



Implementing GPS to Enhance GIS at Unitil

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Welcome

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Presentation Overview

- ☪ Unitil Company Overview
- ☪ Overview of Unitil GIS
- ☪ Unitil GIS Facility Data
- ☪ Emergence of GPS at Unitil
- ☪ Transition to Current GPS Program
- ☪ Assessment of Program
- ☪ GPS/GIS Integration

Unitil Company Overview



Unitil Company Overview

Primary Lines of Business

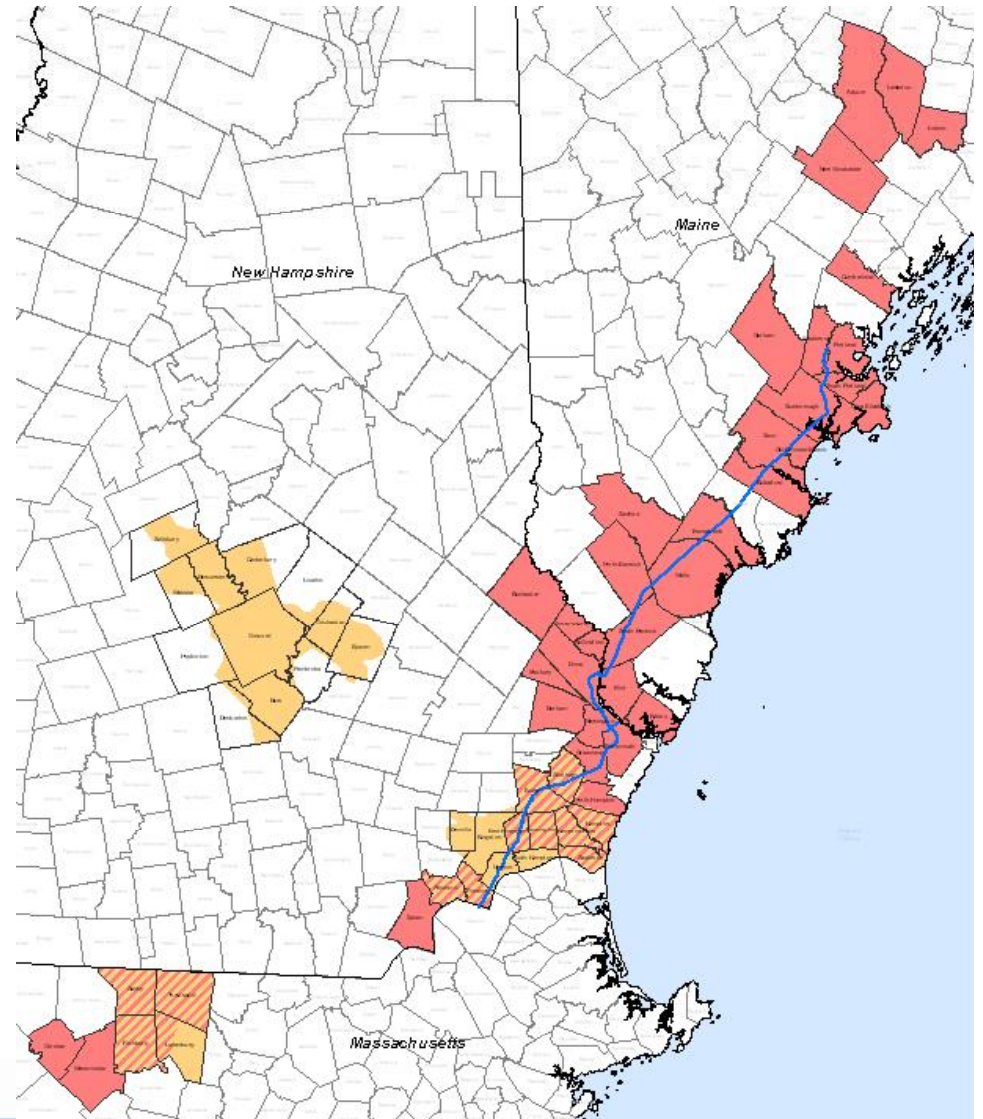
- **Natural Gas Distribution**
- **Distribution of Electricity**
- **Interstate Gas Transmission**



Unitil Company Overview

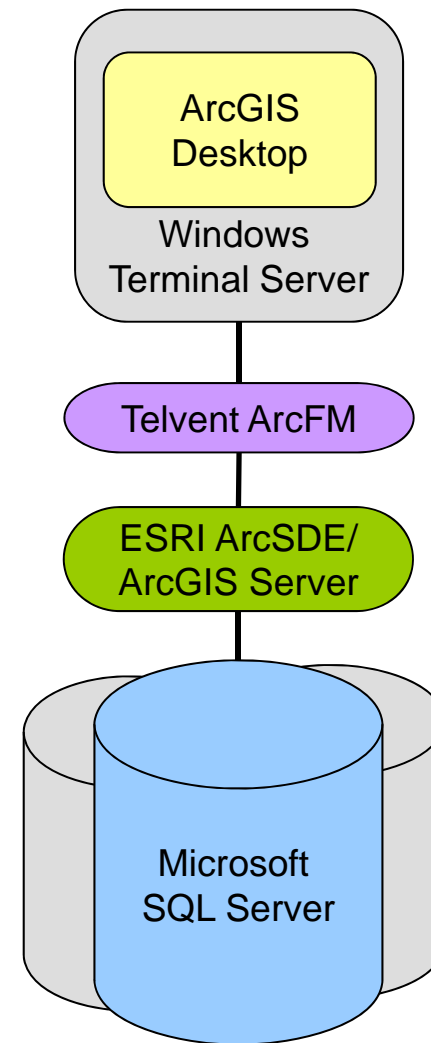
Public Utility Holding Company

- Unitil Energy Systems (NH)
 - 29,600 (E) Capital
 - 44,300 (E) Seacoast
- Fitchburg Gas & Electric Light Company (MA)
 - 28,500 (E)
 - 15,120 (G)
- Northern Utilities (NH and ME)
 - 54,200 (G)
- Granite State Gas Transmission
 - 87 miles of Interstate Pipeline



Unitil GIS – Technology

- ☼ ArcGIS Desktop clients
 - ArcReader field solution
- ☼ Proprietary GIS formats: ESRI ArcSDE and Telvent ArcFM Environment
 - Designer / Session Manager
- ☼ Simultaneous, multi-user editing through versioning
- ☼ Enterprise GIS repository based on Microsoft SQL Server RDBMS



Unitil GIS – Users

- ☀ Core Editors: (ArcGIS Desktop)
 - GIS Group
 - IS Administrator
 - Electric Operations
 - Electric Engineering

- ☀ Active Users: (ArcReader)
 - Dispatch (Desktop)
 - Gas Field Operations
 - New Business
 - Gas Construction

- ☀ Casual Users: (ArcReader)
 - All Employees

Current GIS Projects

Gas

- Gas Expansion Initiative
- Emergency Preparedness
- GIS Data Modernization Project
- DIMP & IMP

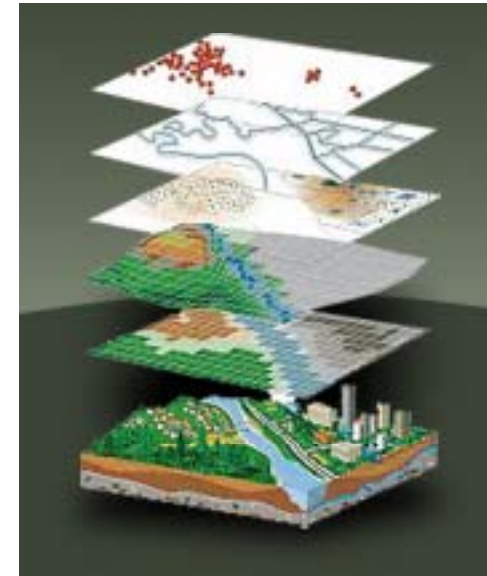
Electric

- Tree Trimming
- Emergency Preparedness
- Customer Connectivity
- Outage Management System
- AMI

Unitil GIS Facility Data

Developed from a variety of basemap sources:

- Electric:
 - MA FGE: GPS Pole Survey
 - NH Capital: Flyover
 - NH Seacoast: USGS
- Gas:
 - MA FGE: Muni Data / USGS
 - NH: Aerial Imagery / State Data
 - ME: Aerial Imagery / Muni Data

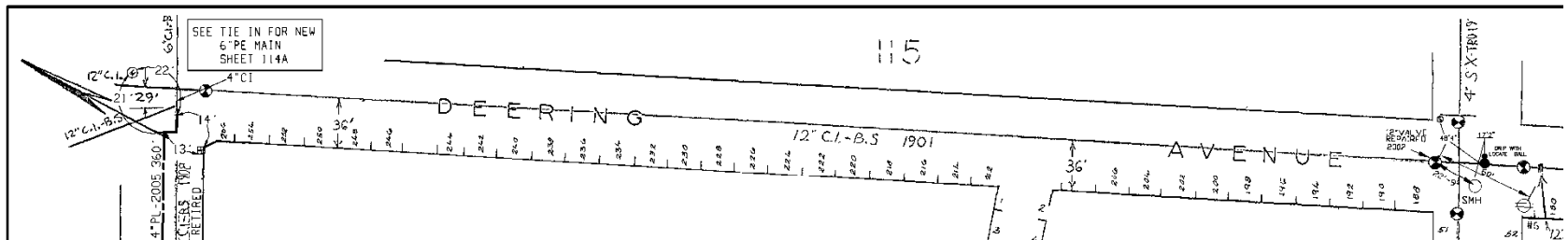


Maine Gas GIS:

- Robust landbase acquired from municipalities
- GPS data to reinforce positional accuracy of source data

Before GPS

- ☀ Raster maps were used and only relative accuracy was considered
- ☀ Paper records were relied upon which degrade over time
- ☀ GPS had been periodically investigated over the past dozen years



Goals of GPS

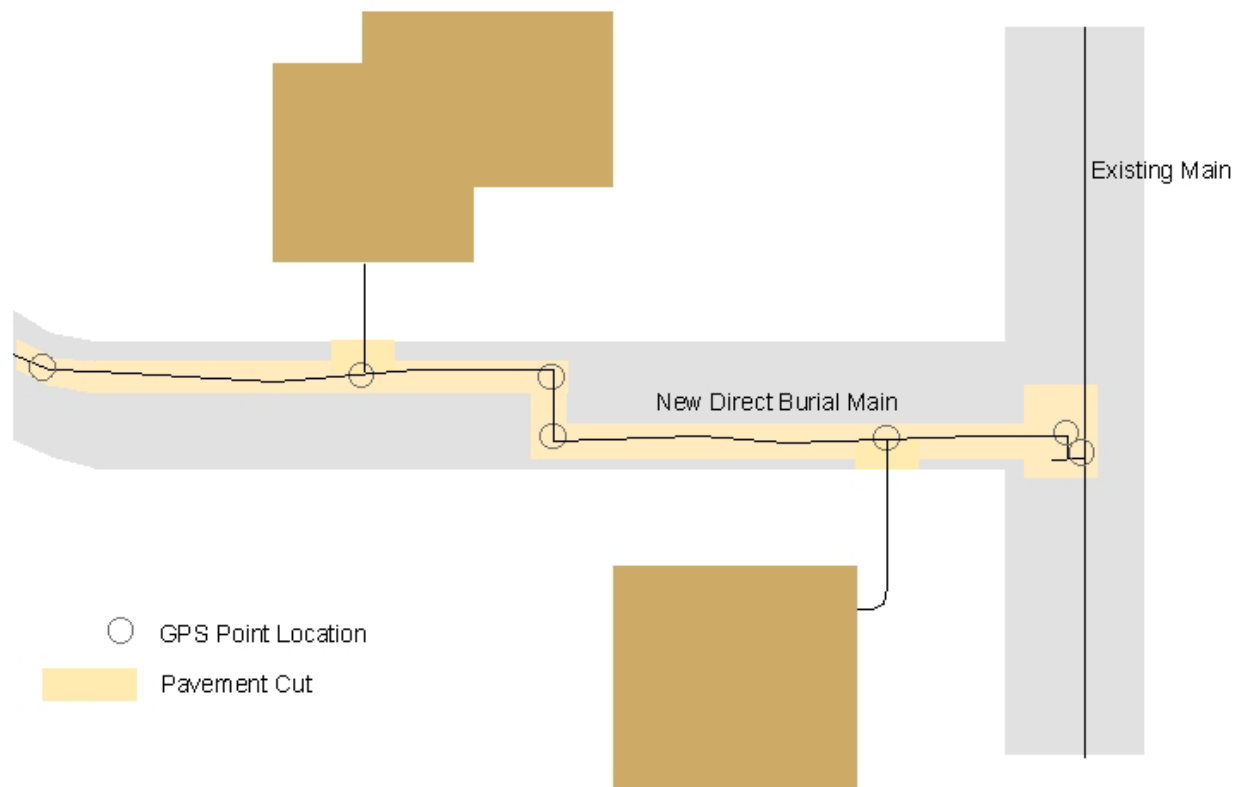
- 🌀 Collect spatially accurate data at strategic points of gas facilities
- 🌀 Desired accuracy based off Chapter 895 DigSafe tolerance zone
- 🌀 Retain old methods of data collection



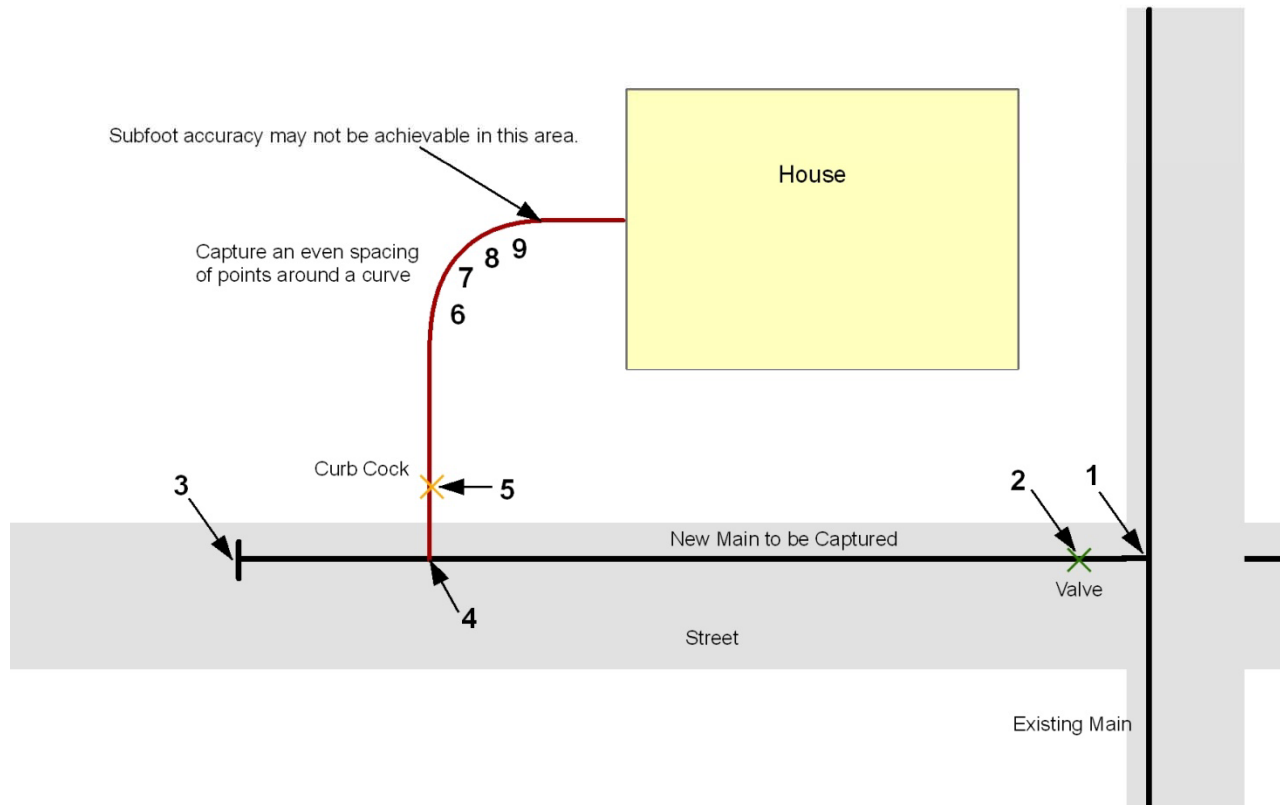
Taking the Plunge

- ☼ No precedent to model from in gas distribution industry
- ☼ Program commenced in spring of 2008
- ☼ GPS was contracted out to Oest Associates for quick start up
- ☼ Difficult to coordinate
- ☼ 5000 points acquired in 2 years

Capturing a Gas Main



Capturing a Gas Service



Taking a Step Forward

- ☀ Buyout of NU by Unitil proved to be a benefit for program
- ☀ Management budgeted to bring GPS in house, and to construction contractor crews for all 3 states
- ☀ Better prepared to meet recent State and Federal Regulations

Current GPS Program

- ☀ Two entities: Unitil field maintenance crews and construction contractors
- ☀ Both groups use Trimble products: GeoXH, ProXRT, TerraSync and Pathfinder Office
- ☀ All data flows to one GPS administrator for review and warehousing

Contractor Crews

- ☼ Responsible for the installation of gas mains and services
- ☼ Data downloaded to state supervisors
- ☼ Post processing occurs at contractor office
- ☼ Data sent to Unitil as a shapefile
- ☼ Quick delivery to meet DigSafe Buffer guidelines

FID	Shape *	CWO_Number	Gas_Line_T	Gas_Featur	GPS_Point	GPS_User	Address	Comment	GPS_Date	GPS_Time	Unfit_Pos	Horz_Prec	Latitude	Longitude
15	Point	0228 1881	Gas Service	Tee	Exposed Main	Robichaud	40 belmont street		7/8/2010	12:33:04pm	31	17.9	43.668979876	-70.279314222
16	Point	0228 1881	Distribution Main	Valve	Exposed Main	Robichaud	belmont street	stub ricker park	7/8/2010	12:34:24pm	57	9.3	43.669134965	-70.278998126
17	Point	0228 1881	Distribution Main	Tee	Exposed Main	Robichaud	belmont street	stub ricker park	7/8/2010	12:35:50pm	46	5.1	43.669154889	-70.279022548
18	Point	0228 1881	Distribution Main	End Cap	Exposed Main	Robichaud	belmont st		7/7/2010	04:07:08pm	42	20.3	43.669581630	-70.276276557

Record: 1 | Show: All Selected | Records (1 out of 2021 Selected) | Options

Unitil Field Crews

- ☼ Responsible for leak repairs, leak surveying and general gas system maintenance
- ☼ Take GPS shots when main is exposed
- ☼ Points are downloaded via central laptop (non-network) at each operation center
- ☼ MyDropBox application allows access to laptops by administrator
- ☼ Points are post processed, and leak data sent on to compliance management system and stored in GIS

Keys to Success

- ☉ Thorough training
- ☉ Targeted data dictionaries
- ☉ Password protection settings on GPS units
- ☉ Efficient delivery of points
- ☉ Proper file management

The screenshot displays the TerraSync mobile application interface. At the top, the status bar shows the time as 8:27 and a battery icon. Below the status bar, there is a navigation bar with a 'Data' dropdown menu, a signal strength indicator, a battery level indicator, and a '0' next to a circular icon. The main interface features a 'Collect' dropdown menu, an 'Options' dropdown menu, and a 'Pause' button with a double vertical bar icon. Below this, there is a section titled '1 Other Gas Work' with a red square icon, an 'OK' button, and a 'Cancel' button. The form fields include: 'CWO Number::' with an empty text input field; 'Gas Line Type:' with a dropdown menu; 'Gas Job Type:' with a dropdown menu; '*Gas Feature Type:' with a dropdown menu; and 'Address:' with an empty text input field. At the bottom of the screen, there is a navigation bar with 'OK', a keyboard icon, and 'Pause' buttons.

Limitations

- 🌀 Technological solution for non technical workforce
- 🌀 Extra layer of work – implement into workflow
- 🌀 Best suited as a supplemental solution
- 🌀 Non network field laptops
- 🌀 Hardware upkeep
- 🌀 Limited amount of time to capture point – no mission planning

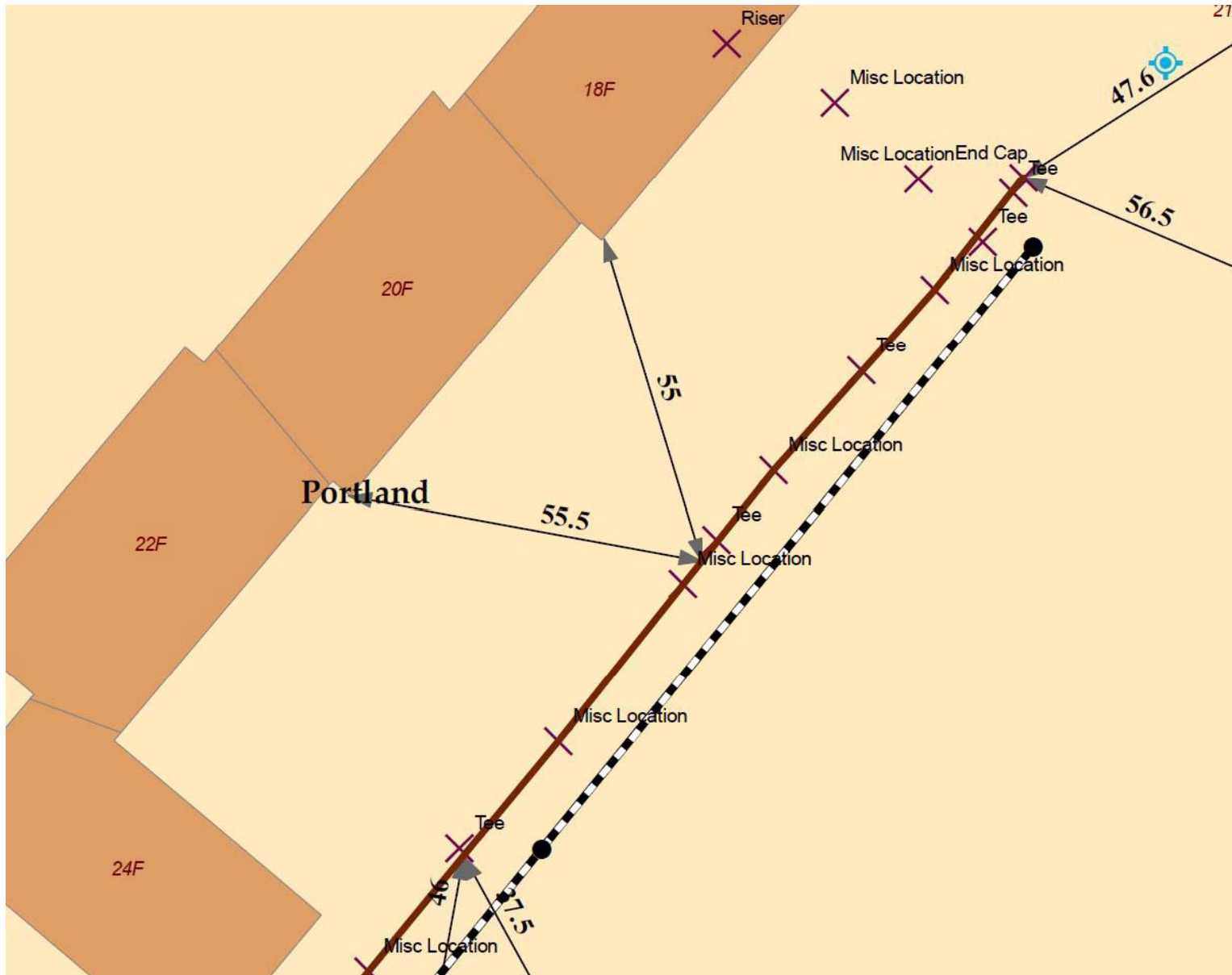
Future of GPS

- ☼ Effectiveness will increase with new GPS technologies
- ☼ DIMP rules may require facility manufacturing data. GPS can leverage barcode scanning
- ☼ Leak survey GPS solution to route surveyors and take shots when gas detected
- ☼ GPS may be used to assist dispatchers
- ☼ Once enough data has been accumulated, GPS can be used as a locating tool

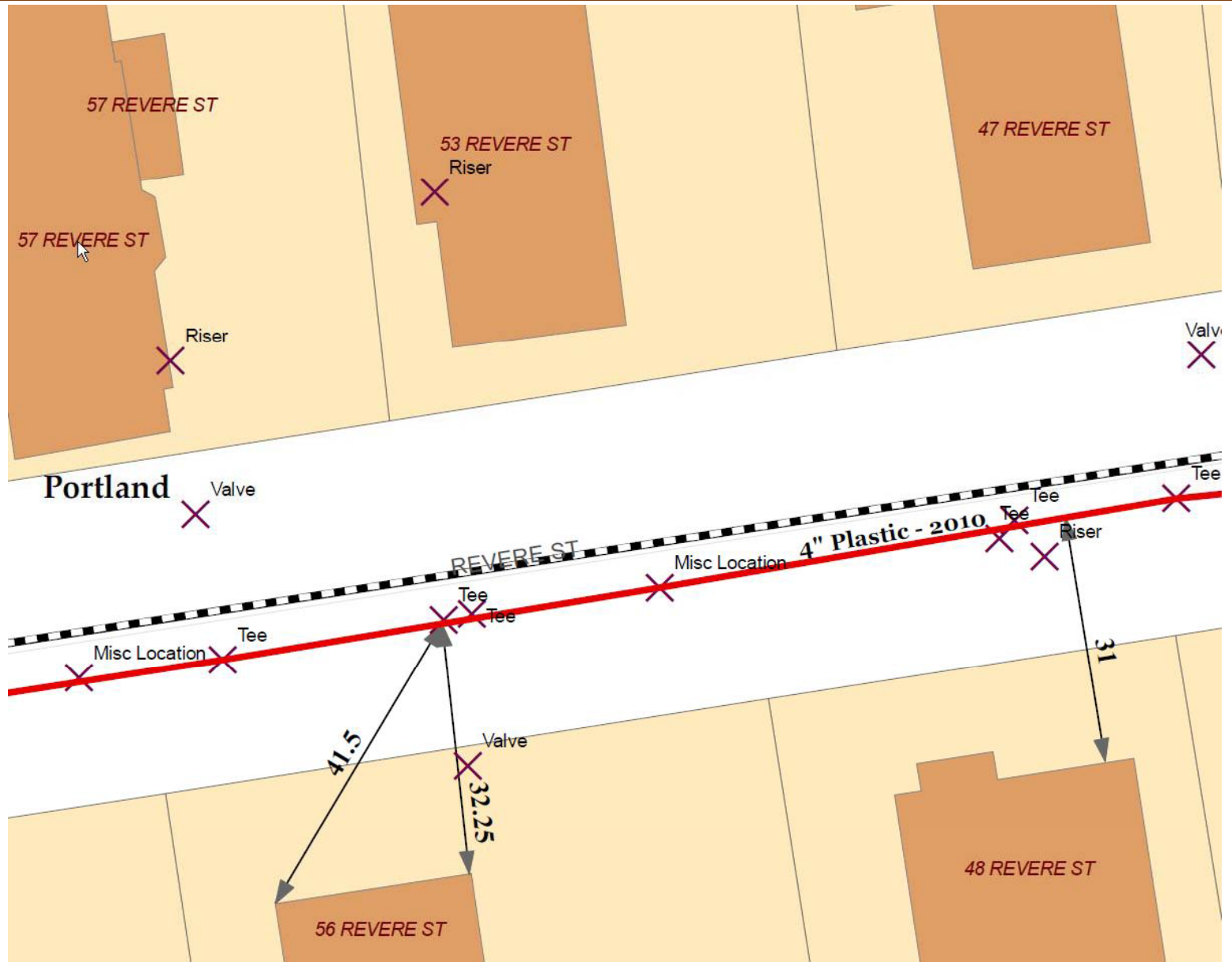
Unitil GIS – Maine Gas Data



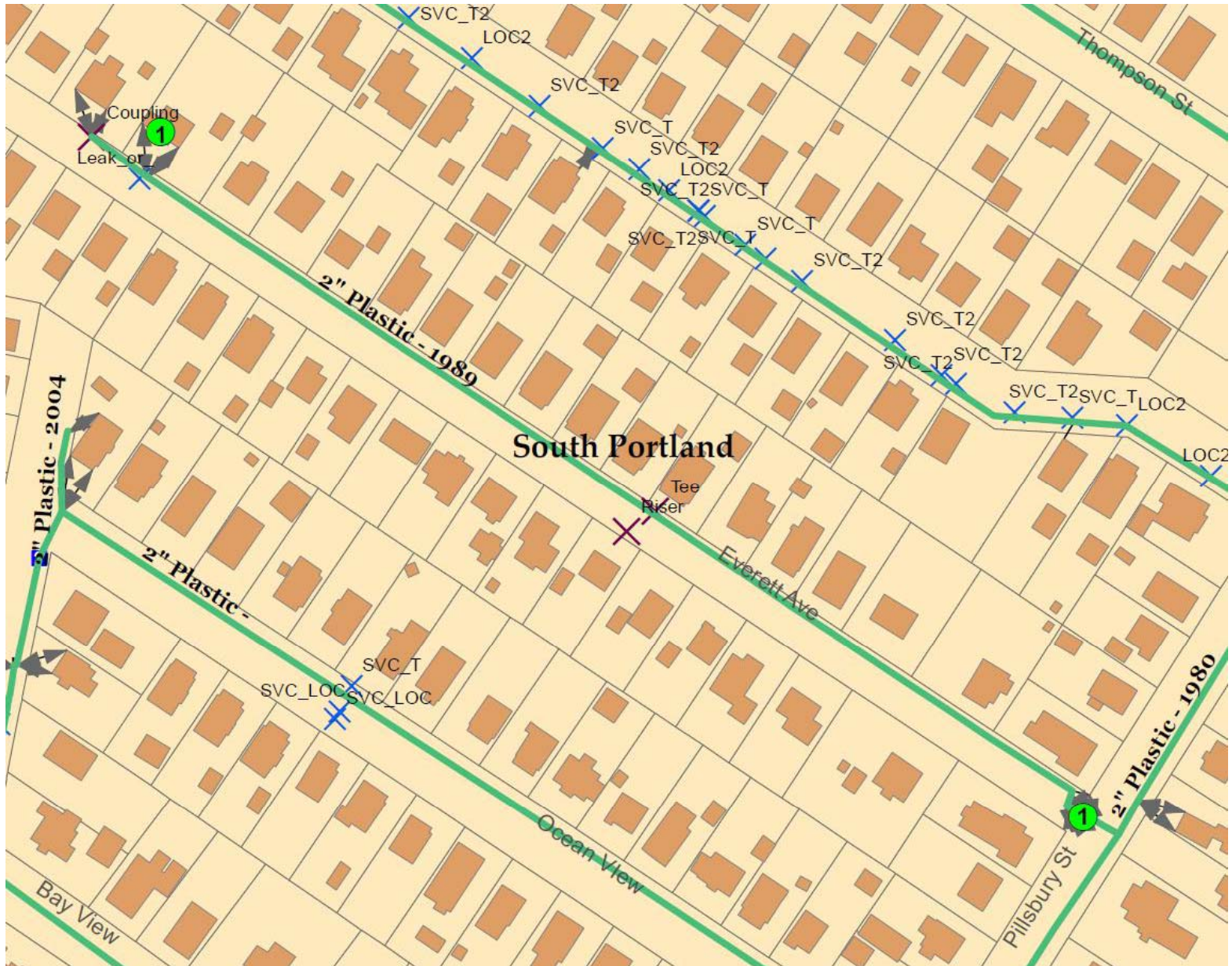
Unitil GIS – Maine Gas GPS – Main Locations



Unitil GIS – Maine Gas GPS – Main Locations



Unitil GIS – Maine Gas GPS – Leak Locations



Summary

- ☼ Unitil has invested considerable time & capital in geospatial solutions
- ☼ GIS is the central data source for many essential company systems
- ☼ GIS is only as good as its source data
- ☼ GPS program is ideal application for providing highly accurate source data
- ☼ Unitil's progressive management approach will aim to move technological solutions forward



Thank You.

Questions?