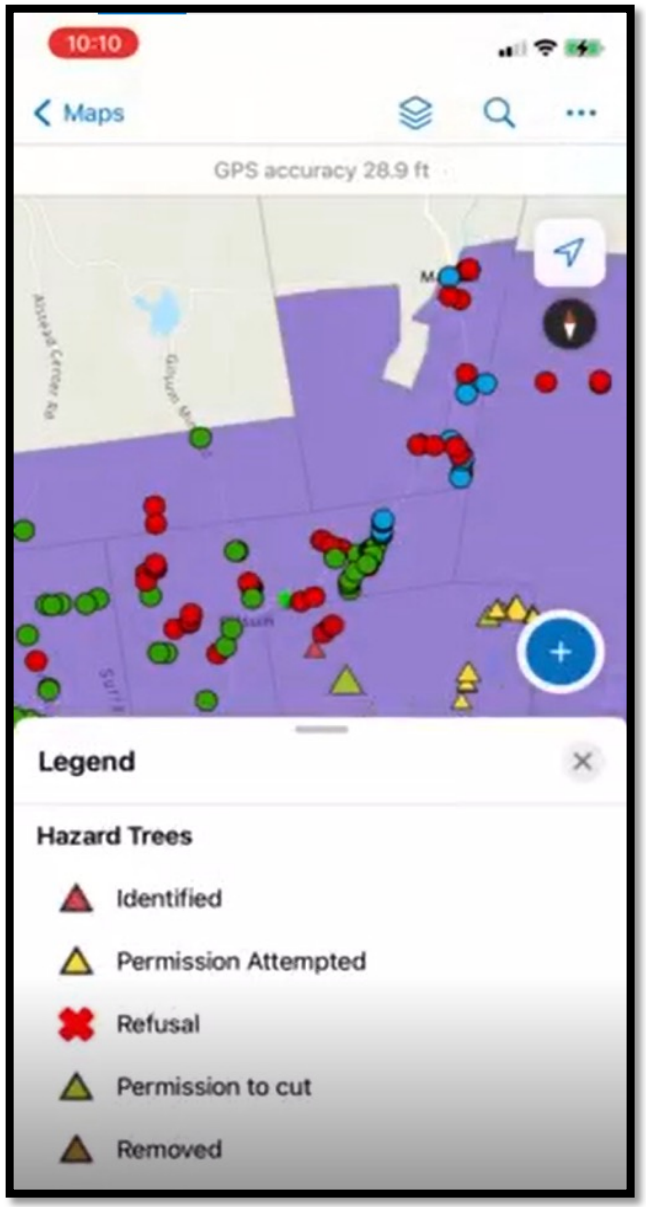
Keene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Maps
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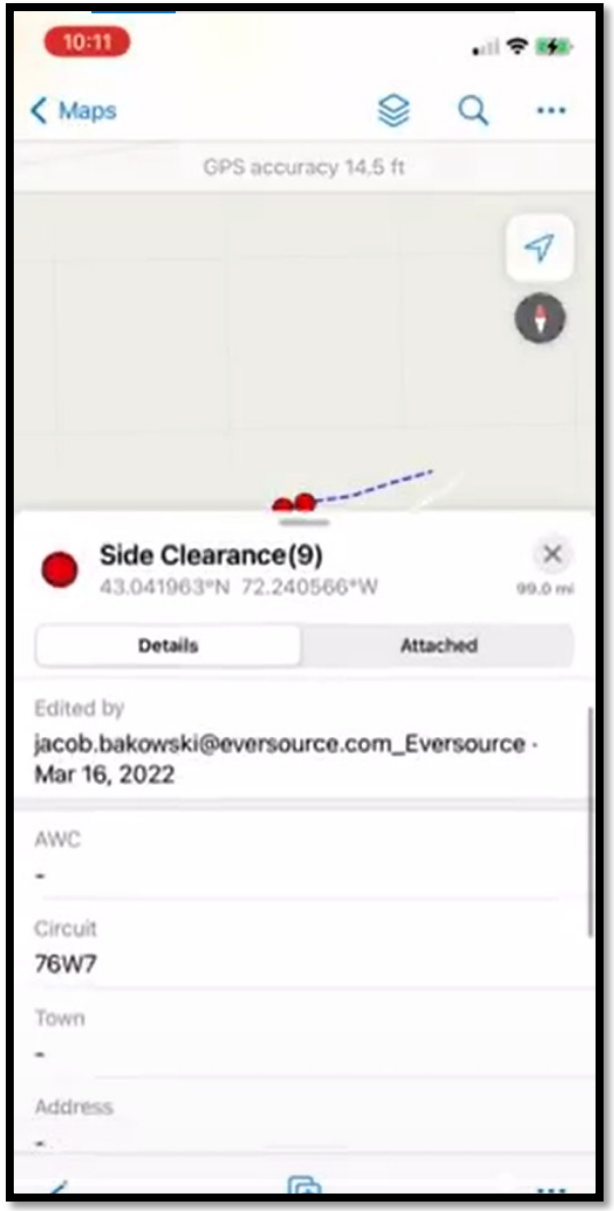
Legend
Hazard Trees
Identified
Permission Attempted
Refusal
Permission to cut
Removed


10:11
Maps
GPS accuracy 14.5 ft
Side Clearance(9)
43.041963°N 72.240566°W
99.0 mi
Details
Attached
Edited by
jacob.bakowski@eversource.com_Eversource · Mar 16, 2022
AWC
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Circuit
76W7
Town
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Address
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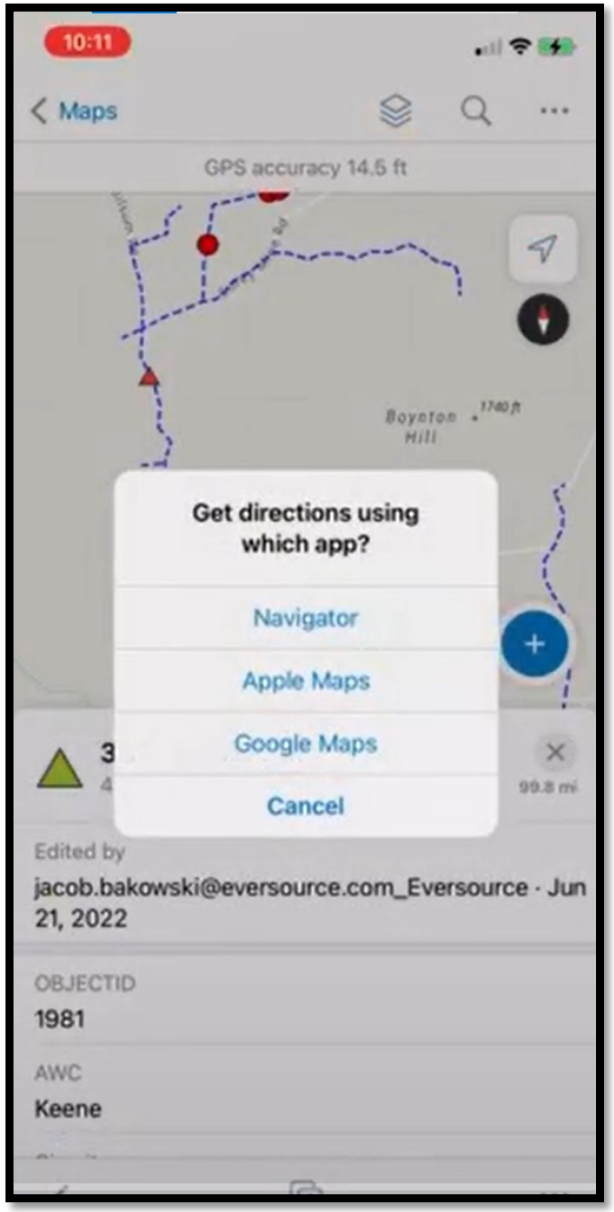
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Maps
GPS accuracy 14.5 ft
Boynton Hill
1740 ft
Get directions using which app?
Navigator
Apple Maps
Google Maps
Cancel
99.8 mi
Edited by
jacob.bakowski@eversource.com_Eversource · Jun 21, 2022
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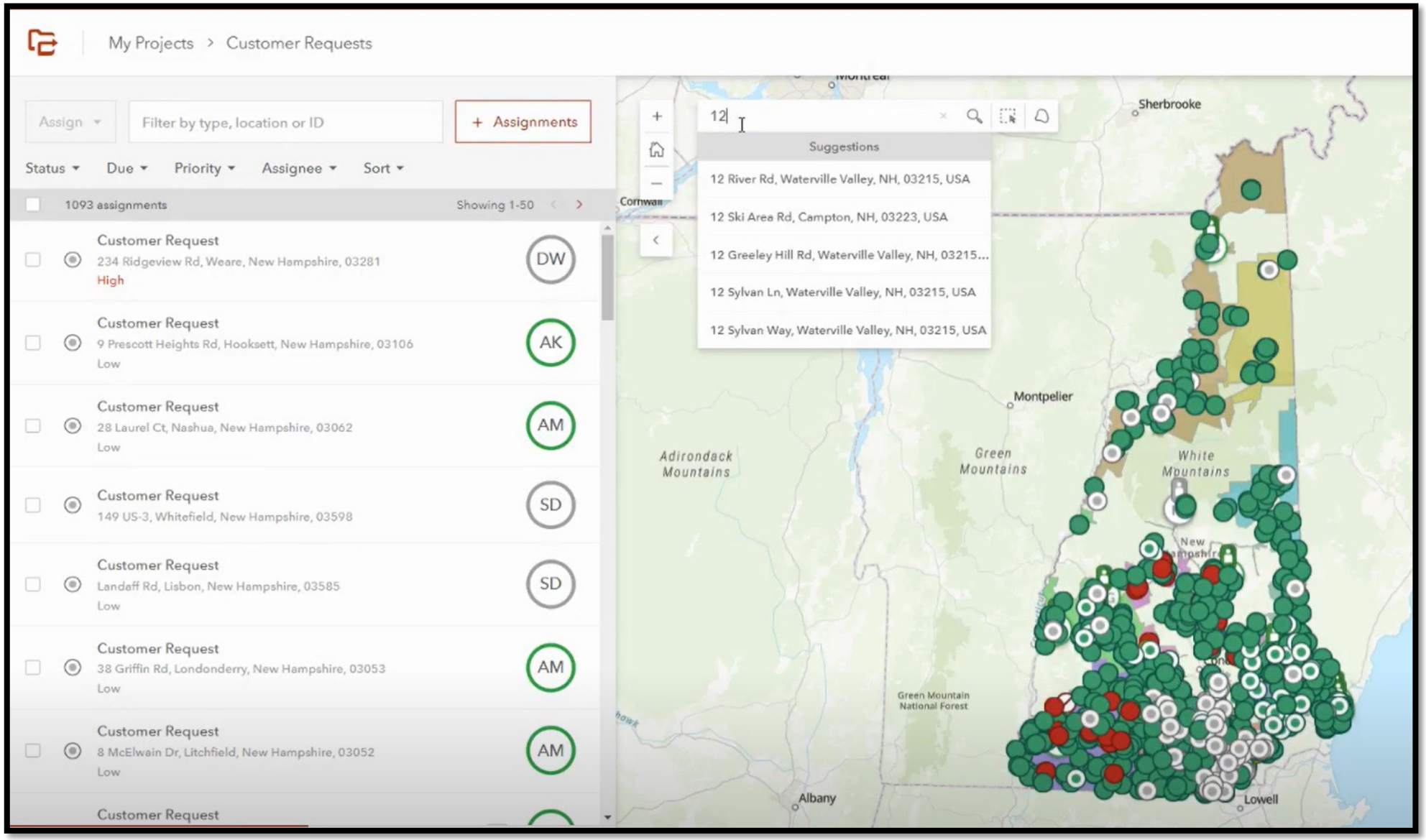

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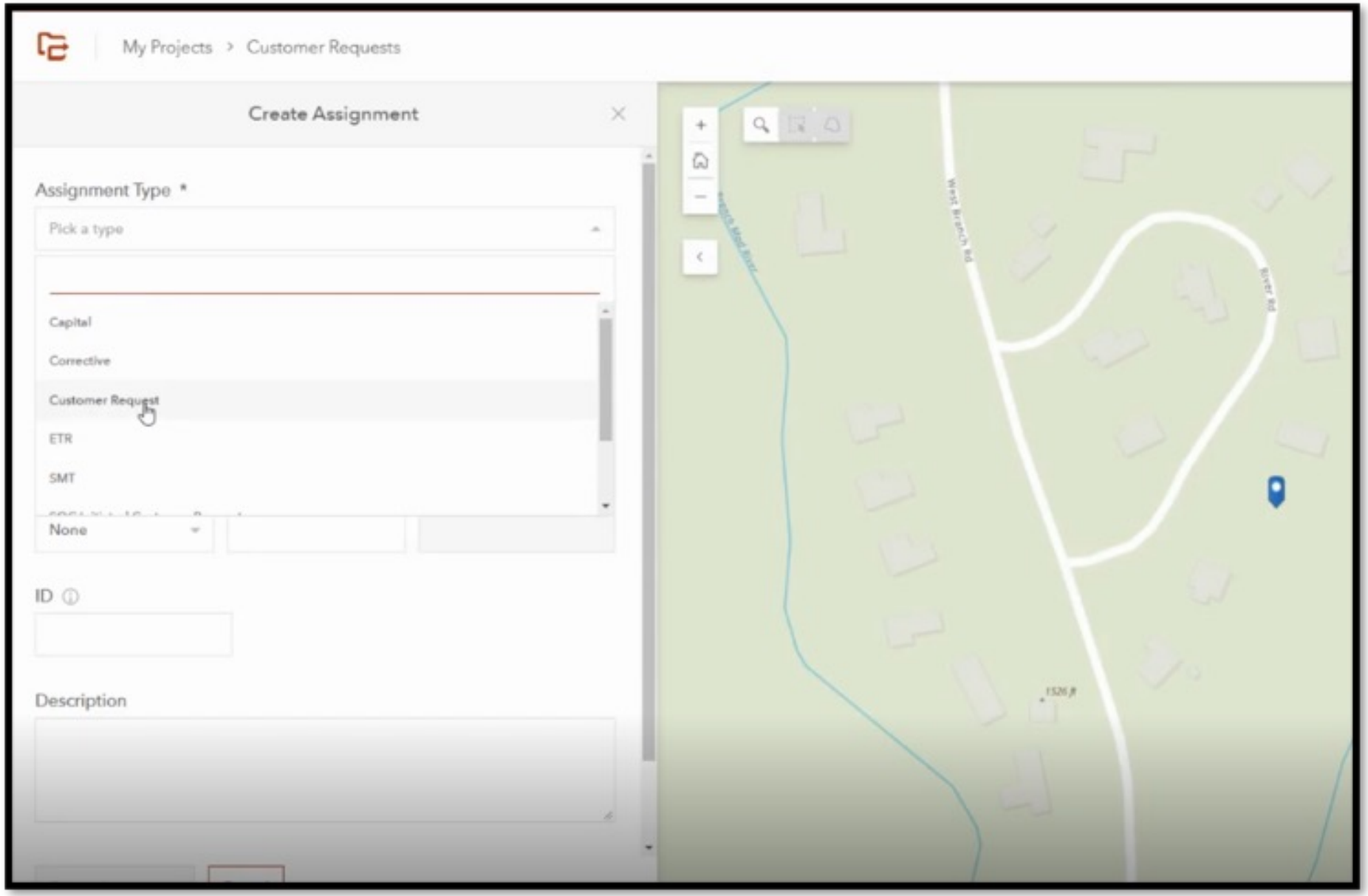

My Projects
Customer Requests
Create Assignment
Assignment Type *
Pick a type
Capital
Corrective
Customer Request
ETR
SMT
None
ID
Description

2024 T Patrol Dashboard

Apply a Filter

Select Inspector
No category selected

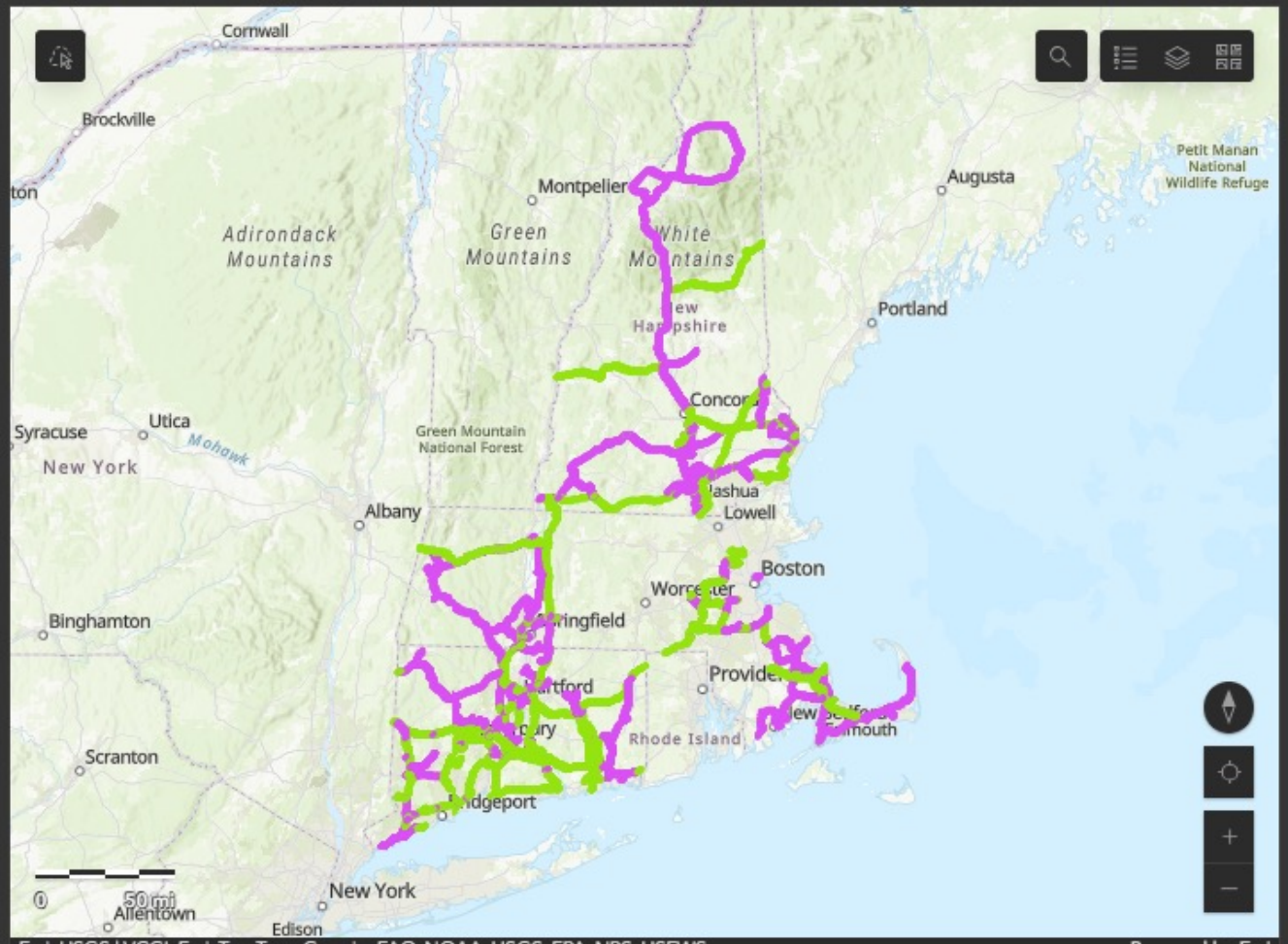
Select Line Num
No category selected

Select NERC
No category selected

Select OPCO
No category selected

Select VM Region
No category selected

Select Project #
No category selected



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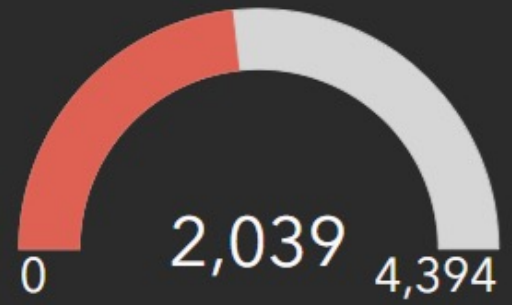

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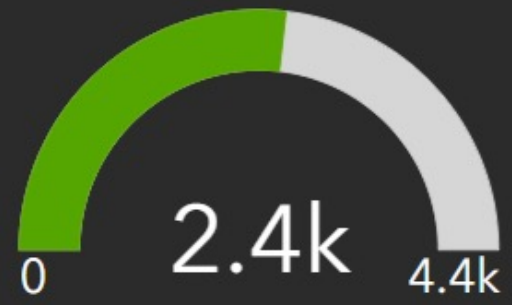

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ESRI Digitization

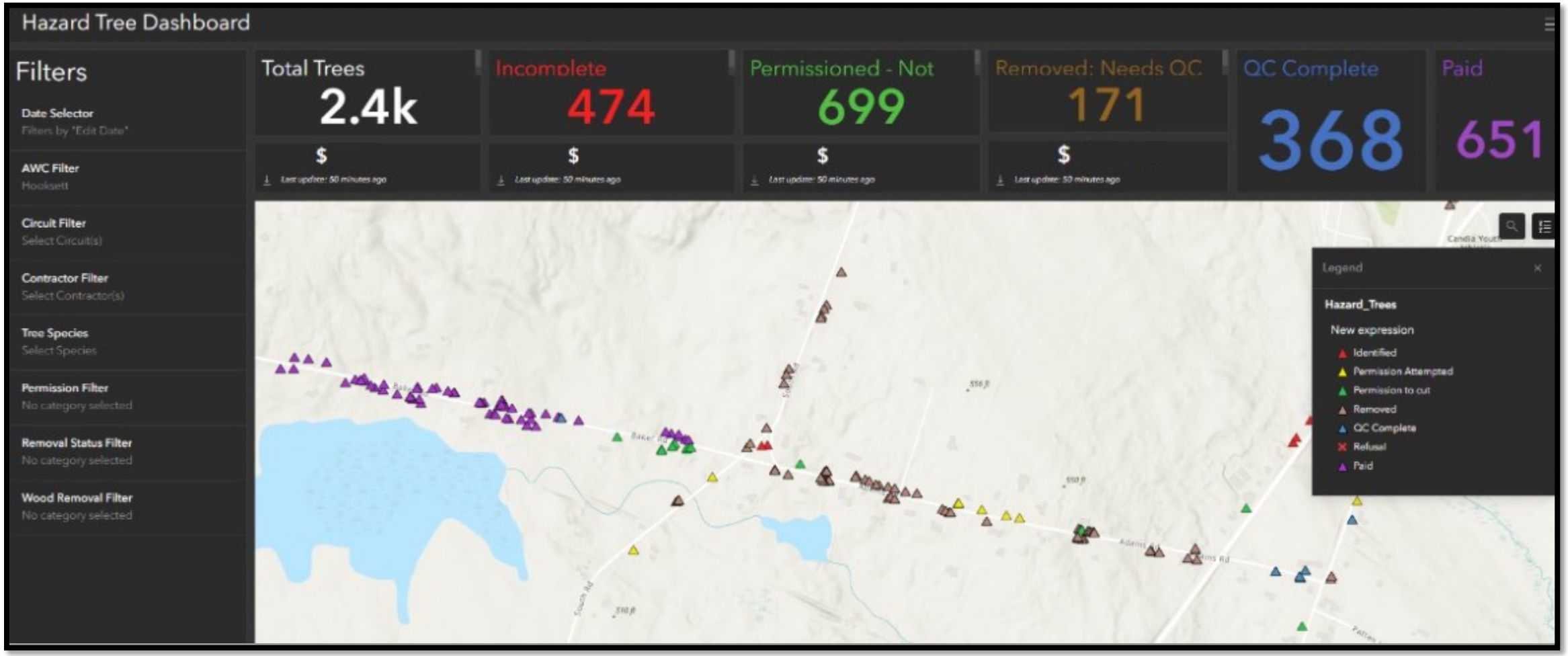
Eversource Use Cases

- ESRI Survey123 for Digitizing Forms
  - Customer Permissions
  - Outage Investigations
  - Contractor Crew Reviews
- Work Planning in Field Maps
  - Hazard Trees
  - Maintenance Production and Quality
  - Annual (aerial and foot) Inspection (TVM) and Hazard Tree Capture

Work Analysis and Reporting

- Dashboards
- Ease of Regulatory Reporting
- Reliability Data Capture with Spatial Elements

ESRI Dashboard for Hazard Trees



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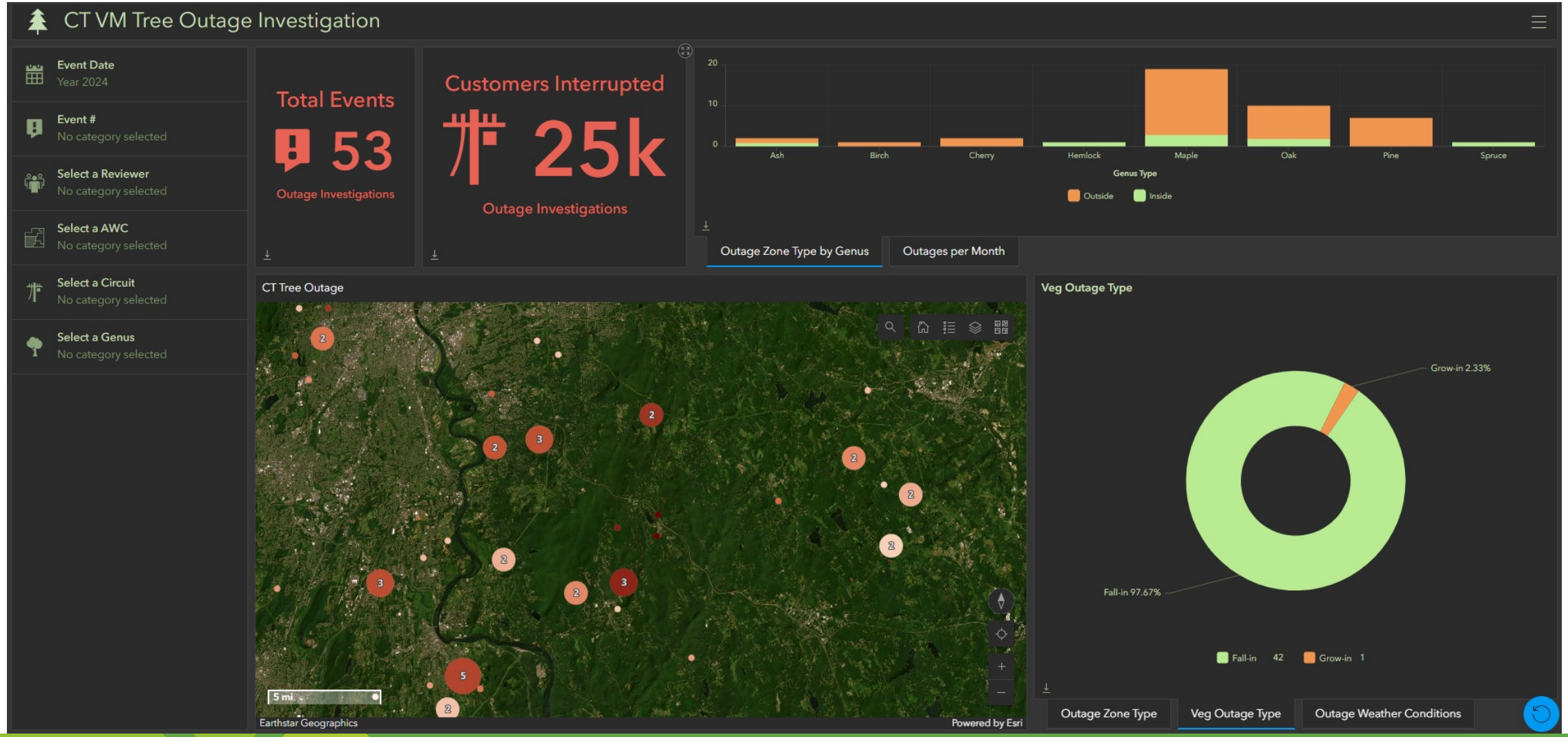
Outage Investigation Dashboard



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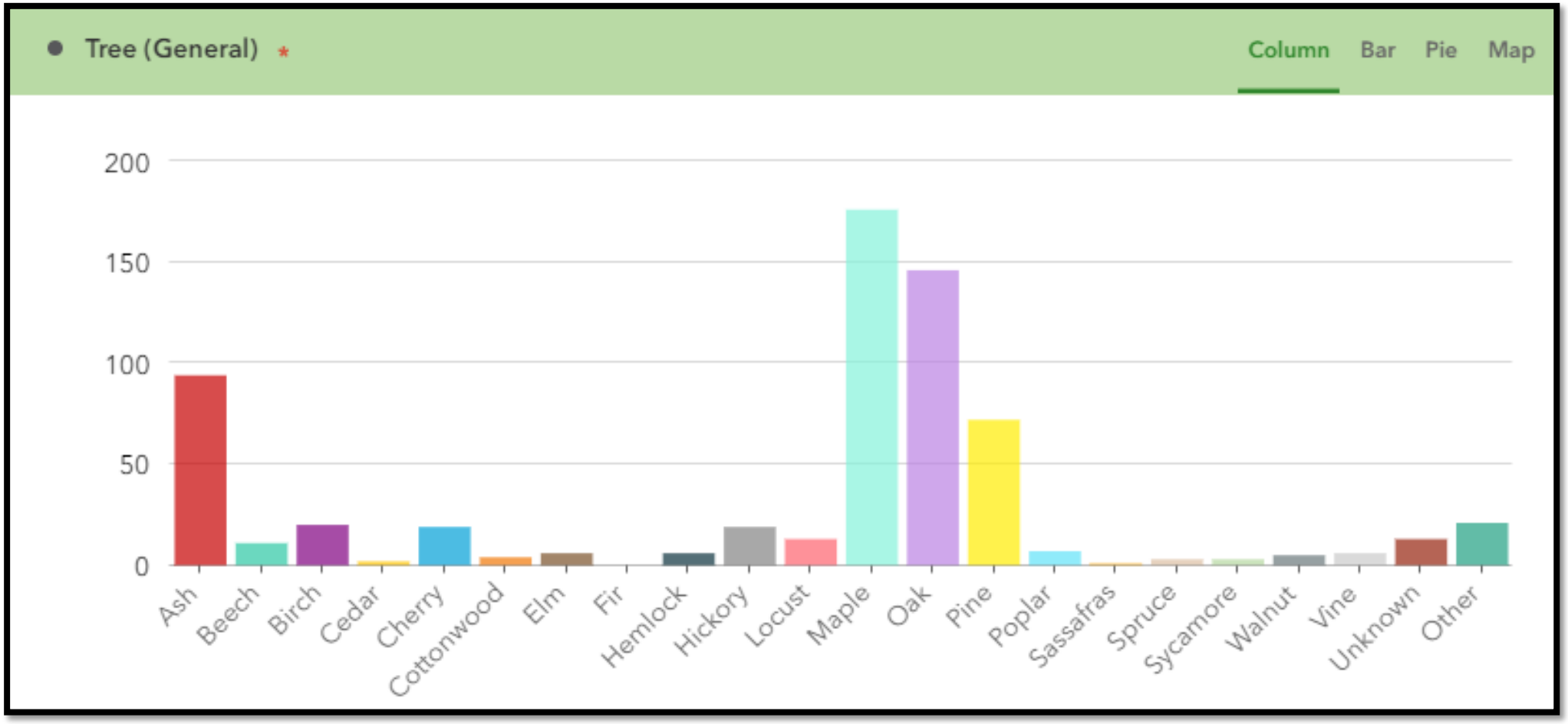
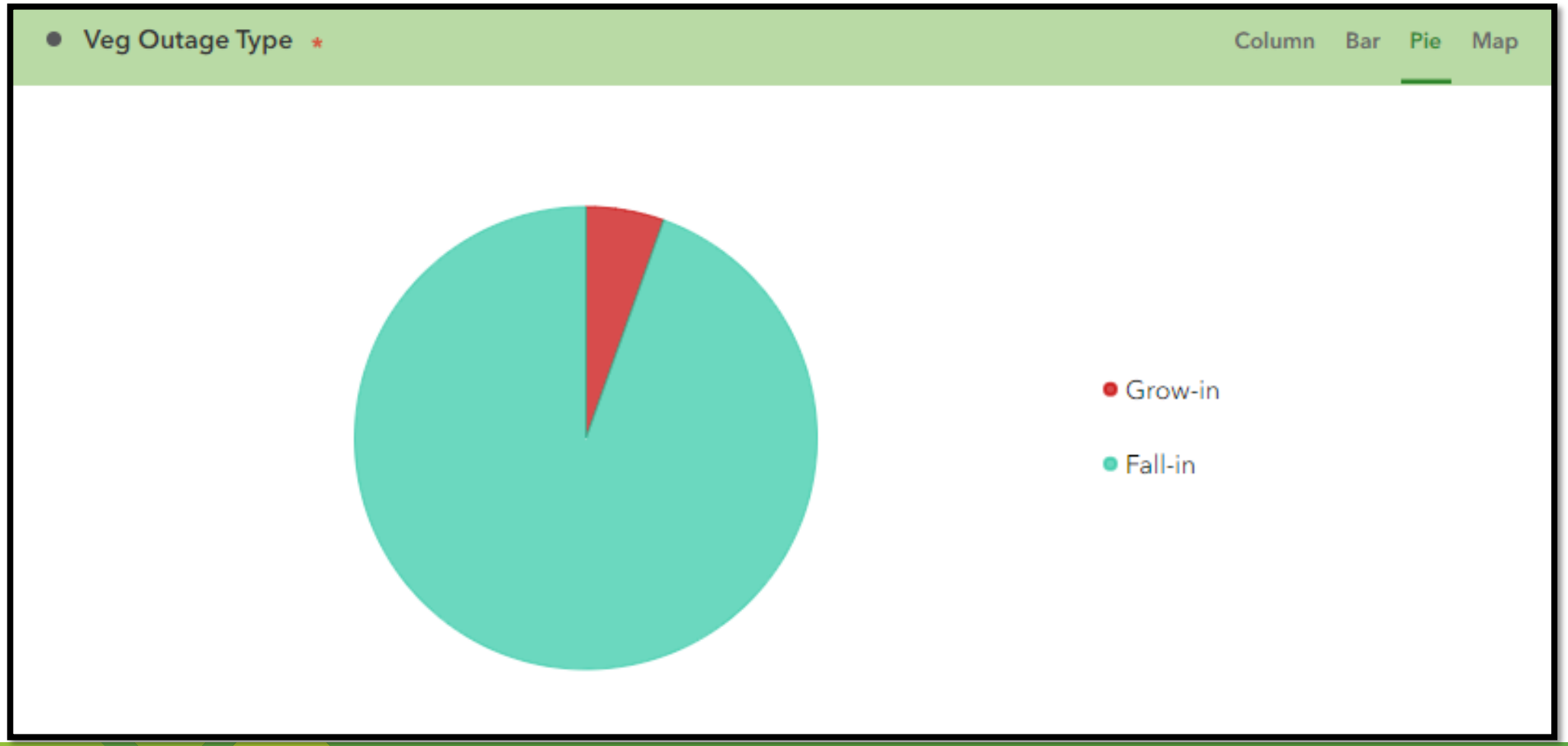
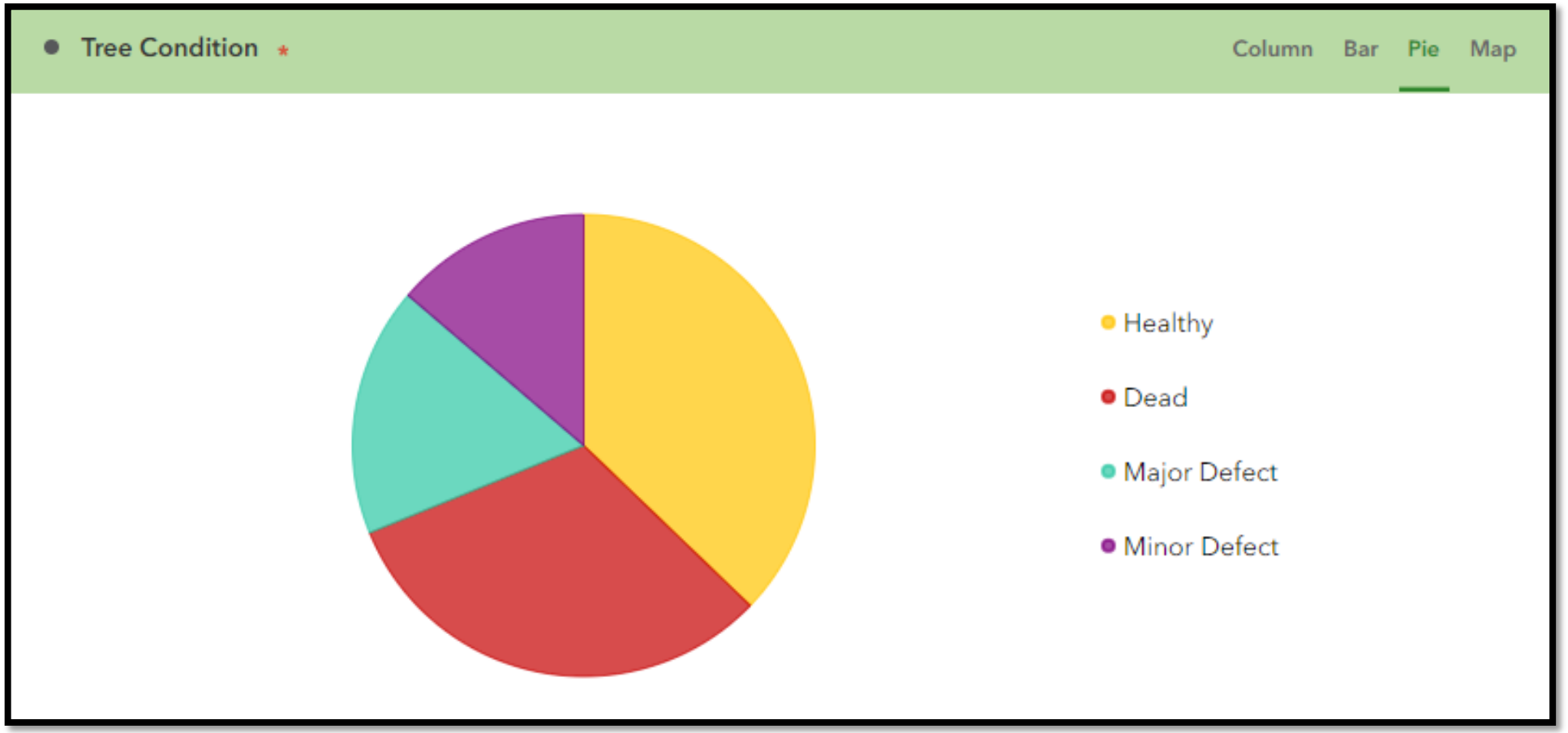
ESRI Survey123 – Instant Analytics



ESRI Survey123 – Instant Analytics



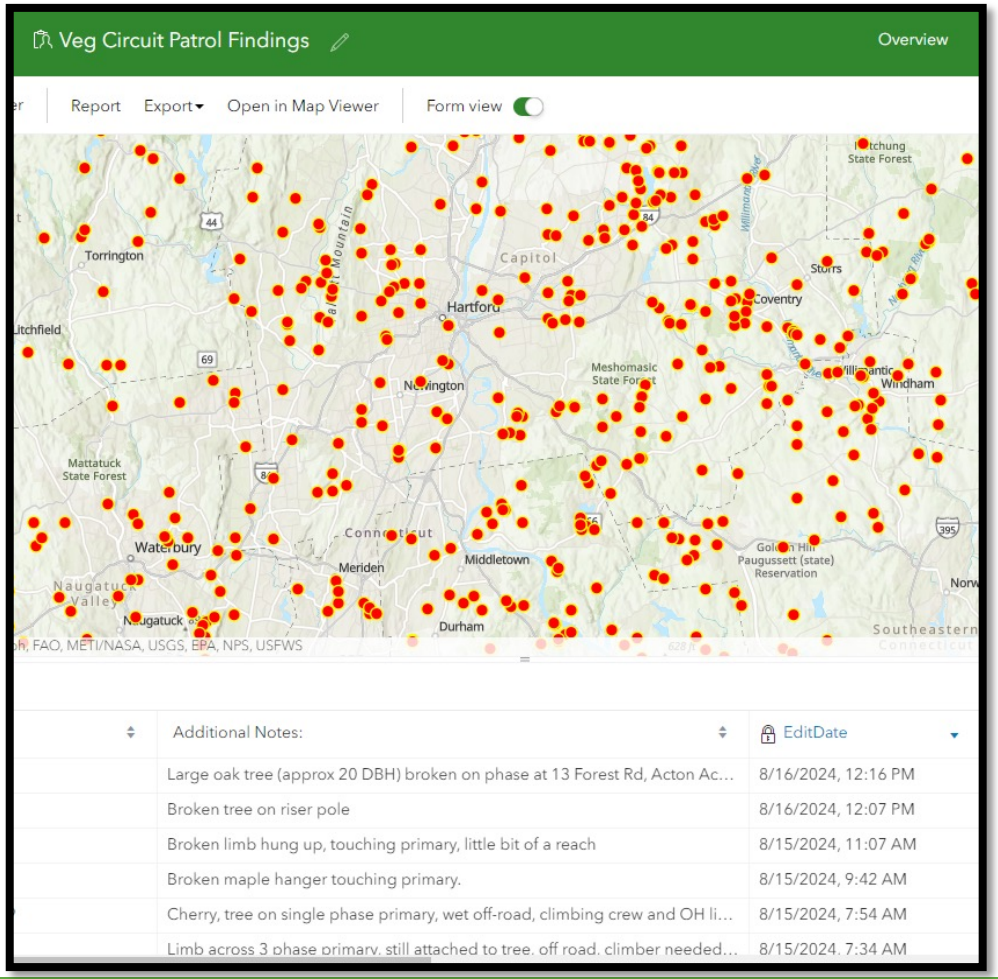
ESRI Survey 123 – Instant Analytics



Capture Photos of Tree Failure

Capture Good Catches, Engineering Findings

Non-veg findings are automatically emailed to customer service to put into Outage Management System



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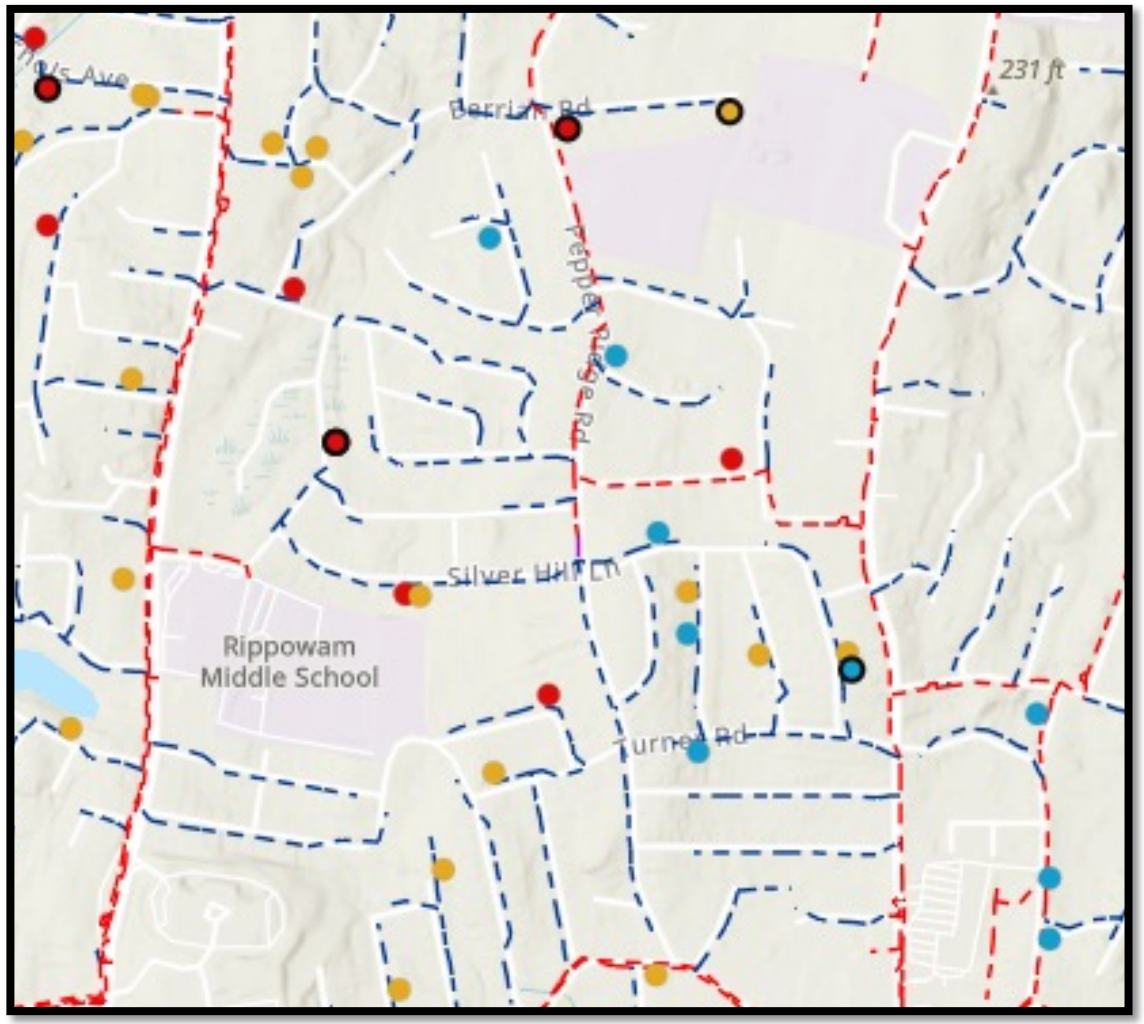
VM Challenges

Limitations of Veg Management in New England

- Requirement for Documented Notification and Consent
- Tree Wardens
- Sensitive customers
- Heavy forested areas

Customer Limitations to VM Work

- Required Regulatory reporting
- Track customer limitations to vegetation work
- Display if direct contact with conductors is present



DC = Direct Contact

VM/Engineering Collaboration

Top 10 Worst SAIDI contributing circuits in CT, MA and NH selected for evaluation and proposed projects by both Vegetation Management and Engineering

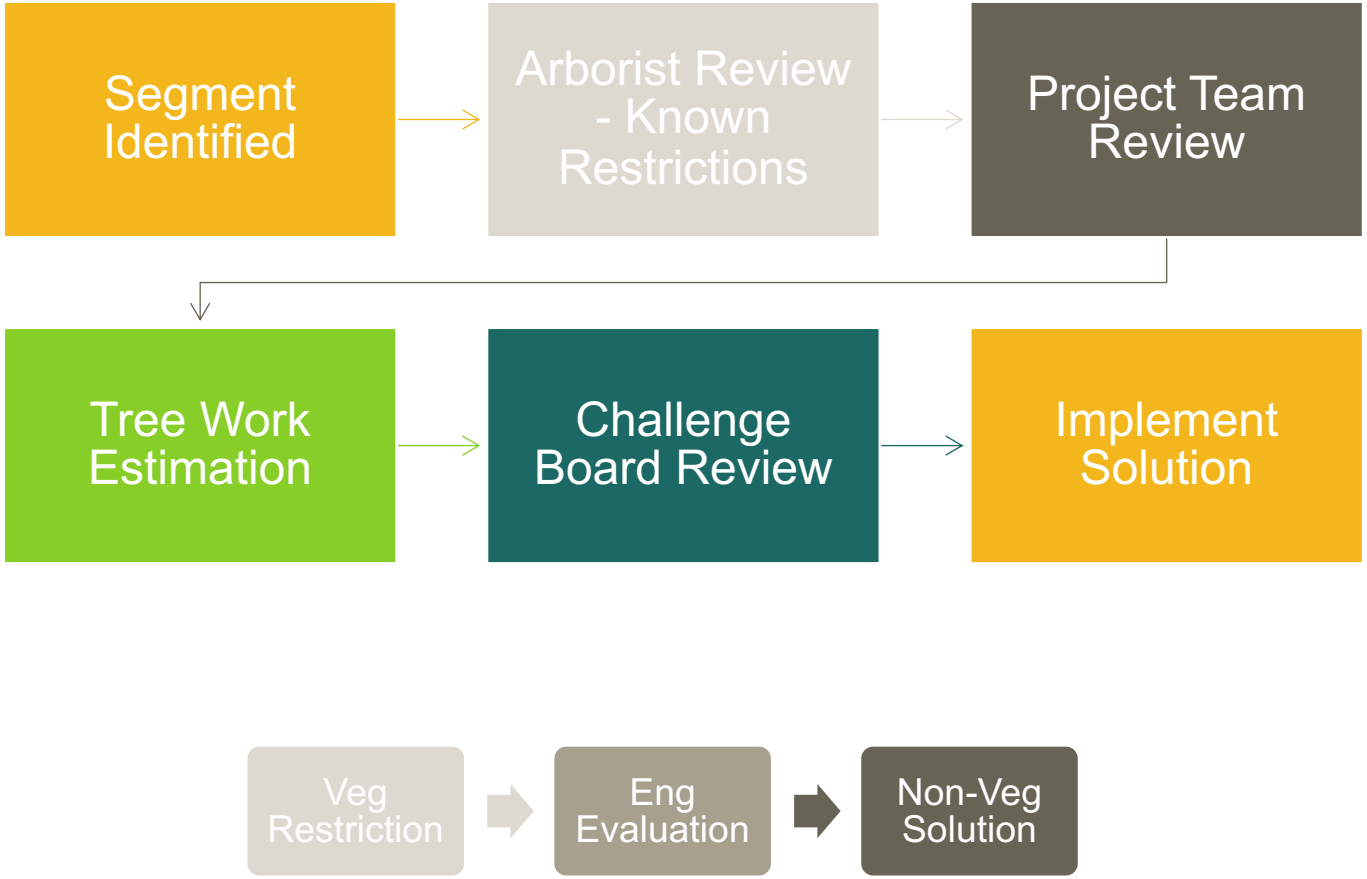
- **Engineering Options explored:**
  - Spacer cable, Tree wire
  - Reclosers, Smart fuses
  - Pole configuration
  - Circuit redundancy
  - Aerial Cable

- **Approach Options Include:**
  - Engineering only solutions
  - Vegetation Management only solutions
  - Combined Engineering and Vegetation Management solutions

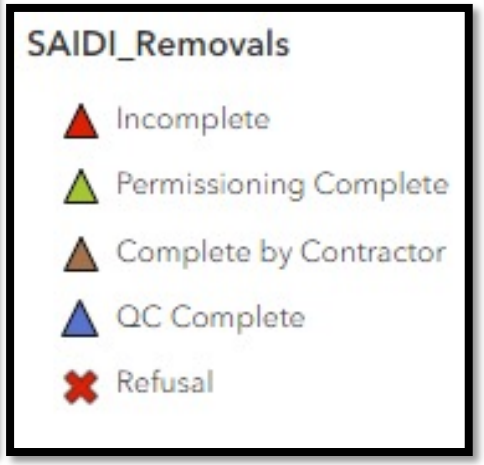
Engineering Collaboration

The Process

- **Field evaluation (joint effort)**
  - **Consider town specific challenges**
- **Identify and quantify Vegetation work**
- **Provide Veg and Engineering Proposals**
- **Data Capture**
  - **Inventory Trees – ESRI**
    - Work status
    - Permission status
  - **Dashboard for collaborative group transparency**



Tracking at the Property and Tree Level



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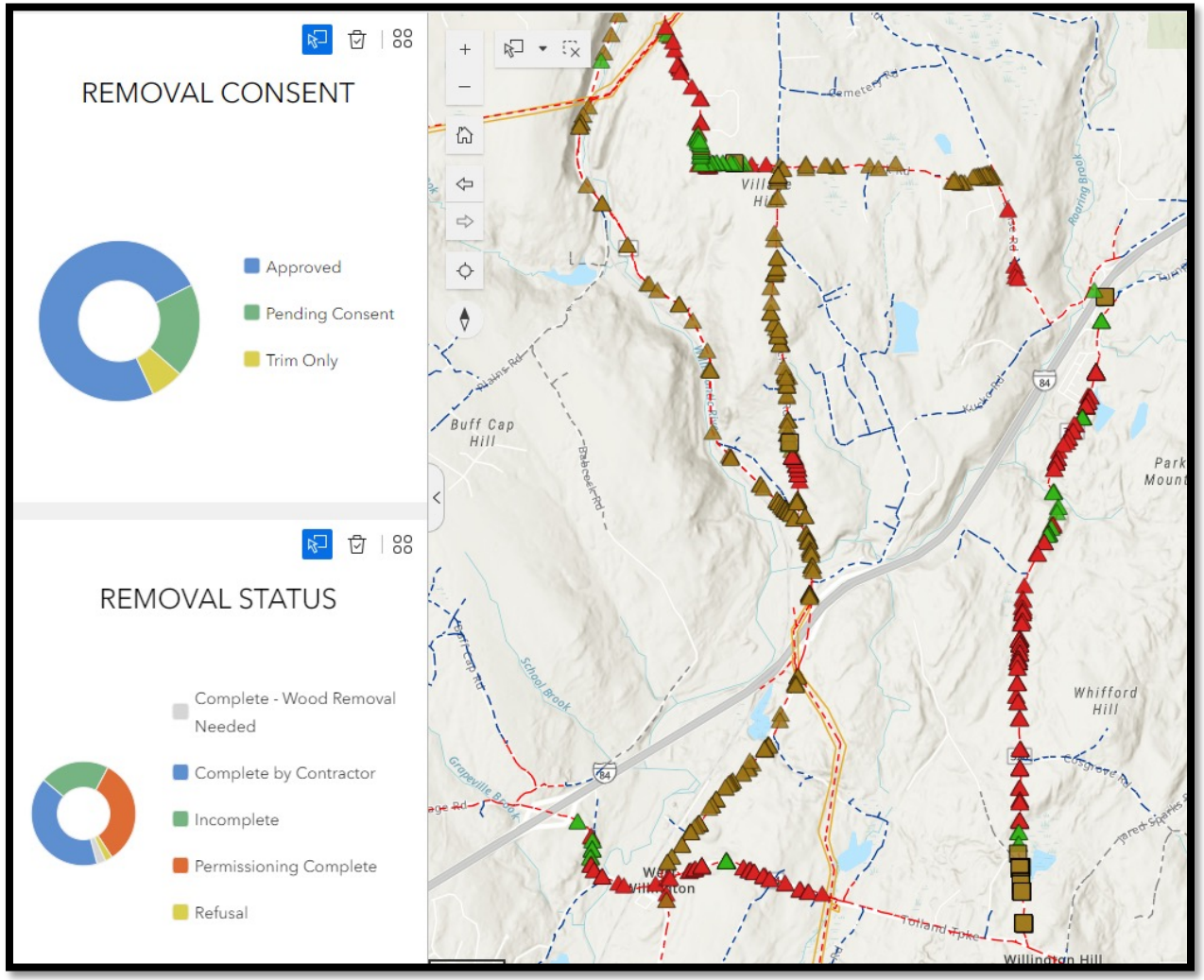
Summary Updates Live in Dashboards



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Engineering/VM Collaboration Work

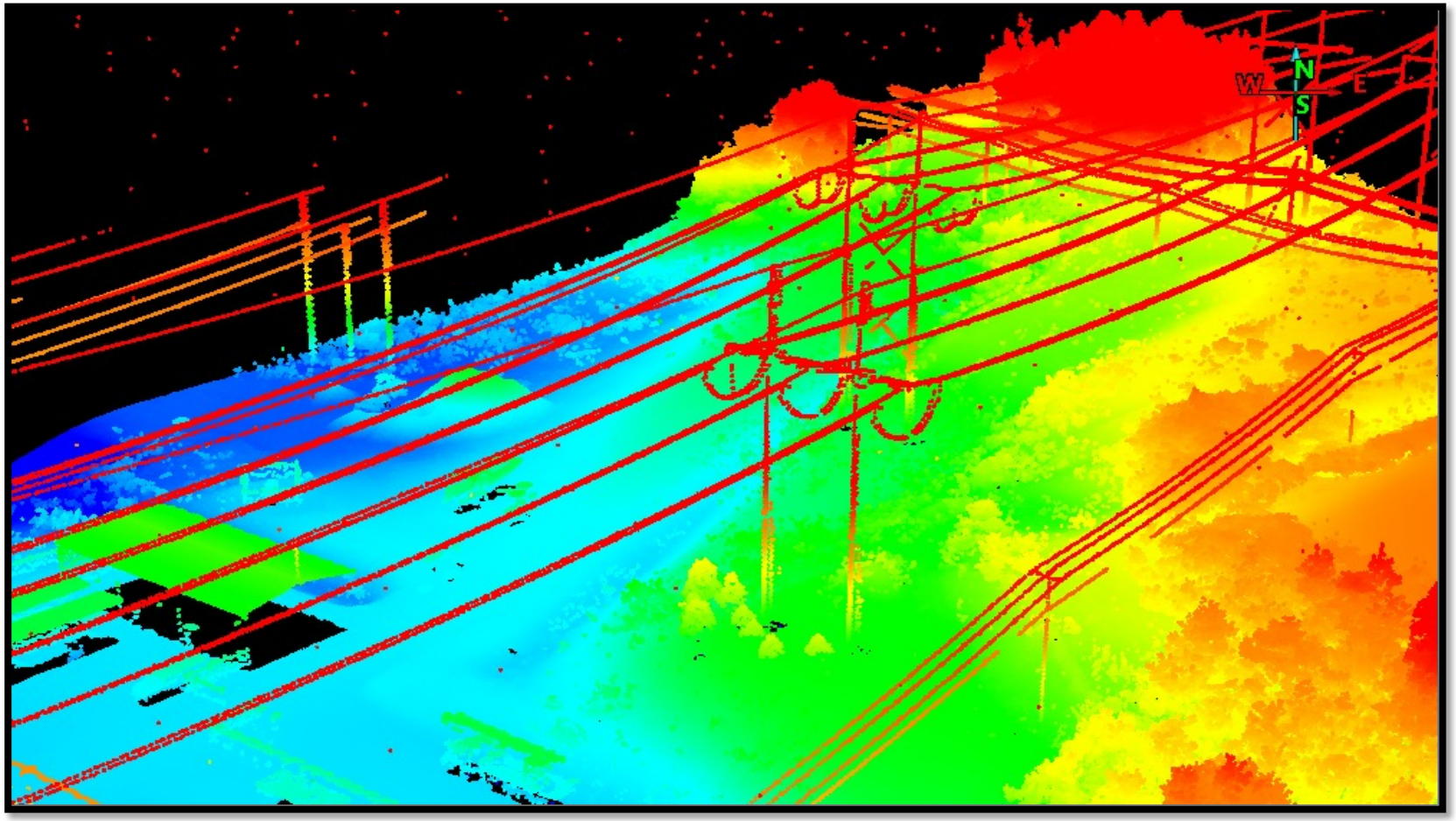
Vegetation Management Specification:

- Obtain 10’ ground-to-sky clearance
- Remove hazard & high-risk trees in fall zone

Engineering Solutions Approved:

- Reconductoring
- Install Spacer Cable/Hendrix
- Aerial Cable
- New Poles
- Install Smart Switches, Reclosers, Load Break Switches
- Build Loop Schemes with Circuit Ties and Line Extensions

Remote Sensing Collaboration



Q Reader and ArcGIS Pro

ESRI Digitization

Consider an In-House Build

- **Many utilities have existing ESRI subscriptions**
  - **See what GIS departments or support exist**
- **Benefits**
  - **Addresses hesitancy and organizational uncertainty**
    - Makes the business case for these technologies
    - Low risk environment
    - Allows for a specific vegetation management environment
  - **Change Management**
  - **Vendor justification – helped us understand what we need**

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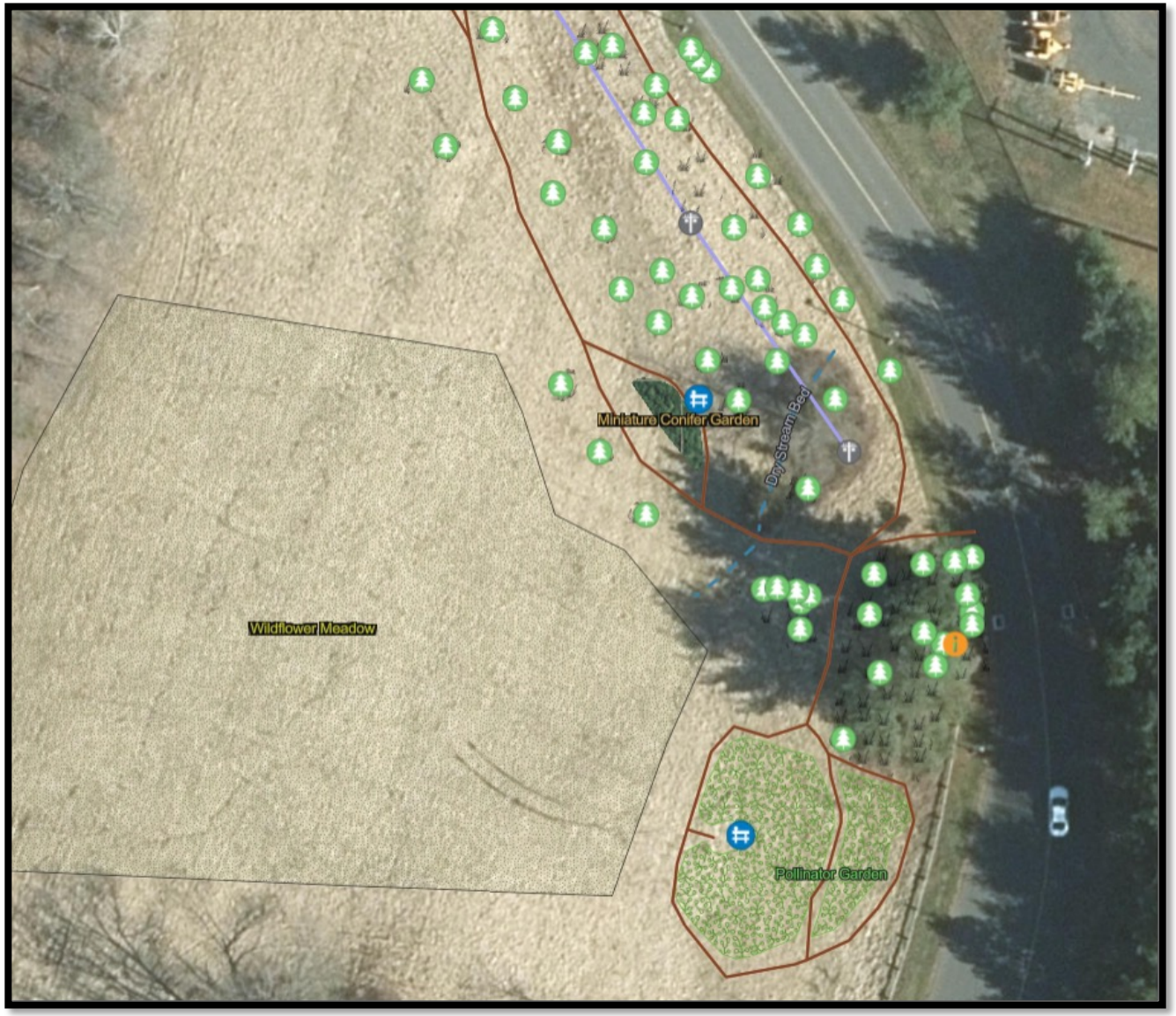

Miniature Conifer Garden
Dry Stream Bed
Wildflower Meadow
Pollinator Garden

ArcGIS StoryMaps
For organizations and GIS professionals
Transform your maps and geographic information system (GIS) work into interactive content that informs, inspires, and engages stakeholders
Sign in to ArcGIS StoryMaps

2
11
13
20
22
44
58
56
38
104
Miniature Conifer Garden
84
85
Wildflower Meadow
Pollinator Garden

2
Eupatorium maculatum
'Gateway'
Joe Pye Weed is a native to the eastern North America, thriving in damp meadows and coastal areas. It is loved by many for its large, densely packed pink flowers atop of reddish-purple stems. The flowers become extremely attractive in midsummer to fall, while retaining the seed heads throughout the winter, providing a food source for the birds. This plant is low maintenance, very adaptable and is perfect for creating borders, wild gardens, or a background plant! This plant is a

Residential / ... / Transmission System Vegetation Management / Transmission Vegetation Management Projects

Transmission Vegetation Management Projects

We perform vegetation maintenance in and along transmission right-of-way corridors in New England.

We maintain vegetation in and along more than 2,300 miles of transmission right-of-way corridors through Connecticut, Massachusetts and New Hampshire.

Each year we maintain about 25% of the rights of way by:

- Performing integrated vegetation management to maintain the cleared right of way
- Trimming branches growing into the right of way towards the lines
- Assessing and removing hazard trees from outside the maintained right of way or outside the easement
- Performing ground and helicopter patrols to identify risks

We perform this work to prevent trees and non-compatible vegetation from growing too close to lines. All work is performed in accordance with specifications conforming to utility industry best practices and compliance with federal management standards.

See the major projects in your state

Connecticut

Massachusetts

New Hampshire

Bloomfield to Hartford (CT-11) - Vegetation Maintenance

Maintaining the existing cleared areas from Bloomfield to Hartford.

Why Are We Doing This Project?

Vegetation near or that can fall on high-voltage lines can cause safety issues and power outages for thousands of customers.

To improve system performance, especially during severe weather events, arborists evaluate each right-of-way project prescribing utility vegetation best management practices.

To sustain the reliability of the transmission system, we will be working in the right of way corridor to ensure compliance with company vegetation maintenance specifications. This work is done on a cyclical basis to address the incompatible woody vegetation that has grown since maintenance was last conducted in the rights of way.

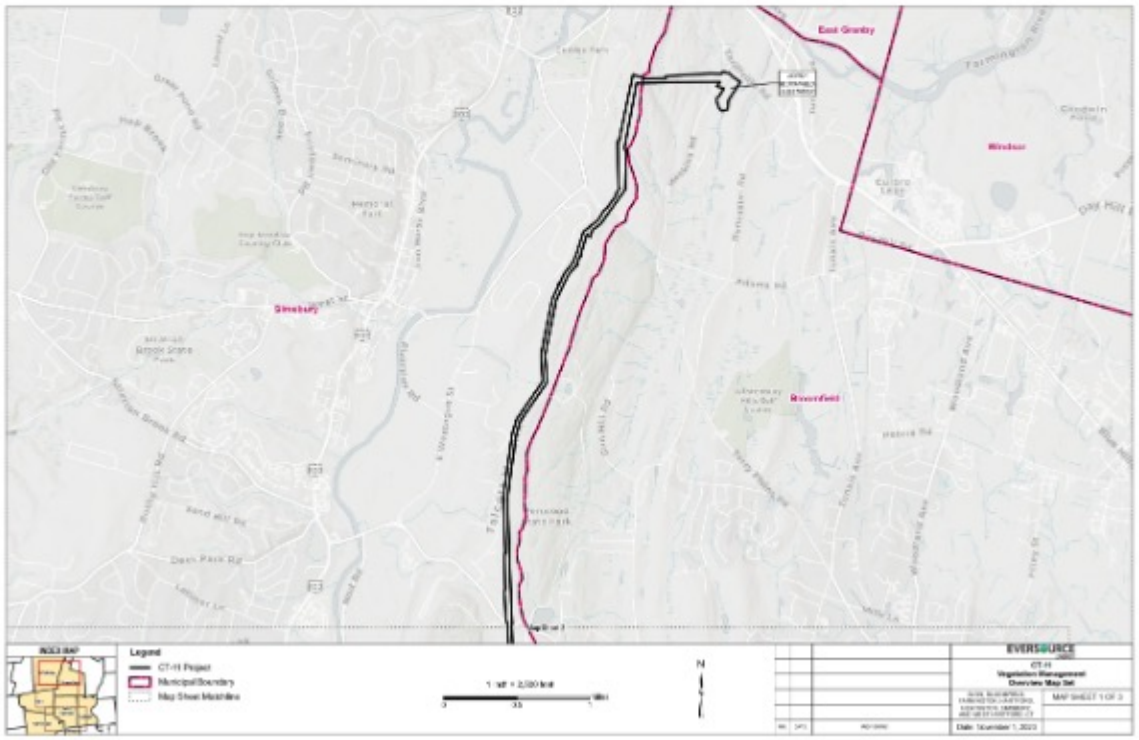
The vegetation management work may include:

- Clearing of incompatible trees and/or removal of branches that are encroaching into the right of way.
- Removing tall-growing tree species that are incompatible with the transmission system, using manual climbing crew or mechanical tree-harvesting equipment, and tree-chipping machinery.
- Removal of vegetation within the cleared areas of the right of way, through cutting and/or mowing.

Where Is The Work Being Done?

We'll be maintaining the existing cleared areas from Bloomfield to Hartford, with work crossing the following towns: Avon, Bloomfield, Farmington, Hartford, Newington, Simsbury and West Hartford.

Please see project maps below for details. Click maps to enlarge.



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Transmission Public Maps

- Redacted public maps readily available
- Powerful tool for field workers interfacing with customers
- Builds trust
- Makes outreach materials shorter and cleaner

Questions?