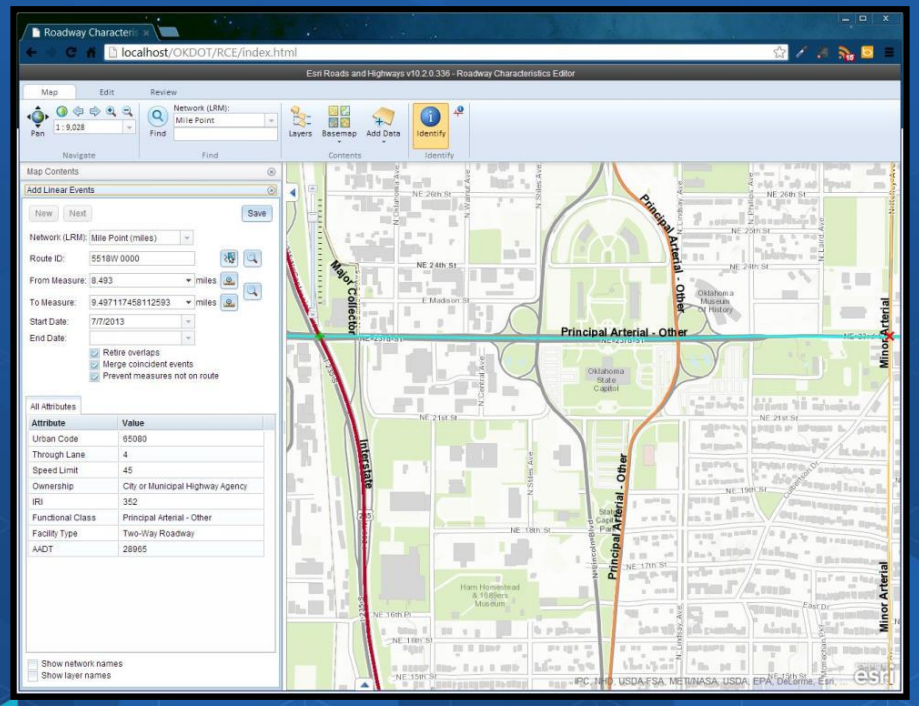
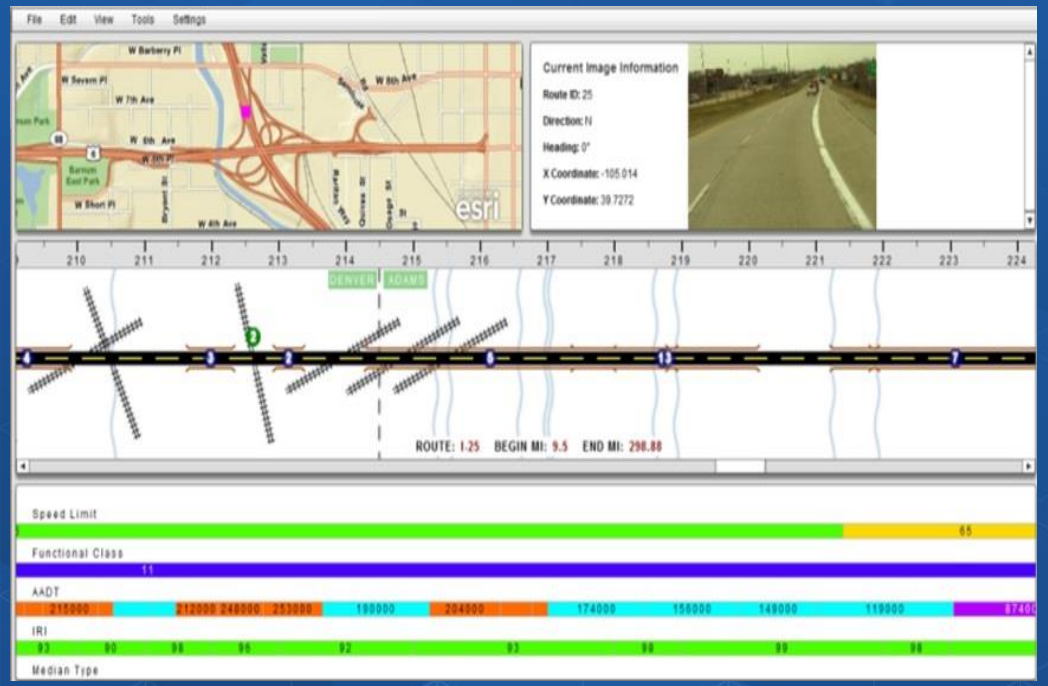
All Roads Network with Roads and Highways



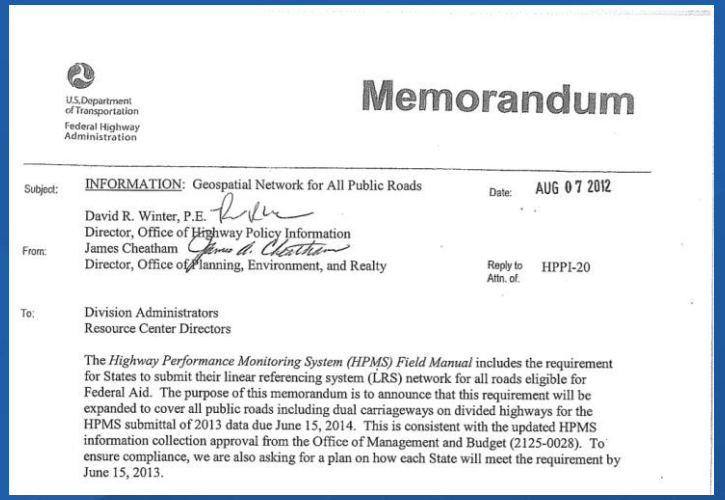


Terry Bills, Gary Waters Esri

Sheila Steffenson, Michael Martin 1 Spatial

All Roads Network (Arnold)

- MAP-21 Requirement for HSIP to Cover all Public Roads (June 2012)
- August 7th, 2012 Announcement of Arnold, required HPMS to be submitted as part of the All Roads Geospatial Network, including LRS
- Left to Each State to Determine Best Method for Collecting / Assembling Data
- ARNOLD Peer Exchange in June, 2016, Kansas City



U.S. Department of Transportation
Federal Highway Administration

Memorandum

Subject: INFORMATION: Geospatial Network for All Public Roads

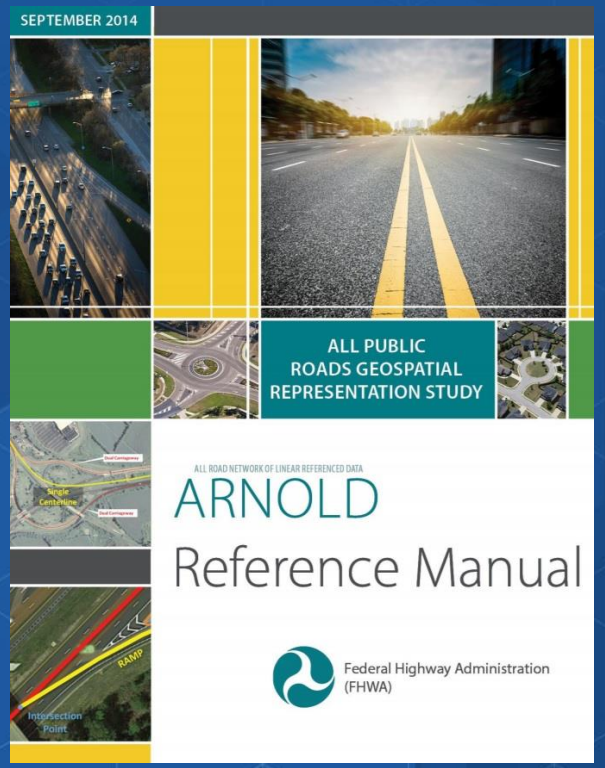
Date: AUG 07 2012

From: David R. Winter, P.E.
Director, Office of Highway Policy Information
James Cheatham
Director, Office of Planning, Environment, and Realty

Reply to Attn. of: HPPI-20

To: Division Administrators
Resource Center Directors

The *Highway Performance Monitoring System (HPMS) Field Manual* includes the requirement for States to submit their linear referencing system (LRS) network for all roads eligible for Federal Aid. The purpose of this memorandum is to announce that this requirement will be expanded to cover all public roads including dual carriageways on divided highways for the HPMS submittal of 2013 data due June 15, 2014. This is consistent with the updated HPMS information collection approval from the Office of Management and Budget (2125-0028). To ensure compliance, we are also asking for a plan on how each State will meet the requirement by June 15, 2013.



Roads and Highways

- Designed to Help DOTs Manage Multiple Linear Referencing Methods / Systems
- Integrates Data from Multiple Business Systems
- Web Based Editing and Collaboration Tools
- Similar to Other Workflows We See: MPO Collaboration; County and Multiple City Collaboration

Smart GIS Enables New Types of Collaboration

Connecting Individuals, Organizations and Communities

Individuals

Breaking Down Barriers

Organizations

Sharing Geographic Knowledge

Web GIS

Networks of Organizations

Meeting ARNOLD (All Roads) Requirements

Tools and solutions to provide a collaborative environment to create and sustain a comprehensive highly functional all public roads network

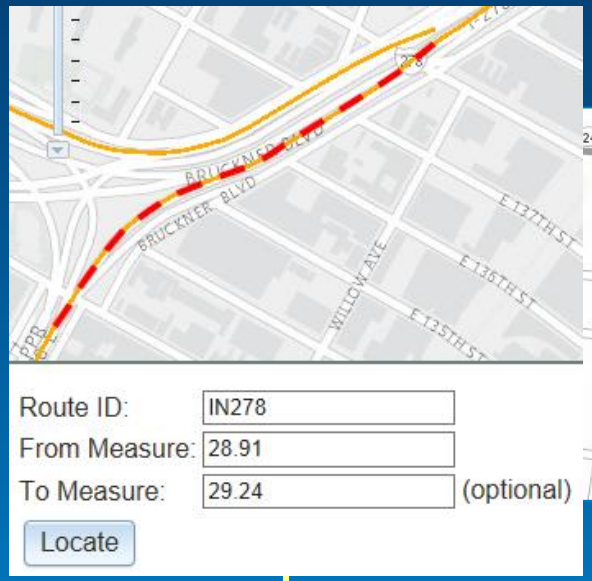
esri

Transportation Practice

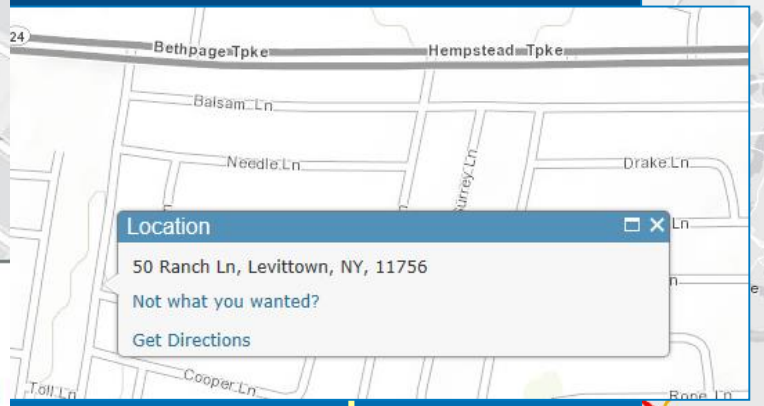
Creating one, unified road network to support a variety of needs

Managing address & other road data through a linear referencing system (LRS) foundation vs. features

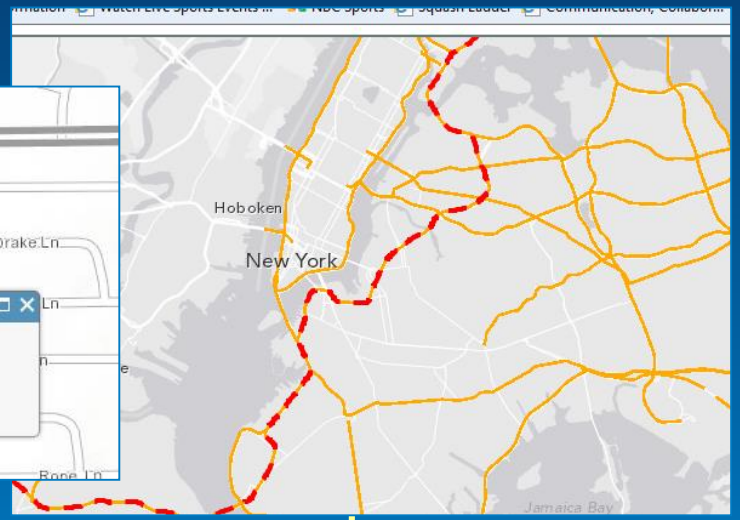
LRSable



Geocodable



Routable



Roads & Highways Data Model

Route
Route definitions

Calibration points
Point feature class that stores route measures

Centerline sequence
Key table for M-N relationship between Centerline and Route

Centerline
Line feature class that stores route geometry

LRS Foundation

How do we get there?

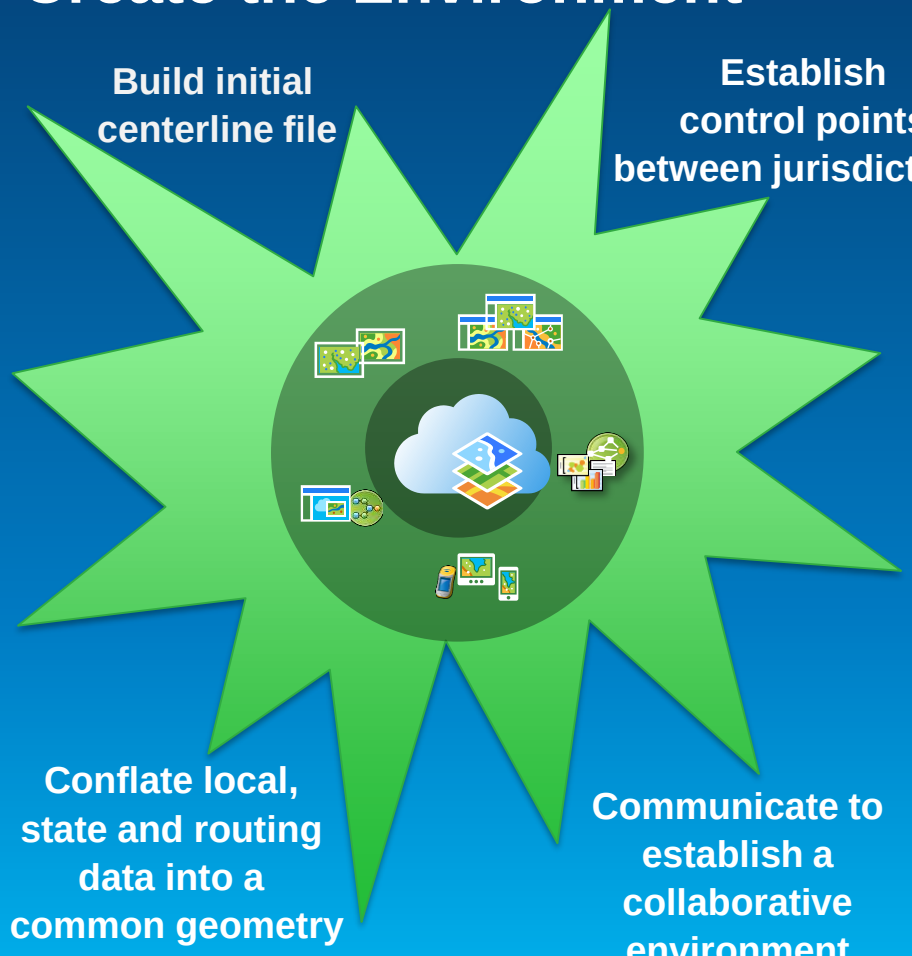
Simplicity is key

- Find data models, tools, best practices and processes that support the LRSable, geocodable, routable, sustainable State-wide centerline file
- Agree on road network geometry across local and State jurisdictions
  - Create edge matching points
  - Combine LRS, address and routing data
- Recognize the varying levels of technology at collaborating agencies
- Establish collaborative, sustainment processes
- Provide benefits to Local, State, Regional and Federal agencies

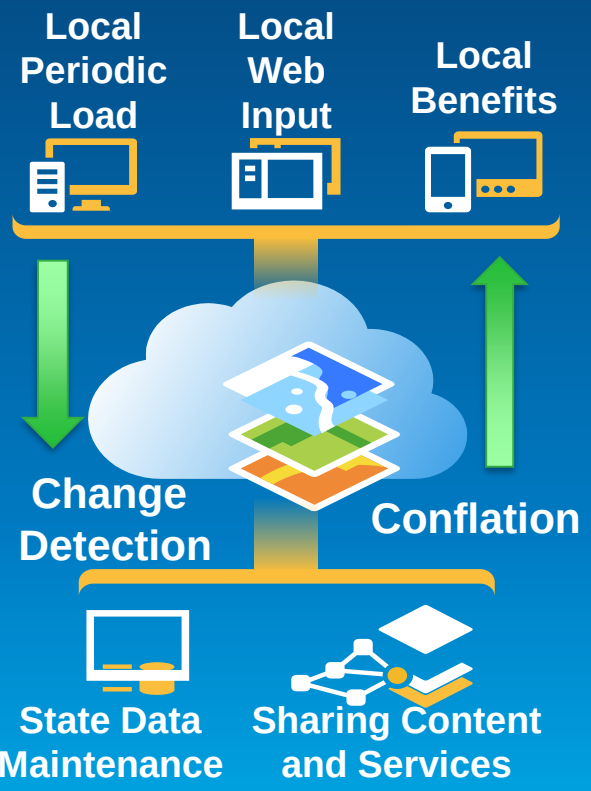
What does the solution look like?

Create, sustain, collaborate and share

Create the Environment



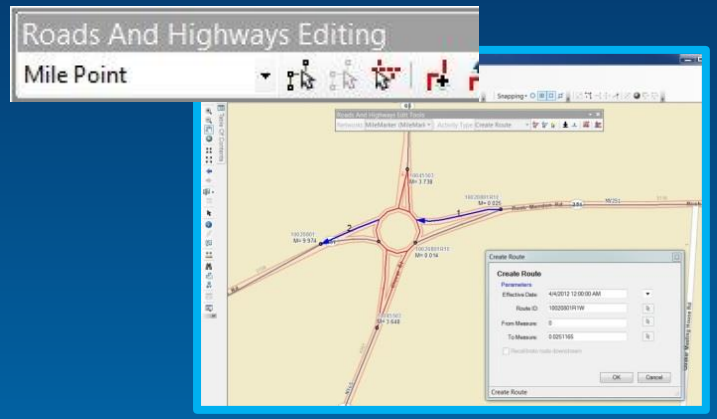
Sustain the Environment



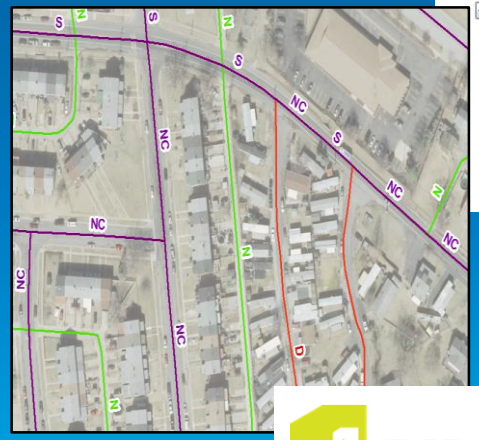
Providing a State-wide, collaborative system that has benefits for all…

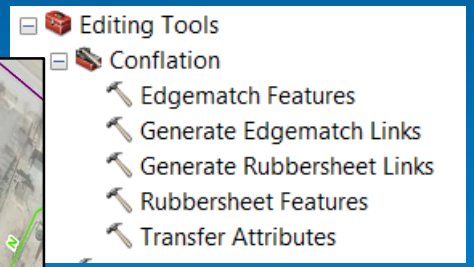
Technical solutions to support collaboration & sustainment

Configurable solutions for street data management, visualization and analysis



Linear Referencing System (LRS) Focused product: Roads and Highways





More sophisticated conflation & change detection tools

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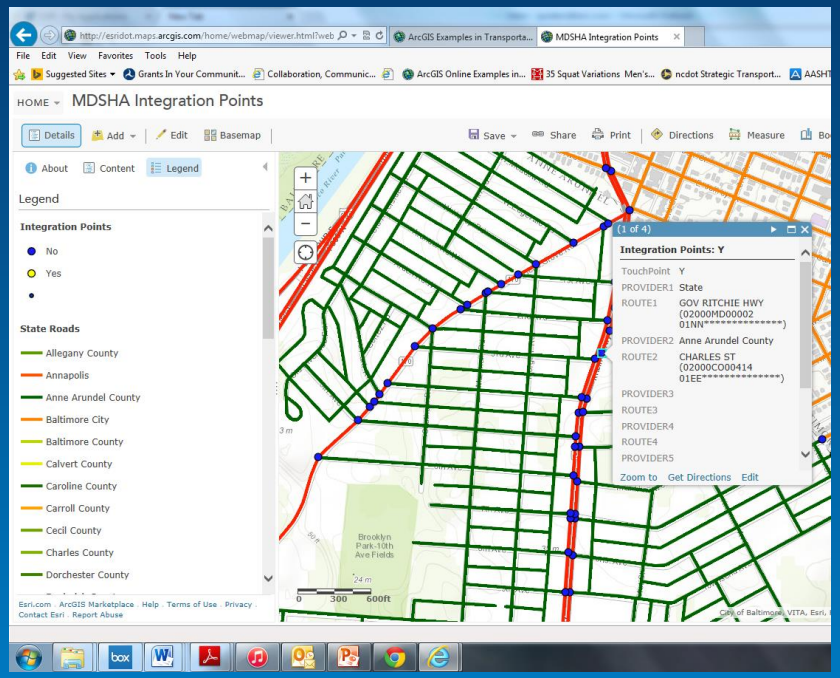
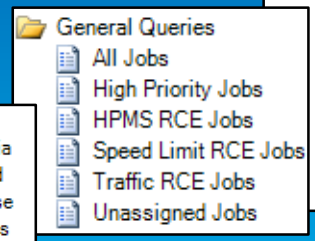
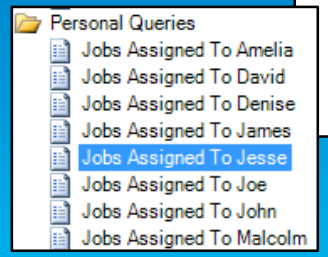
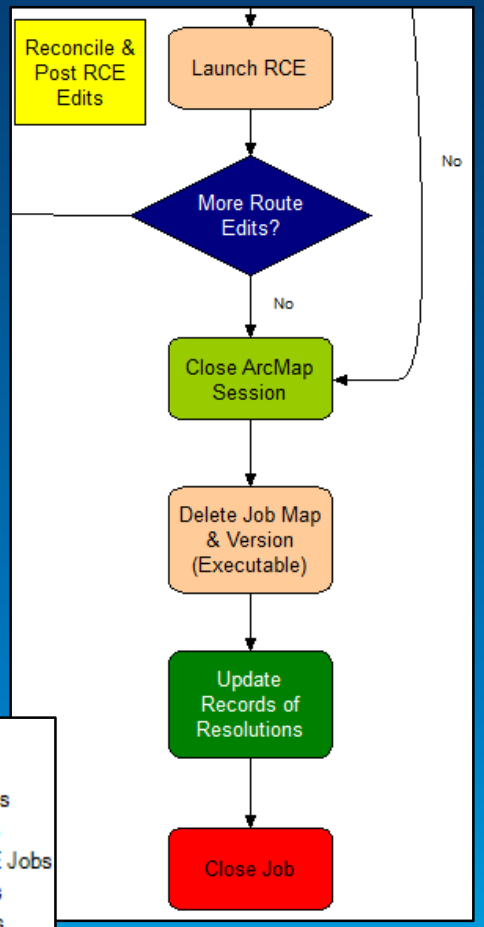


Collaborative jurisdictional edge matching environment



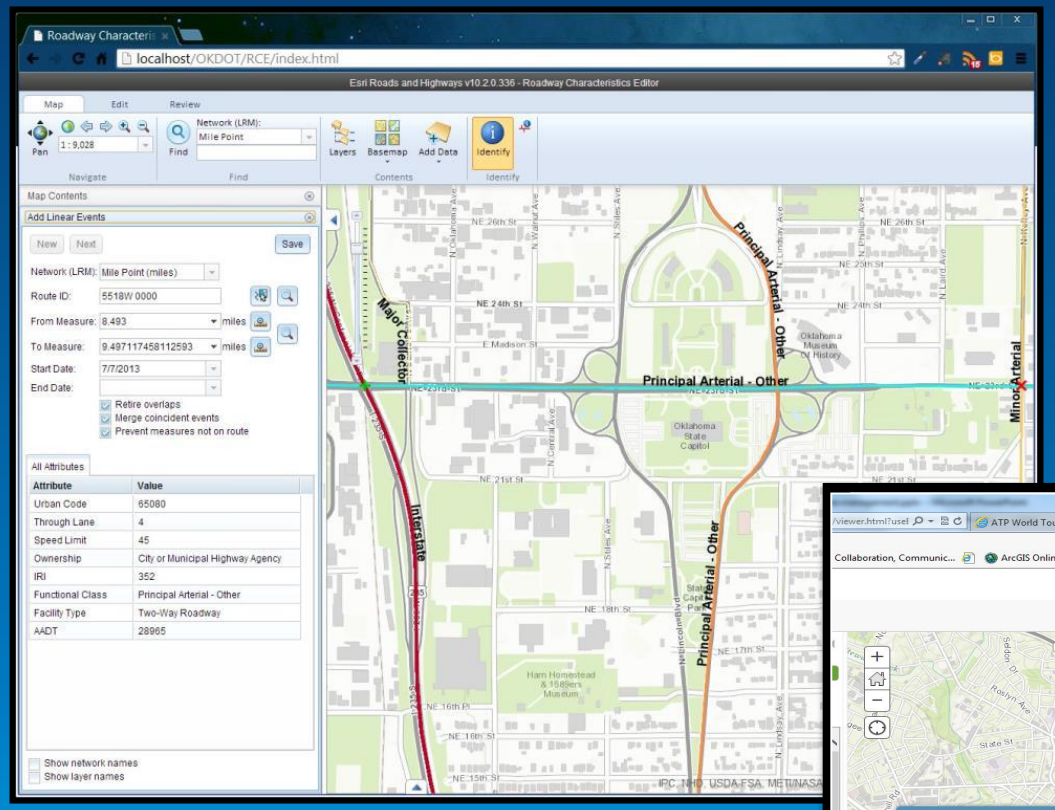




Workflow Manager tools to orchestrate the flow of data, processes and automation

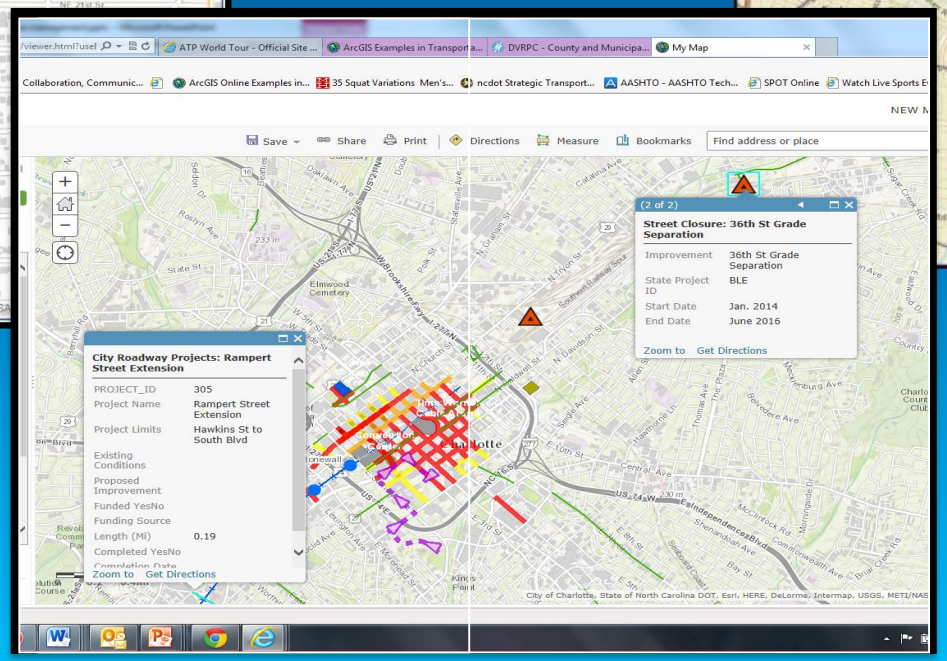
Technical solutions to support collaboration & sustainment

Configurable solutions for street data management, visualization and analysis

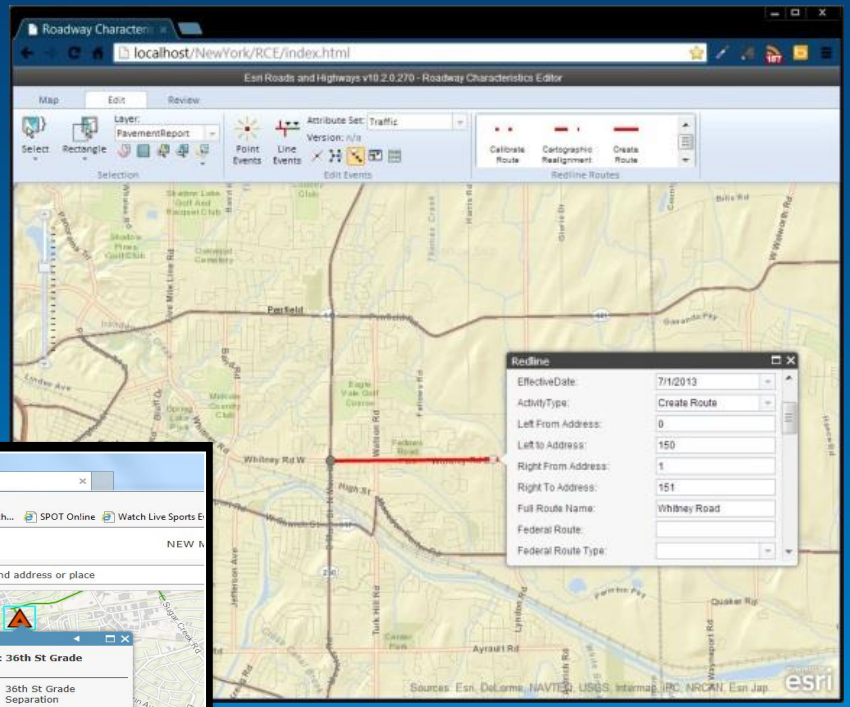


Web-based roadway data management

Executive, public and user level collaboration technology, solutions and information models

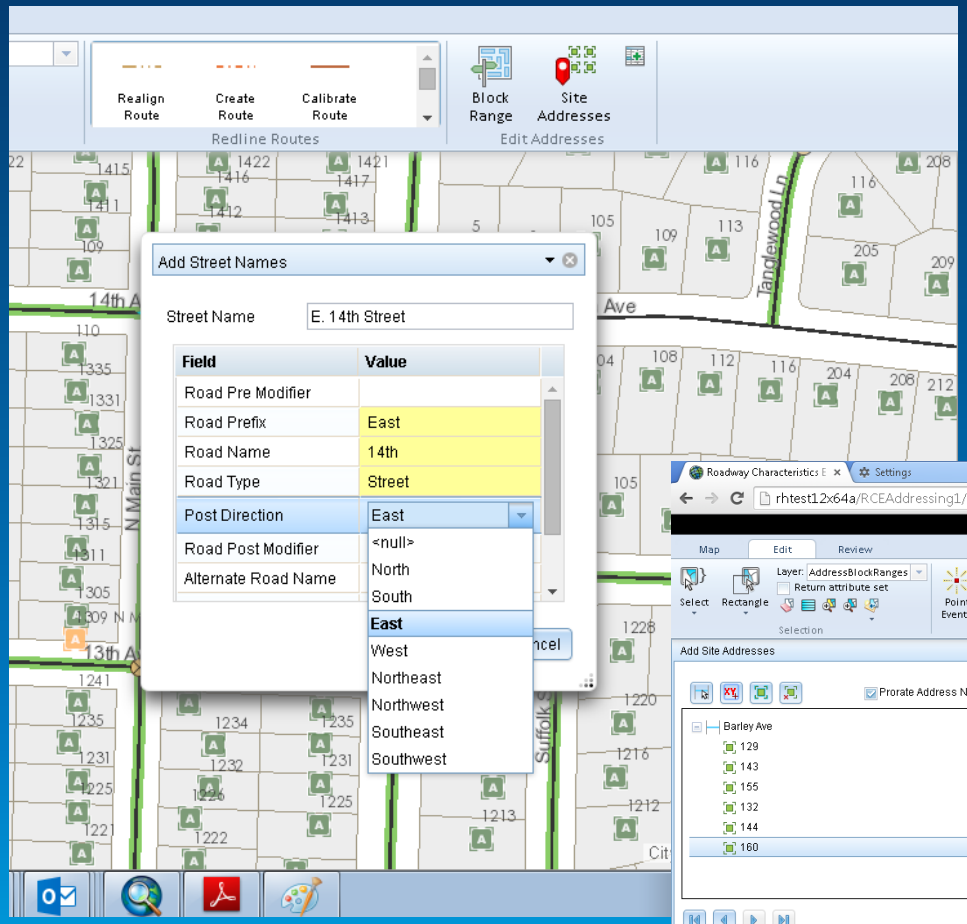


Web-based redlining to support collaboration



Technical solutions to support collaboration & sustainment

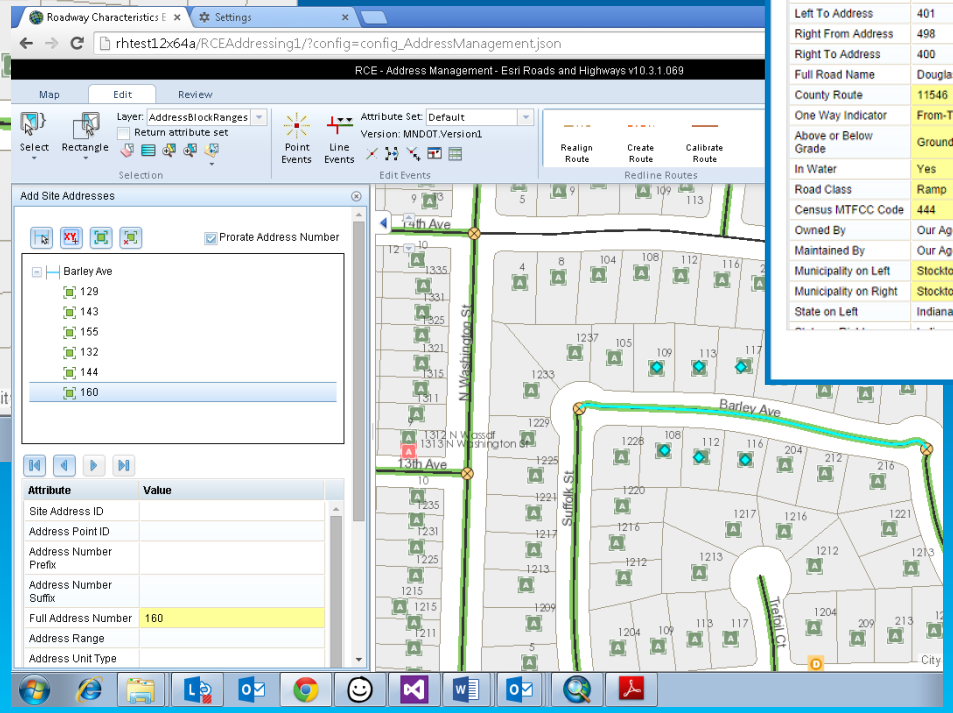
Configurable solutions for street data management, visualization and analysis

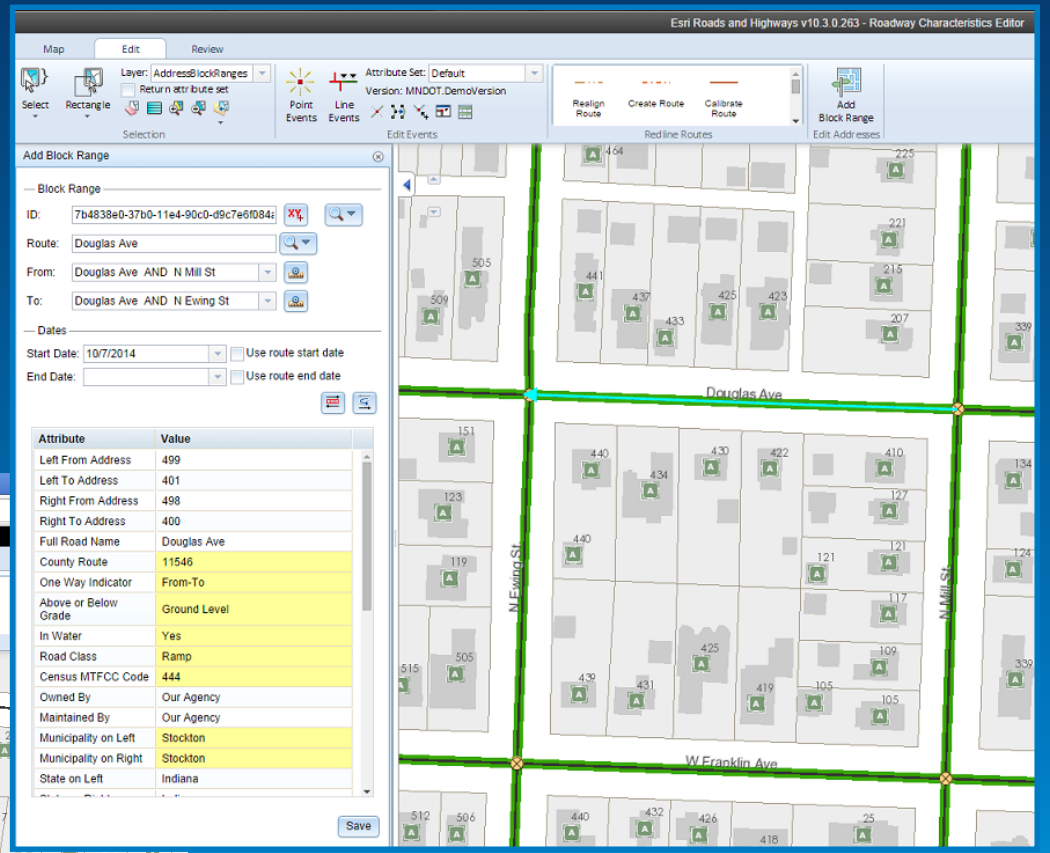


Master Street Name creation and maintenance

Addressing tools in Roads & Highways

Address range creation and maintenance





Address points creation and maintenance

over 45 years

innovation + development in Geospatial solutions

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Industry Sectors

- Transportation
- Spatial Data Infrastructure
- Telecommunications
- Utilities
- Mapping Authorities
- Government

Global offices

US Customers

Global Customers

Technology Partners

Microsoft
Latitude Geographics
ORACLE
esri
SAFE SOFTWARE
Trimble

Rules for Spatial Advantage ™

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Data Validation

Automate manual, time-consuming, subjective QA tasks. Certification required for proof of data quality (SLA's, legislation)

Data Integration

Maximize ROI through re-use, integration of data across the enterprise

Data Enhancement

Automate cleaning tasks, create new data, construct repeatable, non-subjective corrective actions.

Sustaining the State-wide centerline file

The key is minimizing change to local processes while providing benefit

Periodic upload from local source

Conflation and change detection tools used as necessary

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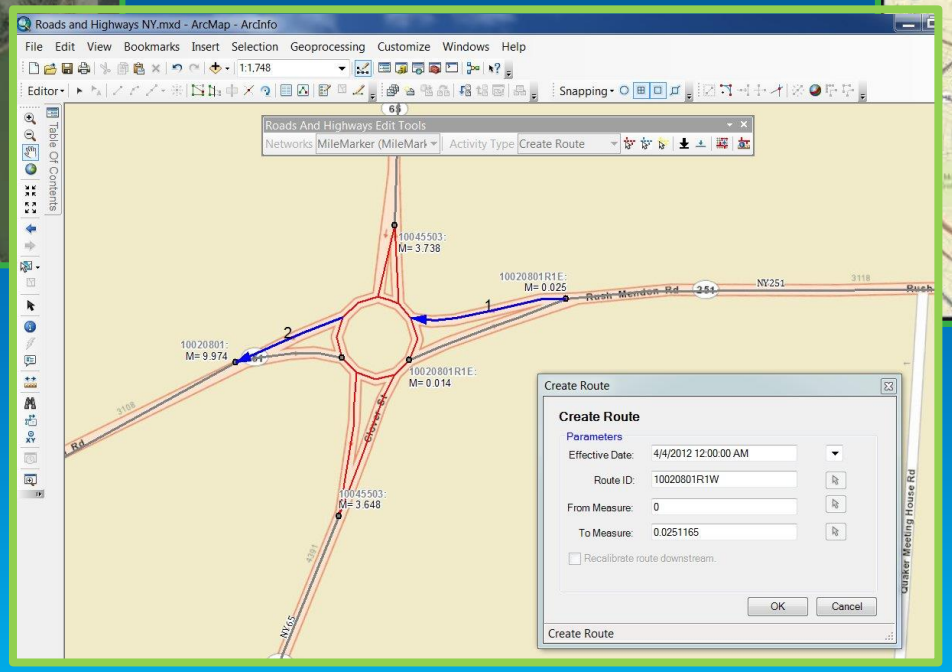
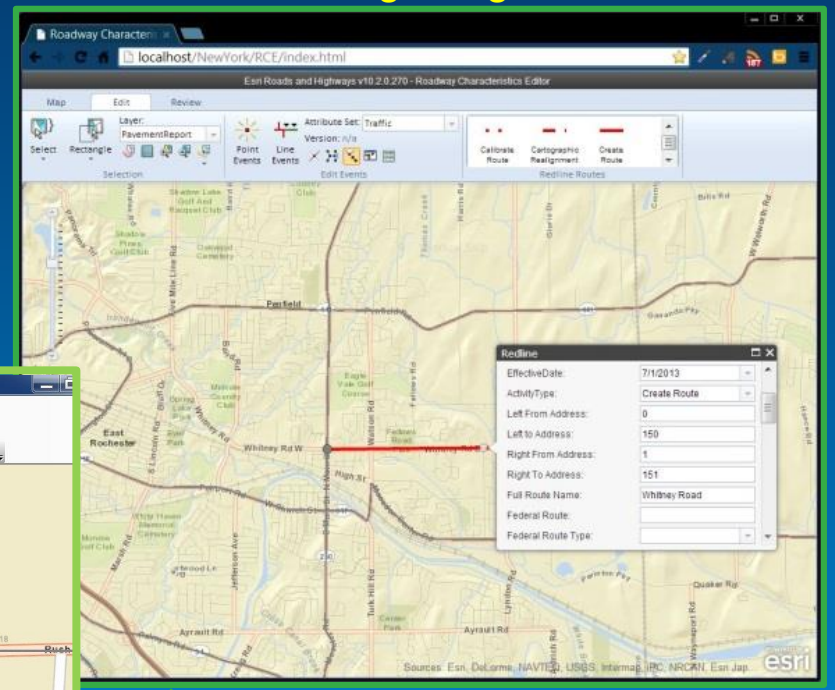
Direct use and automated use of Roads & Highways tools



Redlining using web tools



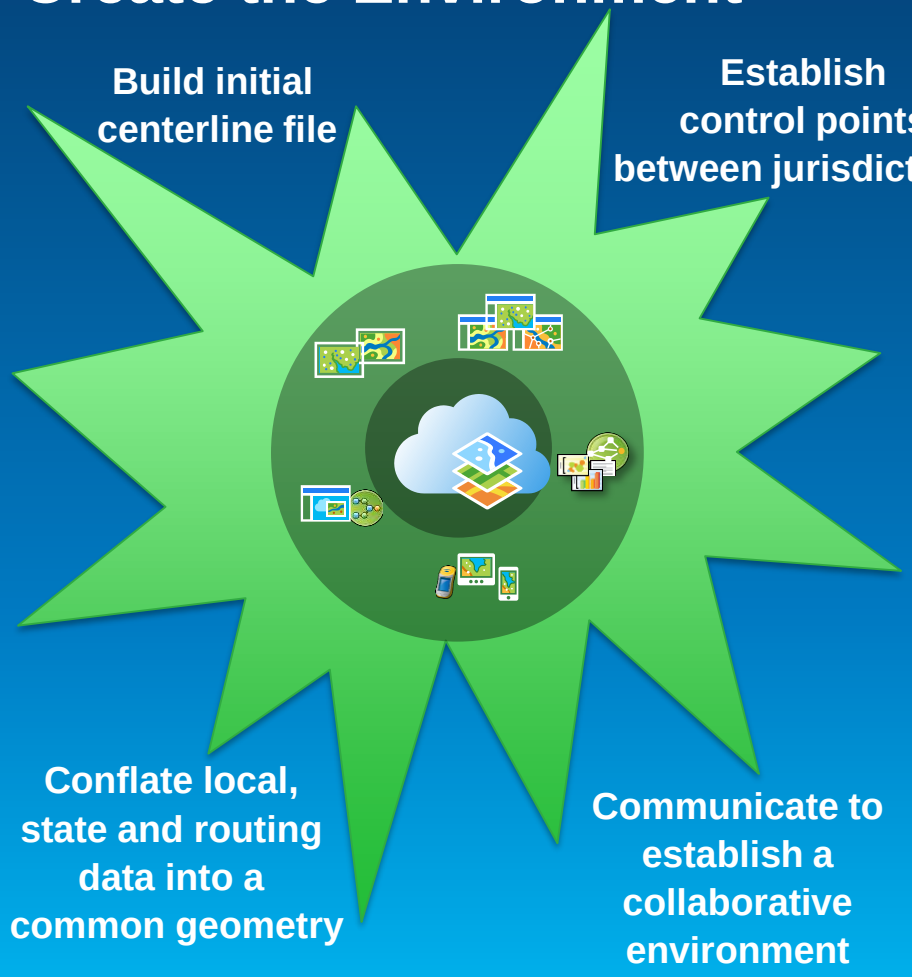
Consolidated data provided back to the locals through Portal

Supporting workflows to recognize the GIS capabilities of all involved…

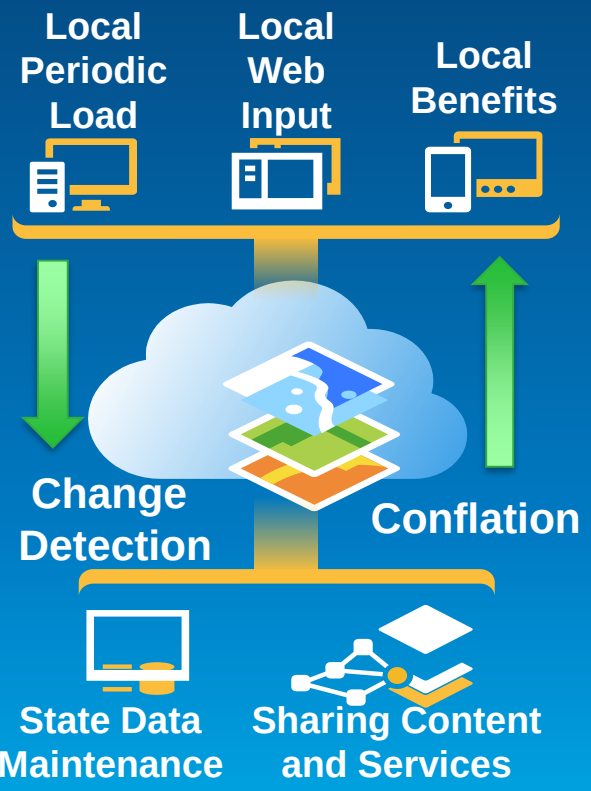
What does the solution look like?

Create, sustain, collaborate and share

Create the Environment



Sustain the Environment



Providing a State-wide, collaborative system that has benefits for all…

Roads and Highways Resources

- https://www.esri.com/software/arcgis/extensions/roads-and-highways
- https://www.roadsbridges.com/esri%E2%80%99s-roads-and-highways-data-integration-solution-designed-support-highway-management-and-more
- https://resources.esri.ca/webinars/manage-road-highway-infrastructure-using-lrs-and-arcgis
- https://www.youtube.com/watch?v=I48VzrVCcjQ
- https://community.esri.com/groups/departments-of-transportation

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