2017
FRA Rail Program Delivery
Meeting

FRA's North American Rail Network (NARN)

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Federal Railroad Administration

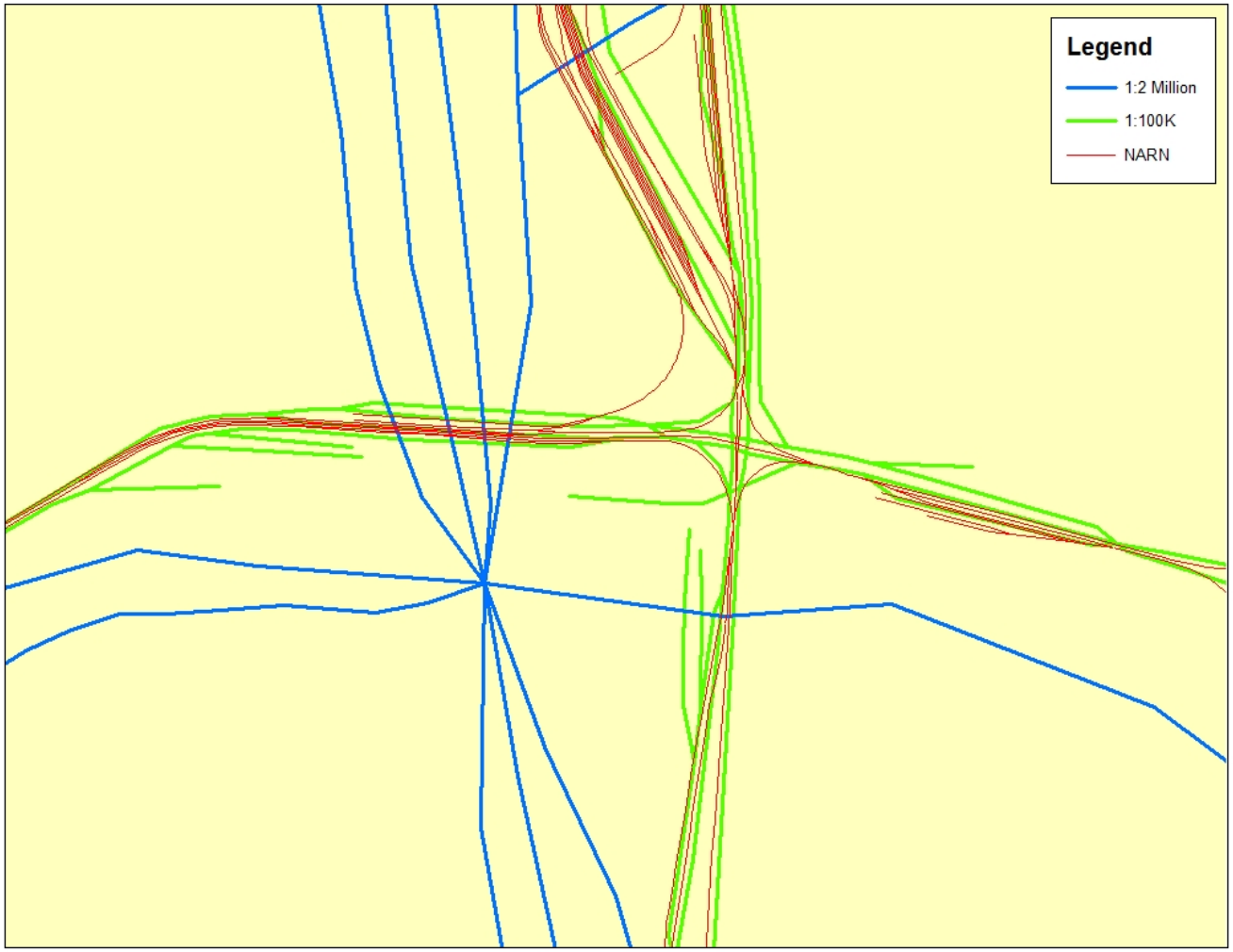
Outline

- Background - NARN
- Where we are today
- How to use the data
- How to get the data
- Next Steps

History

- 1:2 million (USGS): Used for cartographic representation, attributes, and routing
- 1:100,000 (Census): Had a better spatial representation but lack routability and attributes
- By 2005, the 1:2 million attributes were conflated to the 1:100,000 network & the 1:100,000 was completely routable

1:2M – 1:100K - NARN

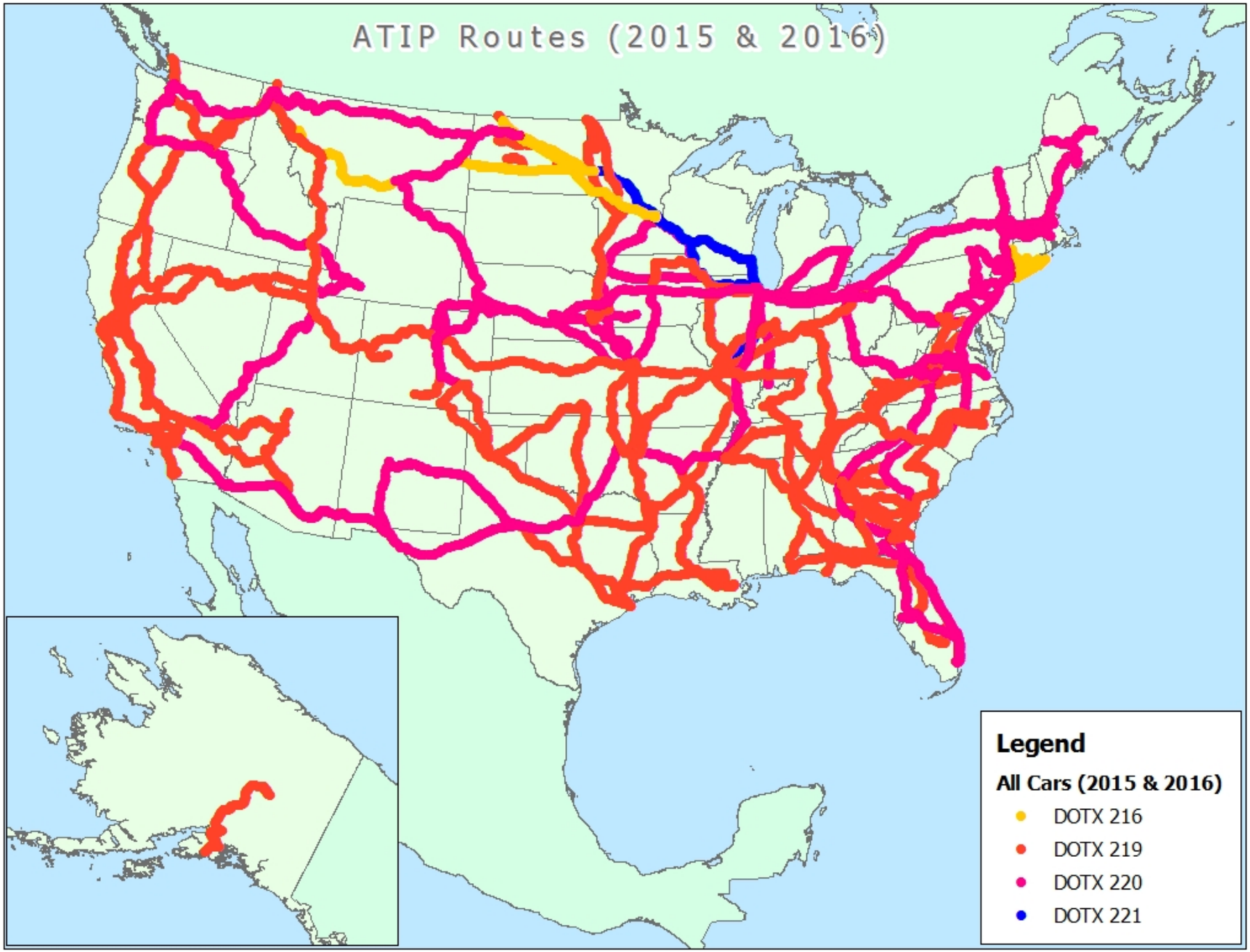


Background

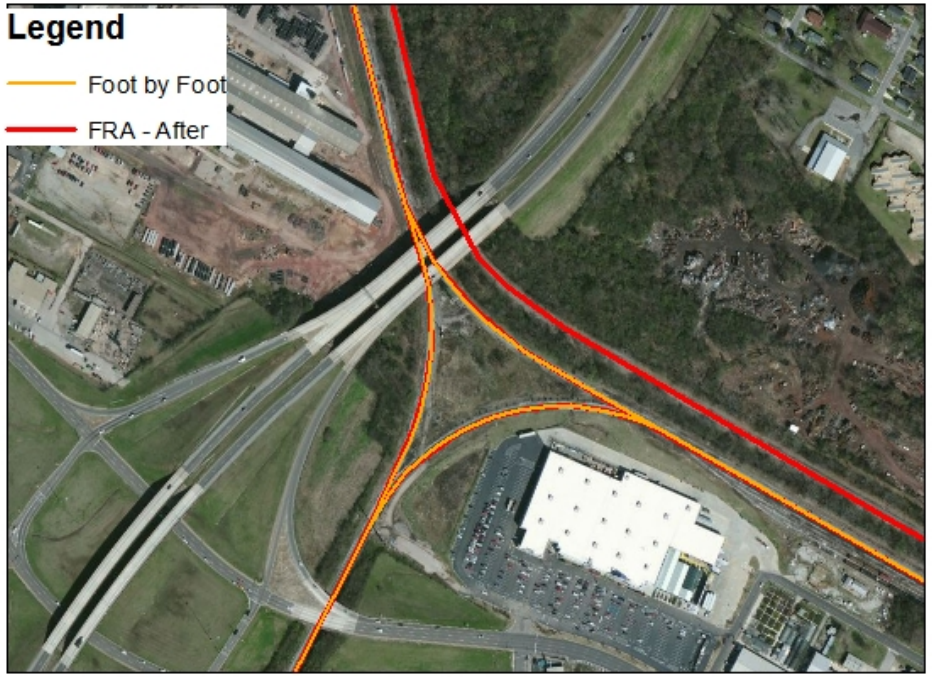
- 2015/2016
  - FRA conflated the FRA network with NGA's Rail Network and using 5 years of FRA's Automated Track Inspection Program (ATIP) Data
  - DOT/FRA Rail Network
    - Represents 185,000 miles of mainline track
    - First created in mid 80s from USGS 1:2million DLGs
  - NGA Rail Network
    - Includes all lines and sidings
    - In general, more accurate
  - ATIP Data
    - Collects long-lat every foot to locate track defects
    - 84,100 miles of main line track collected under ATIP

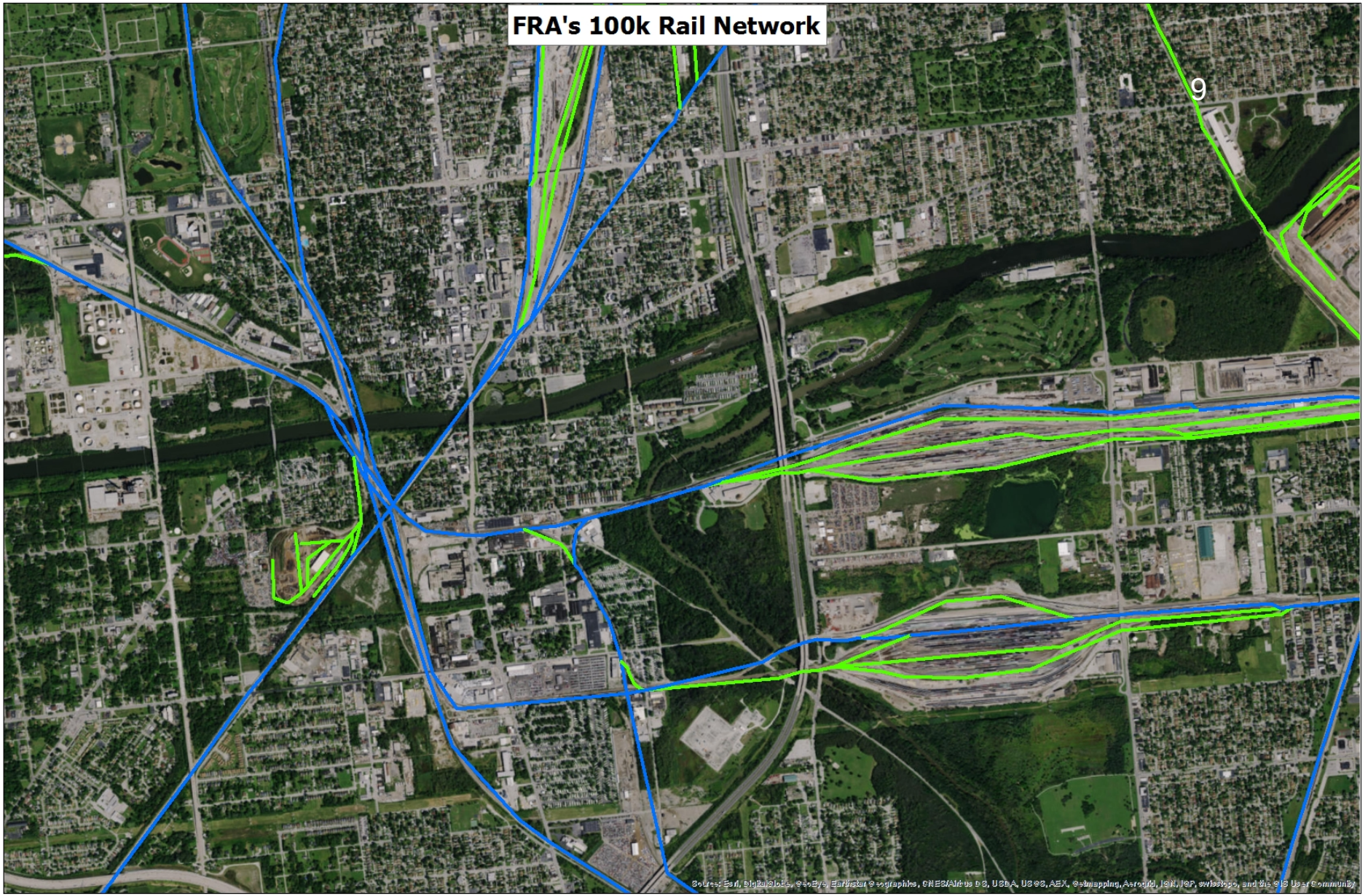
Automated Track Inspection Program (ATIP) Data

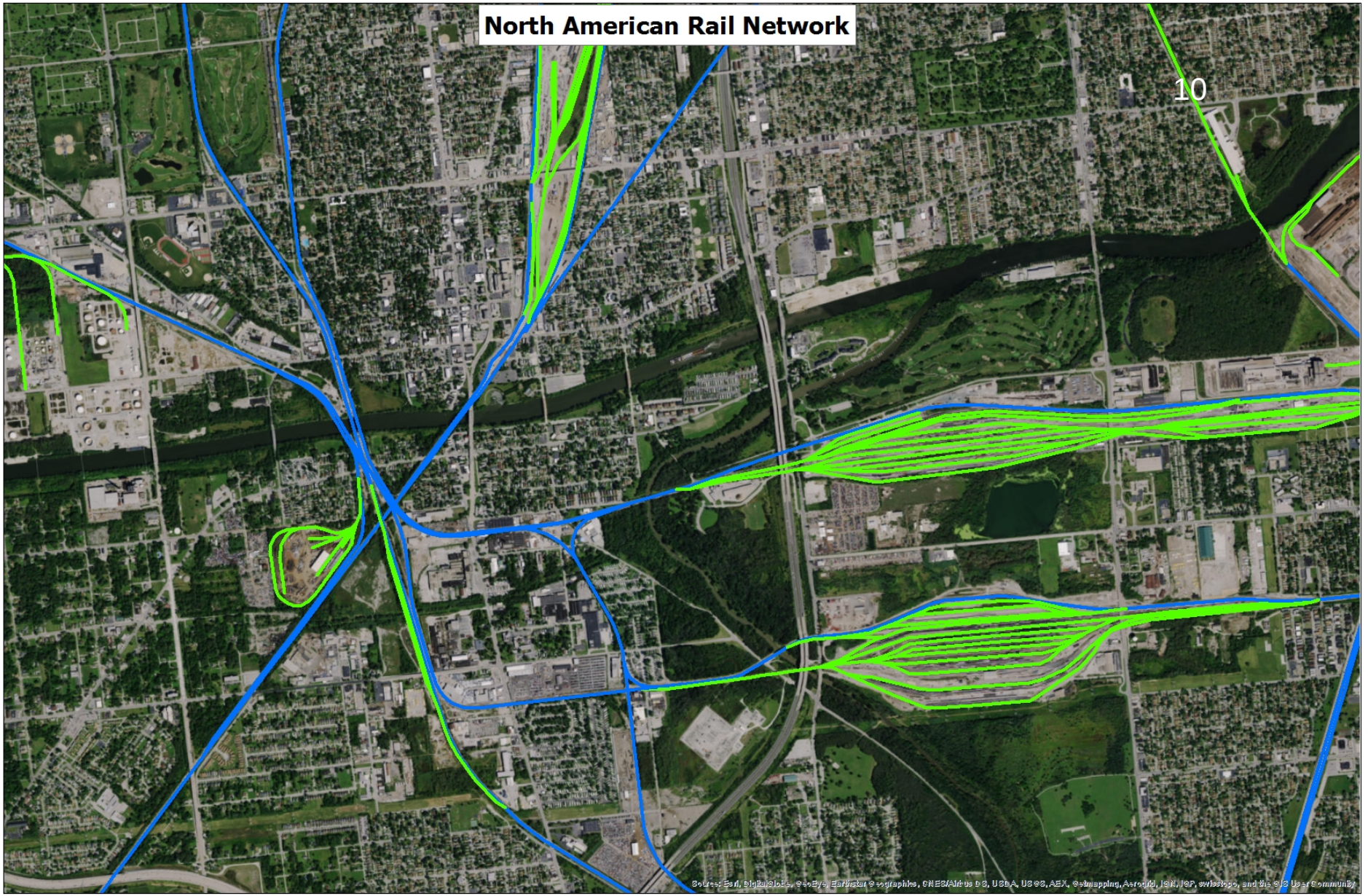
- The ATIP cars take a latitude and longitude reading every foot.


ATIP Routes (2015 & 2016)
Legend
All Cars (2015 & 2016)
DOTX 216
DOTX 219
DOTX 220
DOTX 221

Legend
Foot by Foot
FRA - Before


Legend
Foot by Foot
FRA - After


FRA's 100k Rail Network
9
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community


North American Rail Network
10
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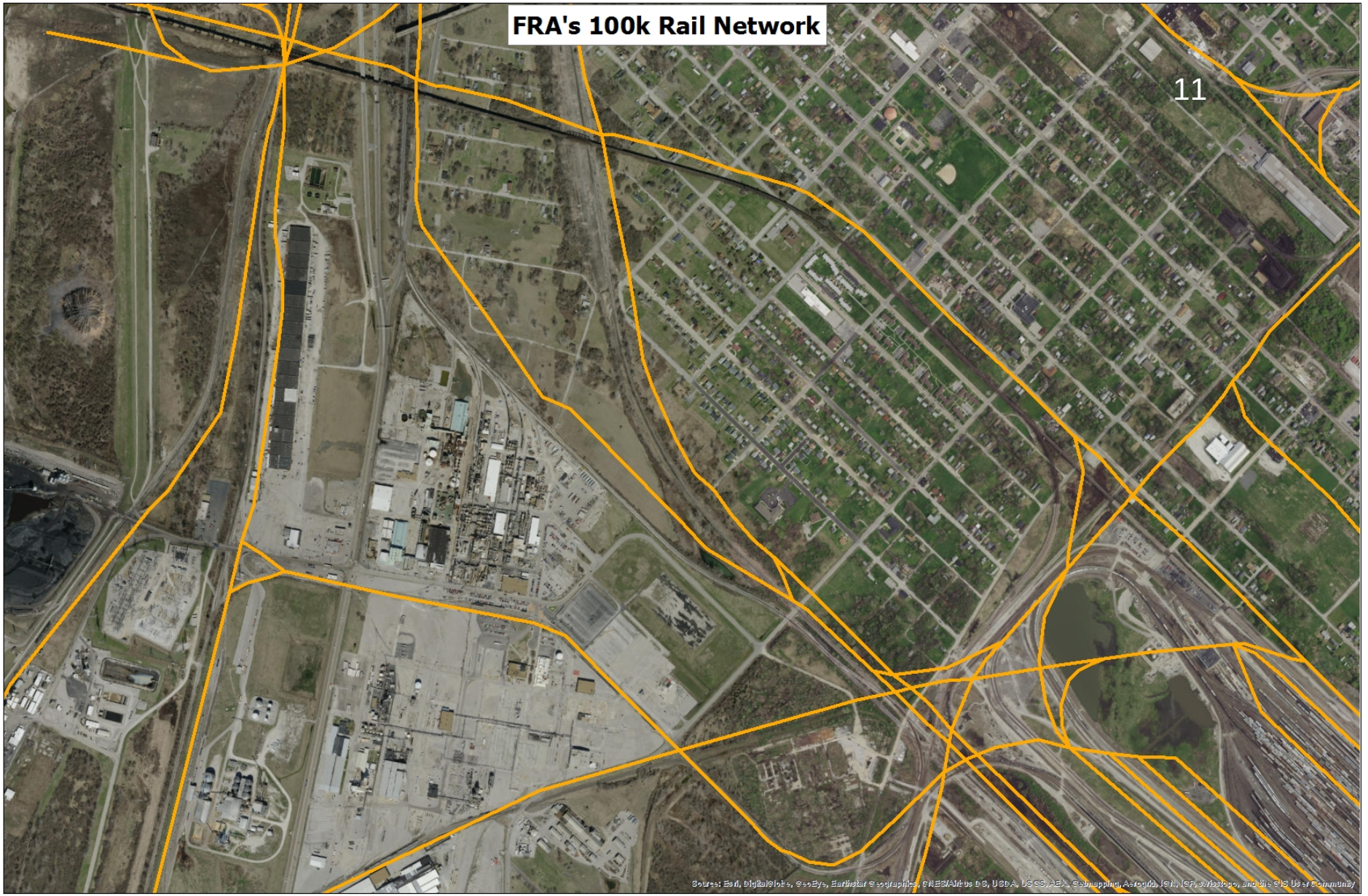
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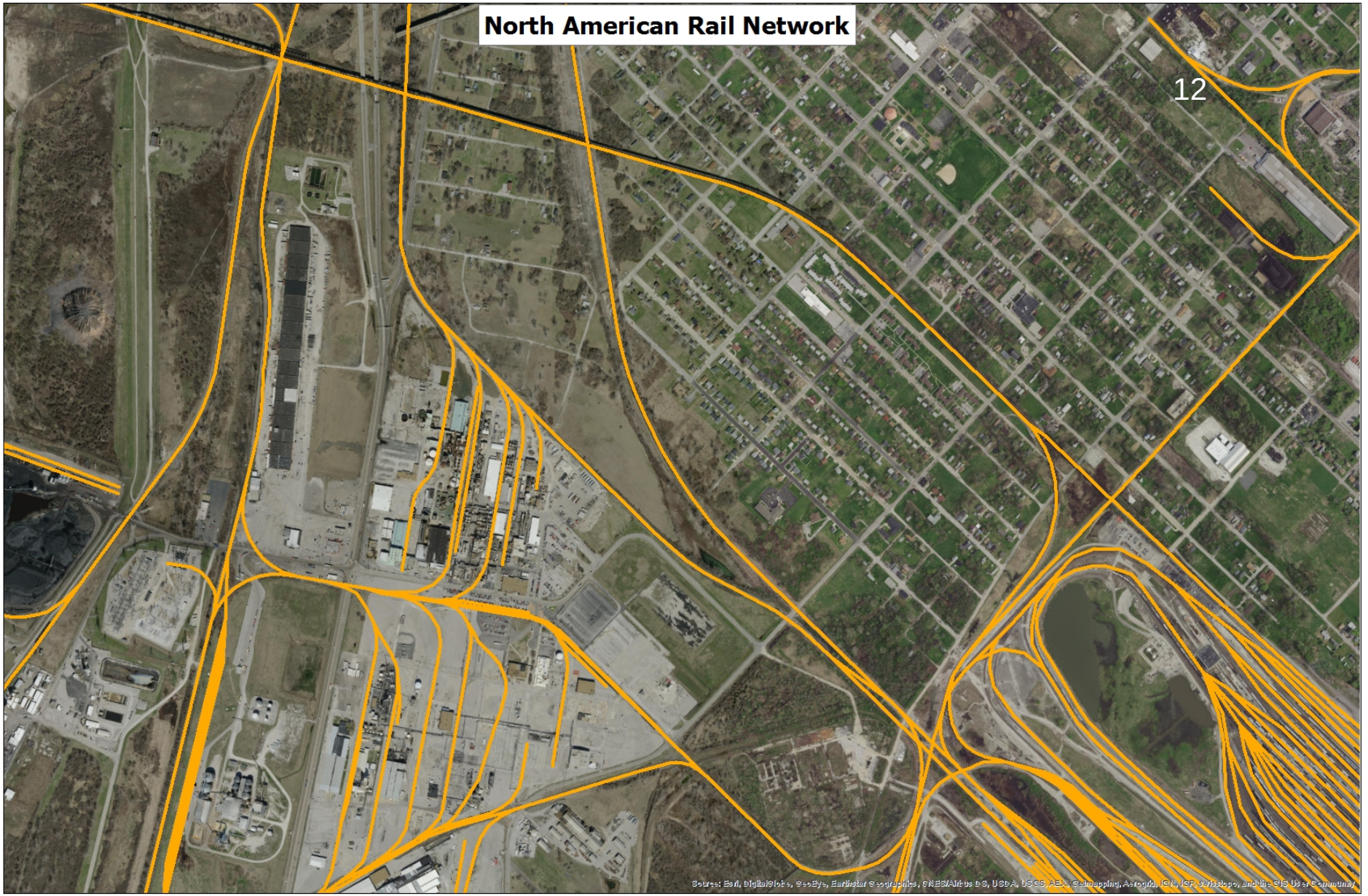
North American Rail Network
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Since the Release of the NARN

- NARN was released to the public July 2016 as a layer on the National Transportation Atlas Database (NTAD)
- AAR GIS Committee adopted the NARN as the industry standard
- Class 1s have validated the Chicago region
- Network was lasted versioned October 2017

How to use the data

- Understanding the attributes, i.e.
  - Geography (State, County)
  - Ownership/Trackage rights
  - Type of track
  - STRACNET
  - Passenger

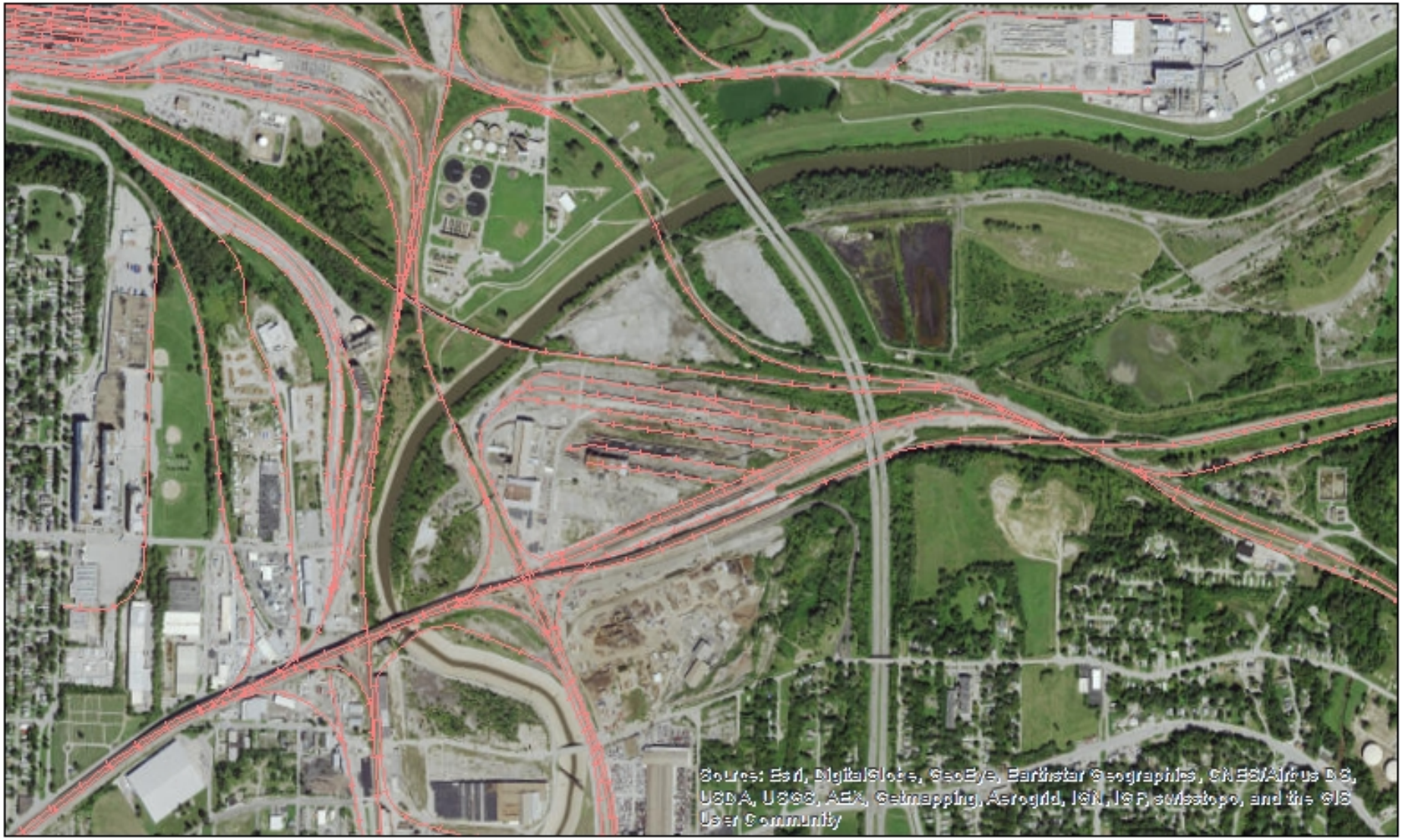
Types of Tracks

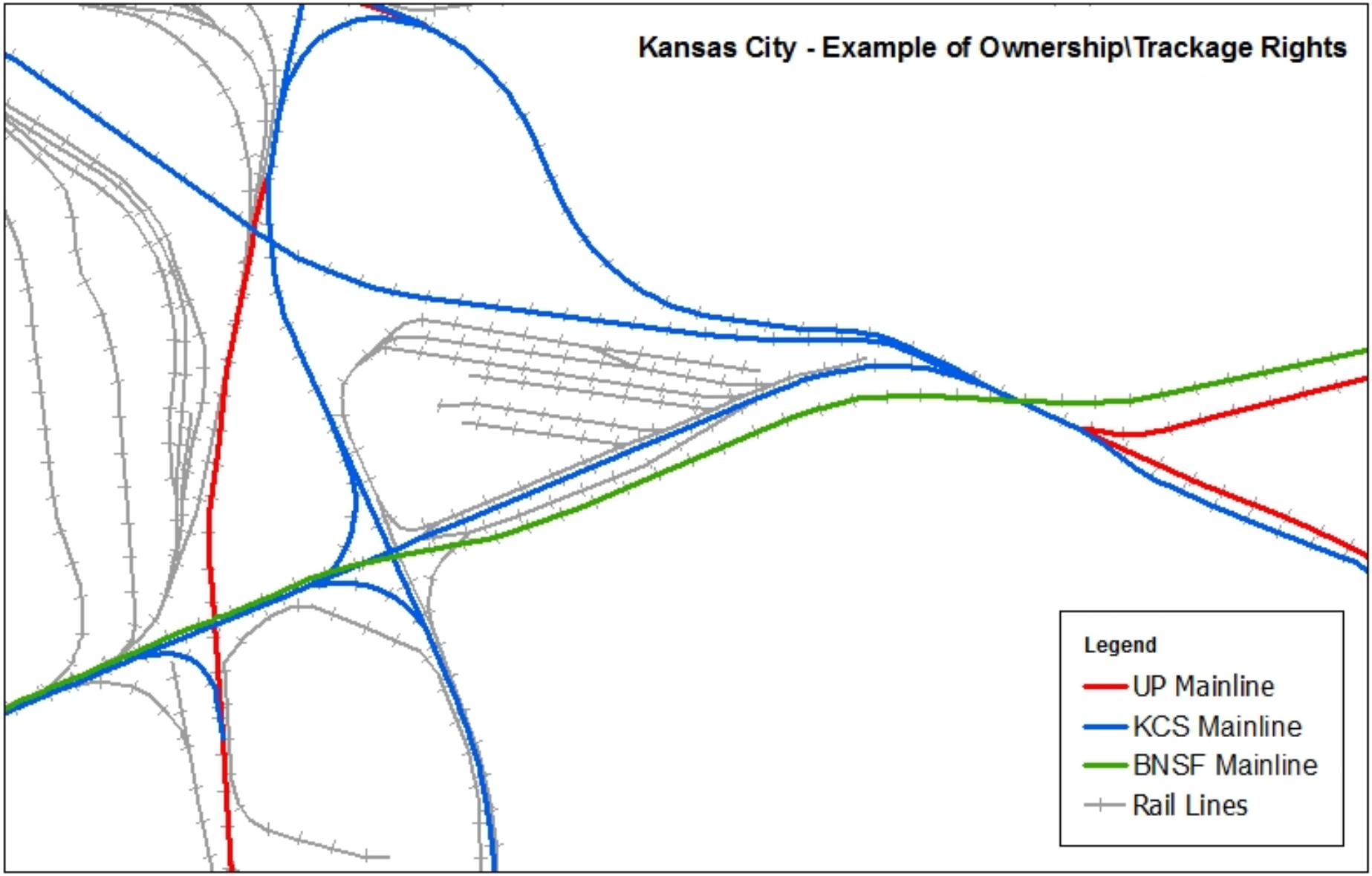
NET Column

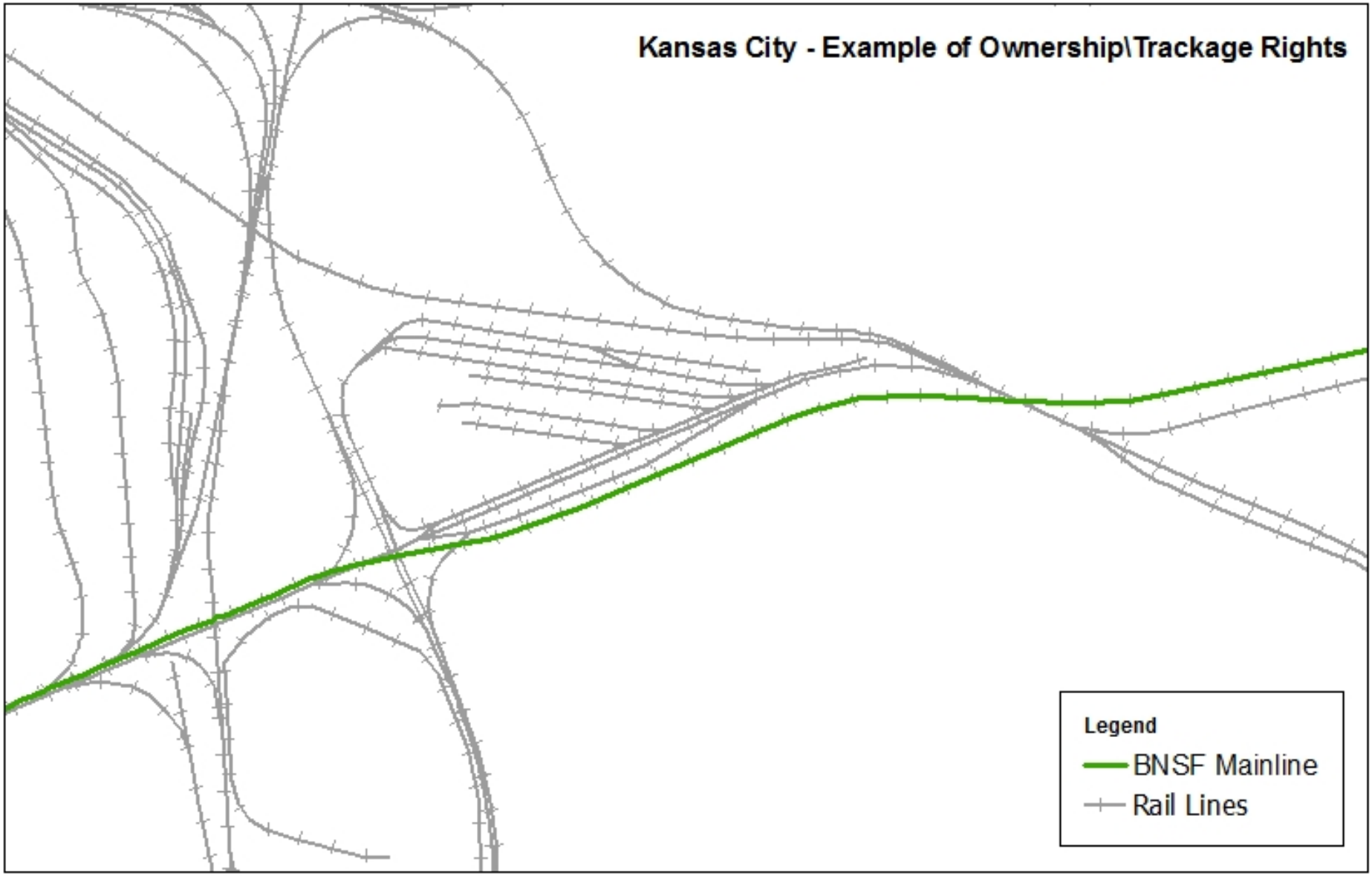
- M: Main line
- I: Major industrial lead
- O: Other track (minor industrial leads)
- X: Out of service line
- S: Passing sidings
- A: Abandoned rail line
- R: Abandoned line that has been physically removed
- Y: Yard tracks
- F: Rail ferry connection
- T: Trail on former rail right-of-way

Routing will be on Main and Industrial lead track

Kansas City - Right of Way




Kansas City - Example of Ownership\Trackage Rights
Legend
UP Mainline
KCS Mainline
BNSF Mainline
Rail Lines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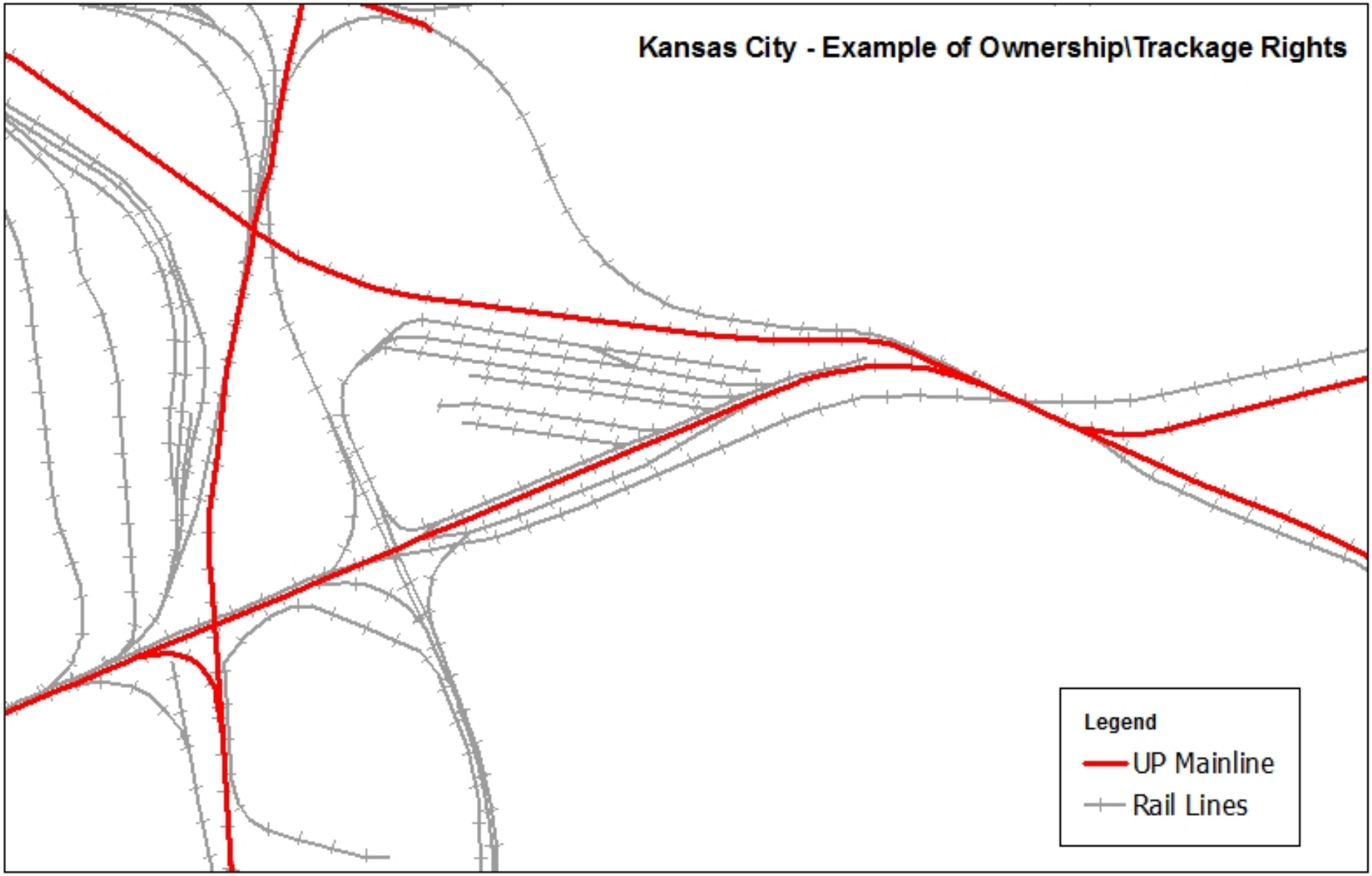
BNSF Mainline
Rail Lines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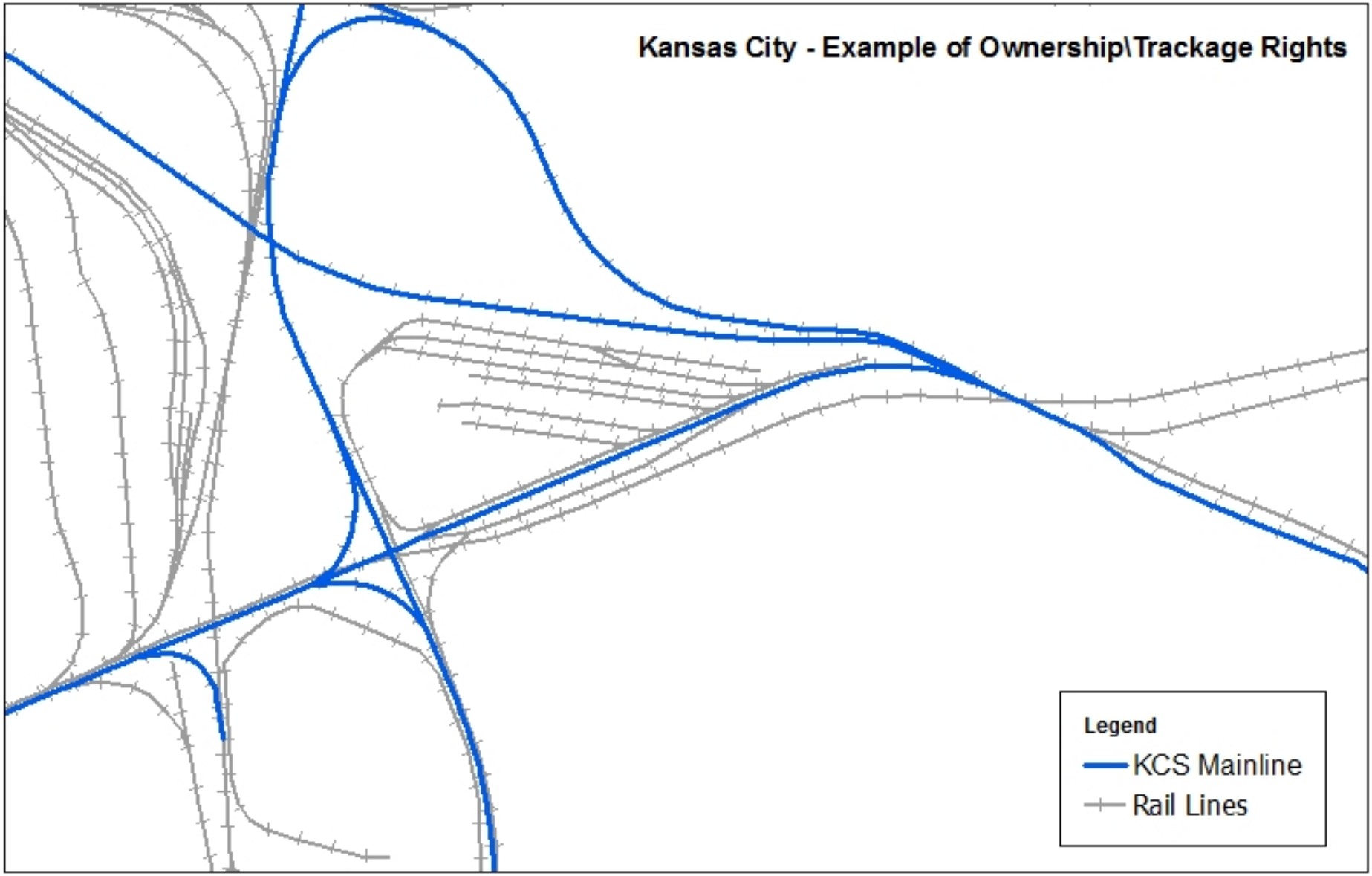
UP Mainline
Rail Lines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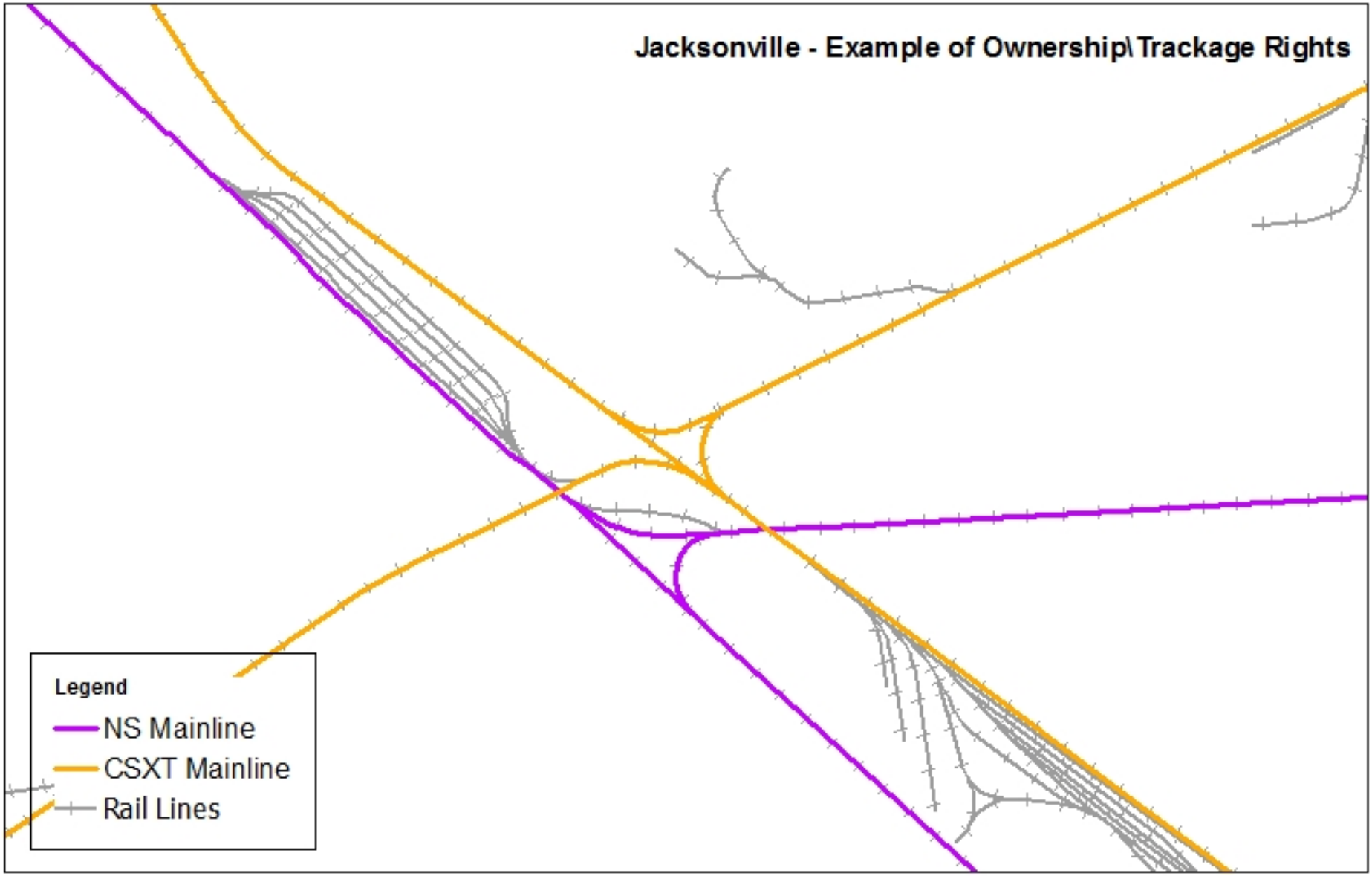
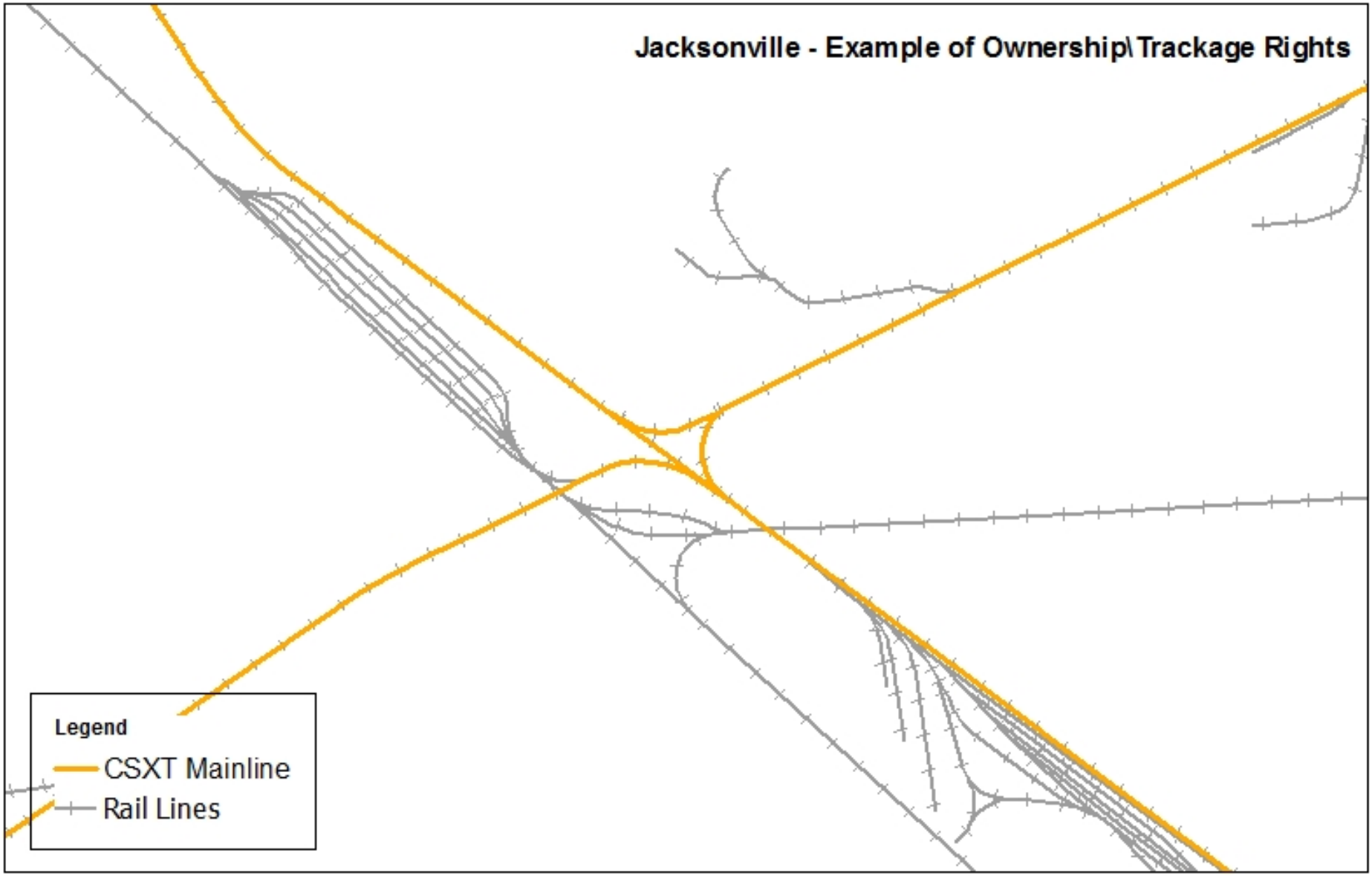
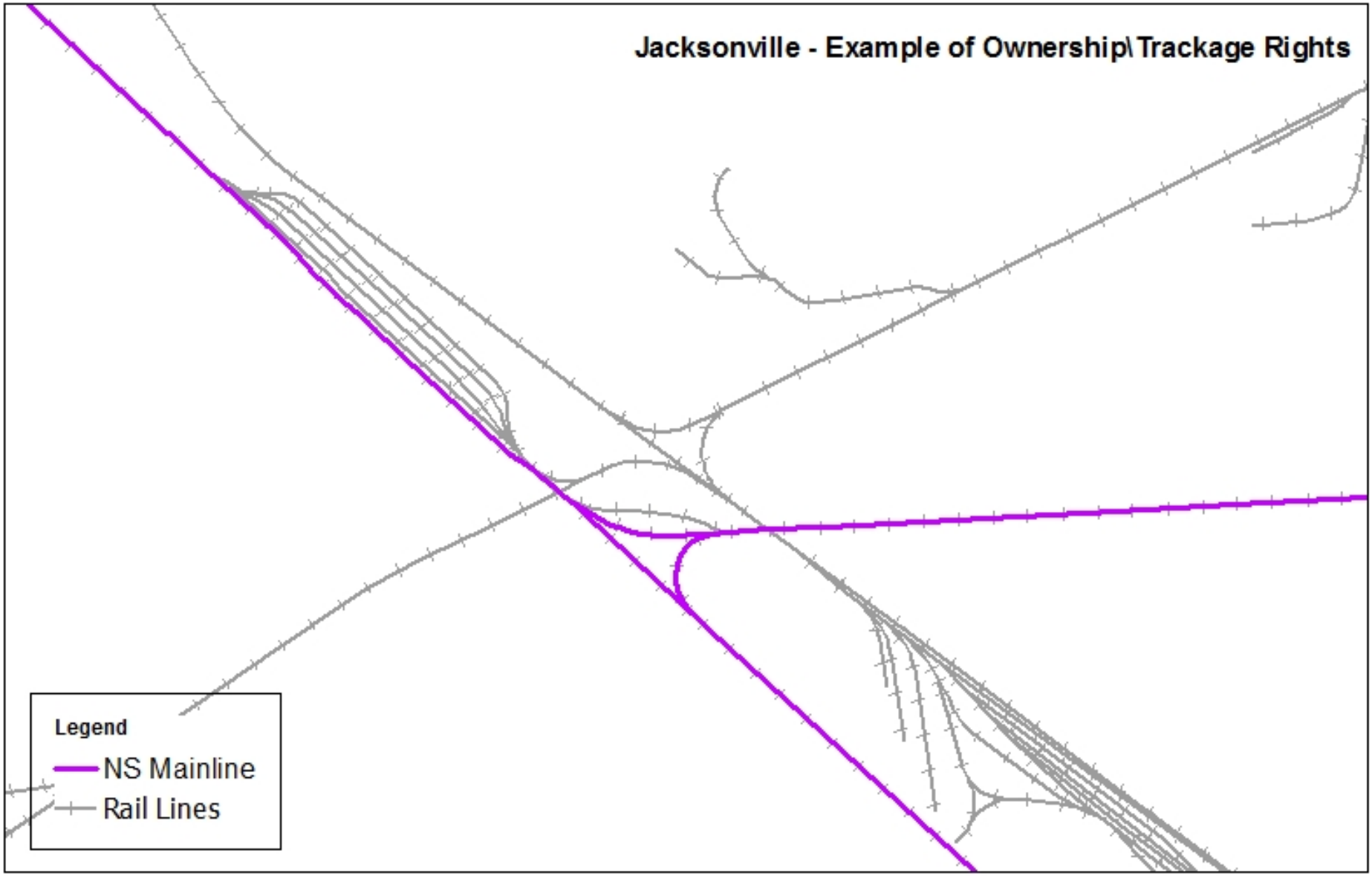
Legend
KCS Mainline
Rail Lines

Jacksonville - Right of Way


Jacksonville - Example of Ownership\Trackage Rights
Legend
NS Mainline
CSXT Mainline
Rail Lines


Jacksonville - Example of Ownership\Trackage Rights
Legend
CSXT Mainline
Rail Lines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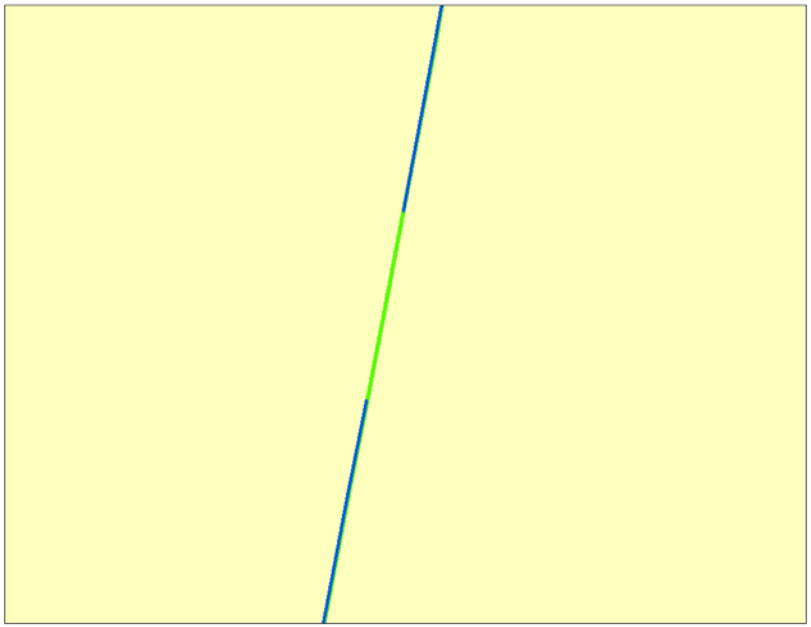
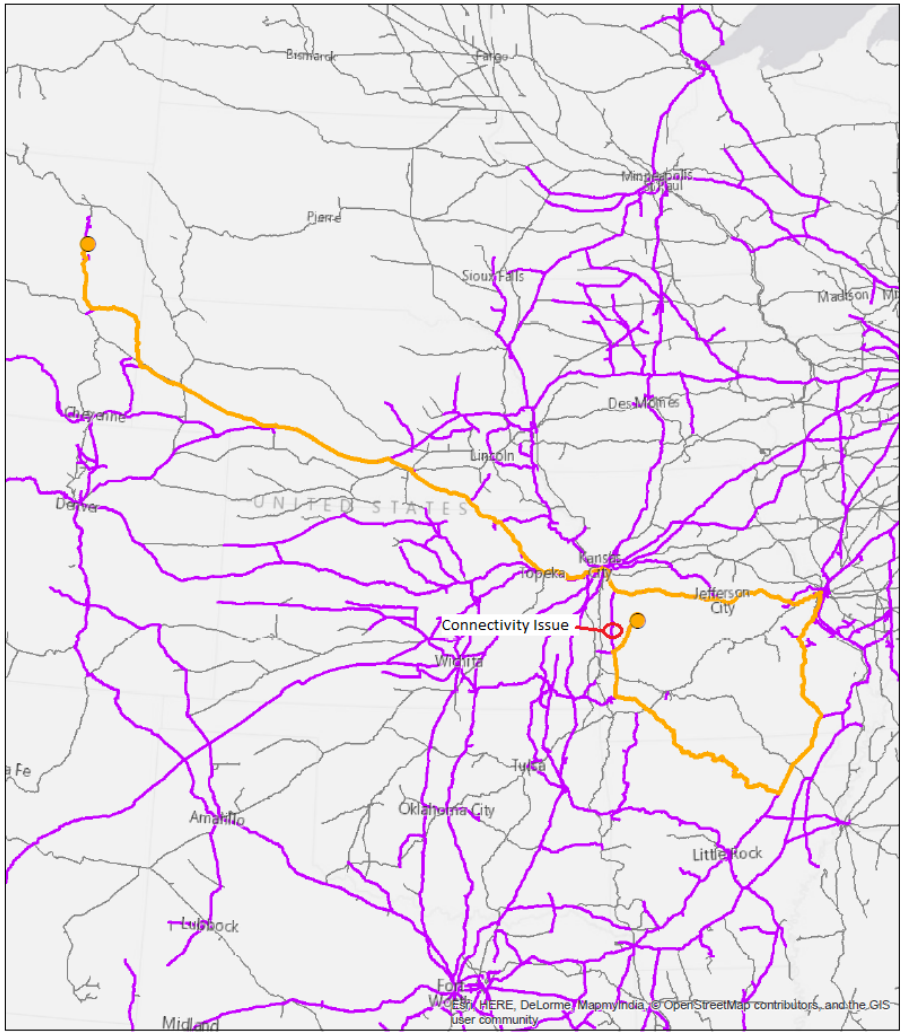
Legend
NS Mainline
Rail Lines

Examples of No Connectivity



Railroad :
Waybill Miles : 905.7
Flowed Miles : 1654.6
Leg Id: 51749
Orig :
Dest :
Leg Use: 32
O_FSAC :
D_FSAC :



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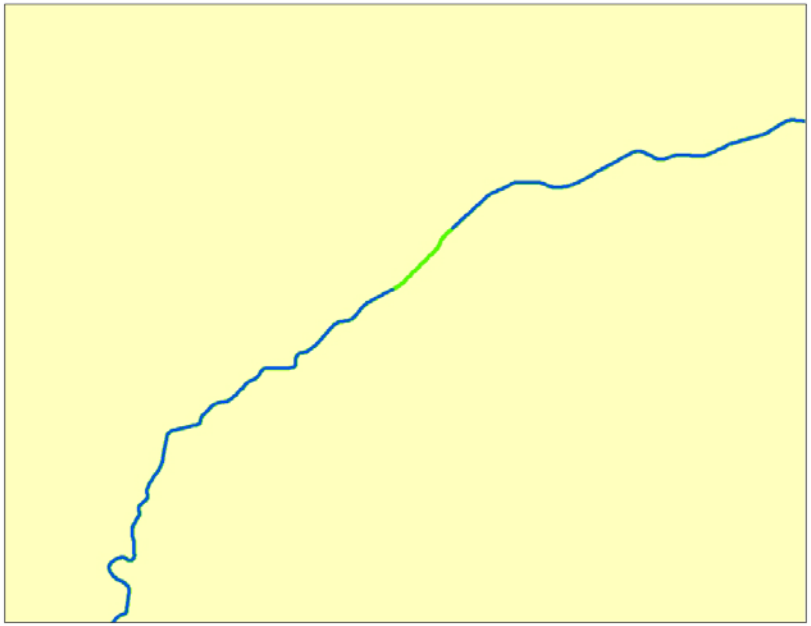
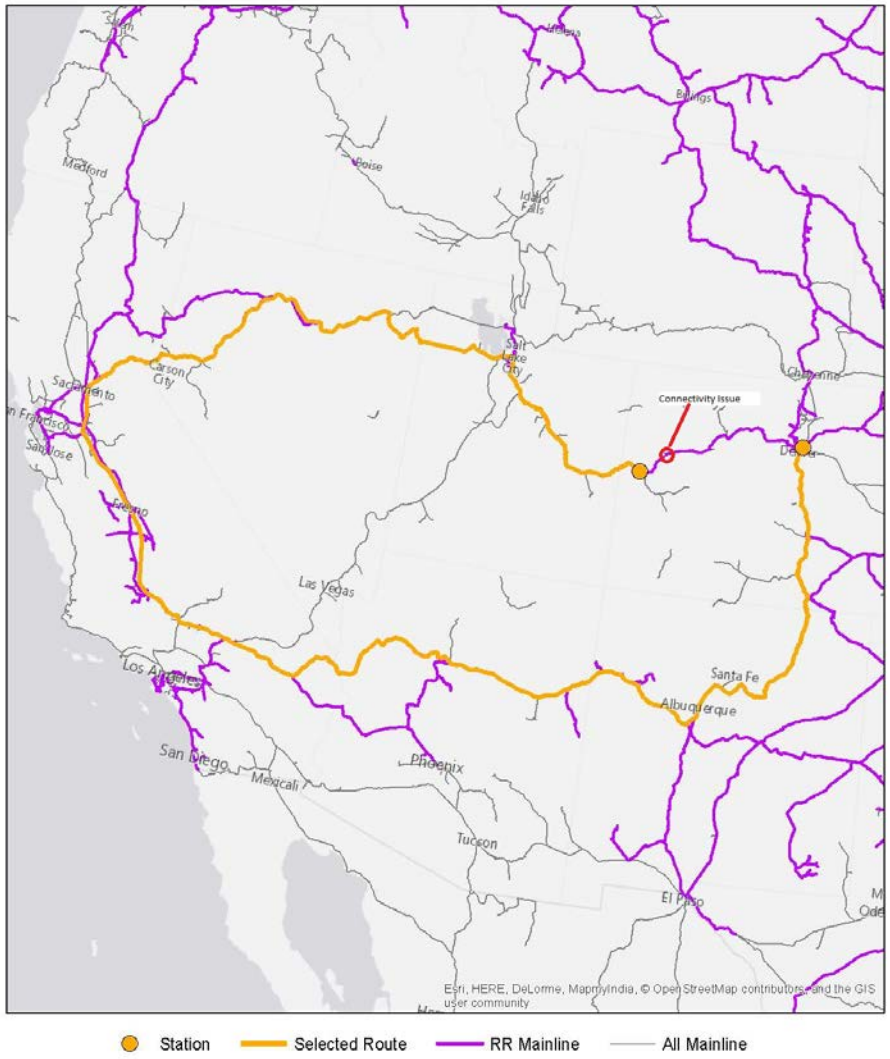


Railroad	:	Leg Id:	9122	Leg Use:	59
Waybill Miles	: 279.2	Orig	:	O_FSAC	:
Flowed Miles	: 2645.1	Dest	:	D_FSAC	:



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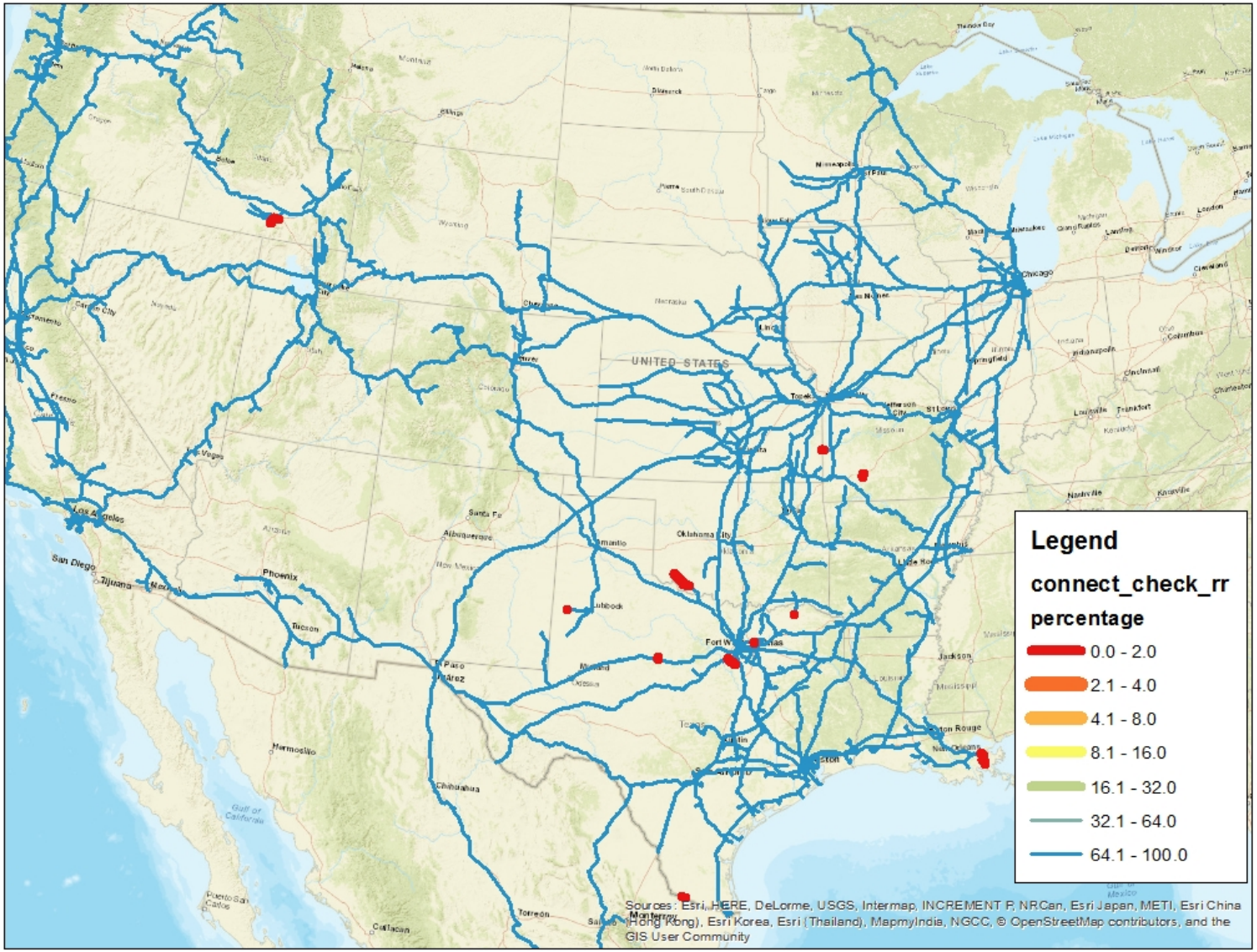


Updates within the North American Rail Network

- 5000 updates of Records since July
  - Ownership
  - Trackage rights
  - Type of Track: Main Line, siding, etc.

- Several dozen Spatial Updates

How to get the data

- National Transportation Atlas Database (NTAD)

- FRA GIS Viewer

https://osav.usdot.opendata.arcgis.com/datasets?keyword=Rail

FRA-GIS Applications & Requirements

Purpose & Capabilities

- FRA maintains 4 GIS web mapping applications that provide geographic information and spatial analysis for railroad and related transportation data
- RPD manages the underlying database representing the route structure of the North American railroad system
- RRS and RPD provide geo-coded data that support FRA's safety and rail development missions
- All of FRA's GIS applications allow for querying data, toggling among available visual layers, and importing custom geo-coded data layers from outside sources

4 GIS Web Applications

Public

1. Main Public Viewer
2. Trespassers
3. Grade Crossing Popup Viewer
4. Grade Crossing Mobile App

System Requirements

- Supported web-browsers: Internet Explorer 9 or higher, Firefox, Chrome

Main Public Viewer

Availability

- Public

Capabilities

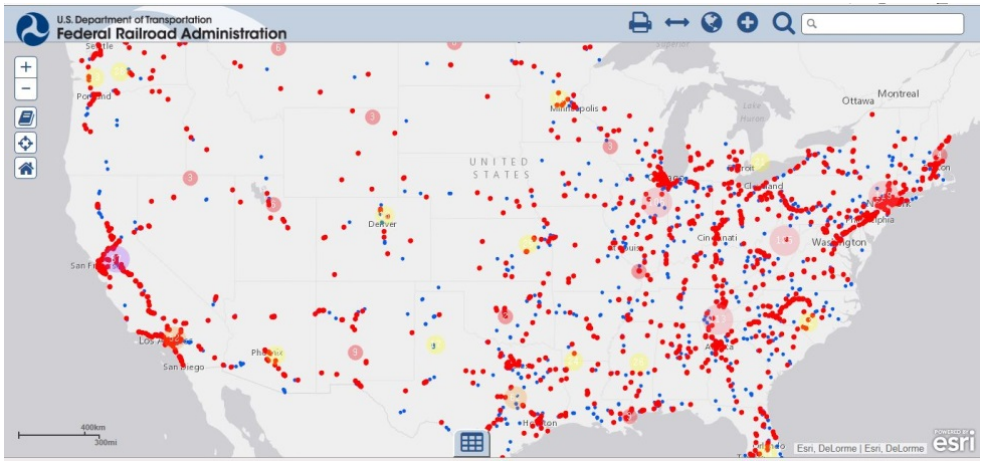
- Provides access to FRA's publicly available GIS layers

Data Considerations

- Contains Class I network, Amtrak, and commuter rail lines
- All Main line track
- Grade crossing data is updated weekly from RRS systems

http://fragis.fra.dot.gov/GISFRASafety/

Trespassers



Availability

- Public

Capabilities

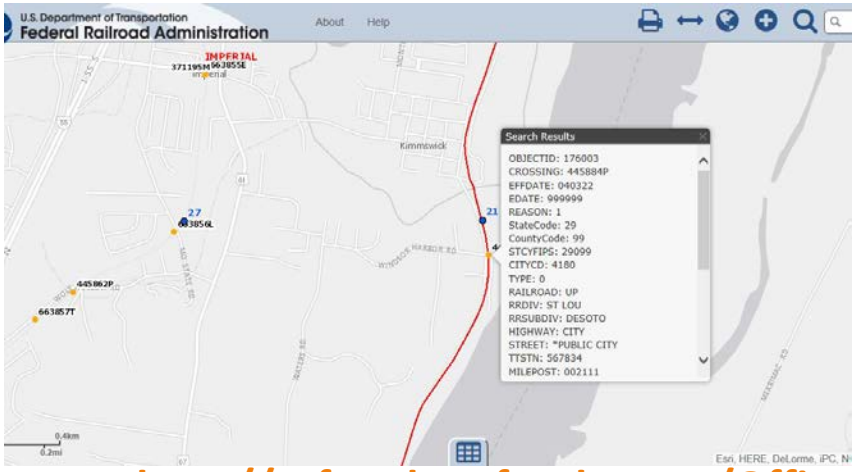
- Displays all railroad trespasser-related injuries and fatalities dating back to June 2011
- Intended to increase education, enforcement, and engineering efforts to reduce trespassing on railroad property

Data Considerations

- Trespassers are updated as needed
- Contains Class I network
- All Main line track

http://fragis.fra.dot.gov/Trespassers/

Grade Crossing Popup Viewer



Availability

- Public

Capabilities

- Links from FRA's public Office of Safety Analysis website to provide visual / geographic views of grade crossings
- Viewer provides links to FRA grade crossing inventory and accident reports

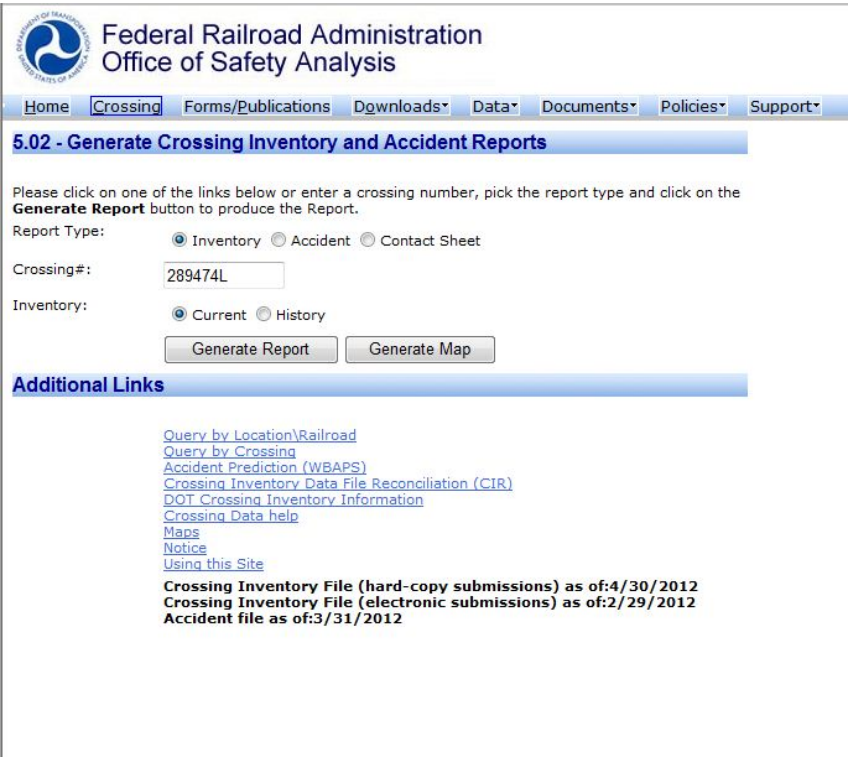
Data Considerations

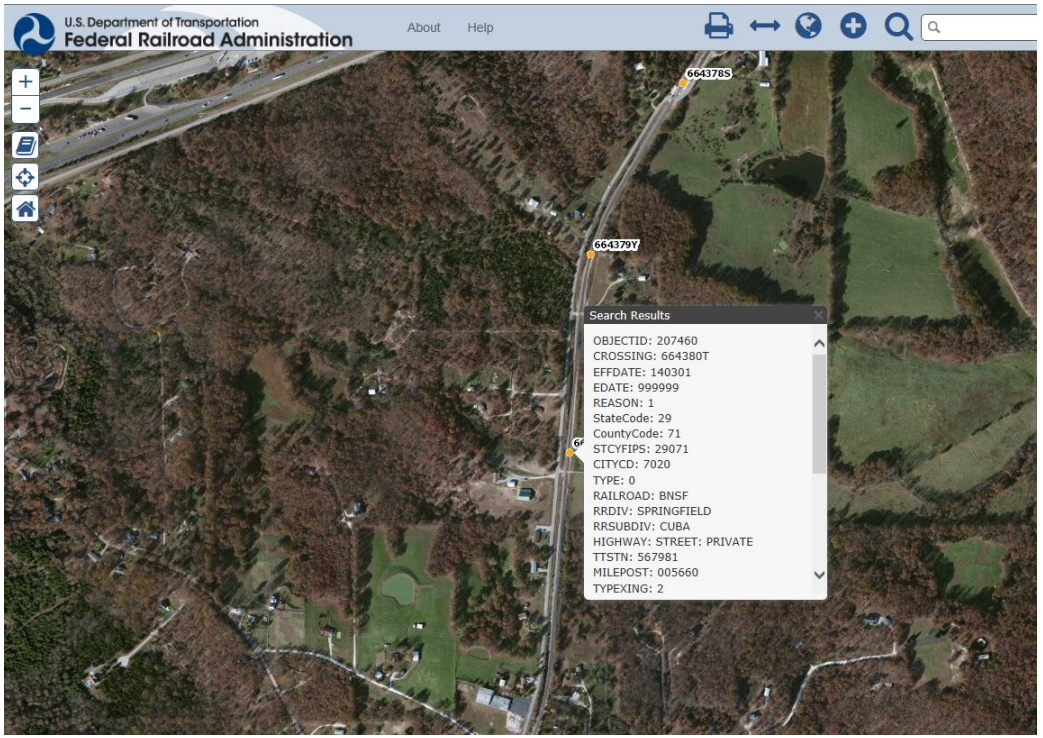
- Contains Class I network, Amtrak, and commuter rail lines
- All Main line track
- Grade crossing data is updated weekly from RRS systems

http://safetydata.fra.dot.gov/OfficeofSafety/PublicSite/Crossing/Crossing.aspx

http://fragis.fra.dot.gov/FRA-PopupViewer/index.html?ZoomToCrossing=294553H

Popup Viewer





Rail Crossing Locator mobile app - Overview

- **Android** and **Apple** devices
- ***Locate*** crossings, ***view*** FRA Safety data and reports, ***contact*** FRA, and ***report emergencies*** via ENS
- ***Empowers public***, (including transportation, emergency, and safety organizations) to ***join FRA's*** effort to further ***improve grade crossing safety***
- ***ESRI Mobile SDK***

Next Steps

- Keeping the Network Updated
- Short lines
  - Developing a Strategic Plan for incorporating the short lines
- Validating Routes
- Routes by Commodity
- Change Management with the Railroads

2017 FRA Rail Program Delivery Meeting

Thank you!

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