



# 2014 Global Level Crossing Safety & Trespass Prevention Symposium

August 3 - 8, 2014 Urbana, IL

## *Data Management Technology as a Means to Optimizing Grade Crossing Improvements on Transportation Infrastructure*

Presenters:

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2014 Global Level Crossing  
Safety & Trespass Prevention Symposium



## Introduction

**Why is technology important as a means of communicating?**

**Conservation of Institutional Knowledge**

**Secure and Maintain Funding**

**Maximizing Information Technology Infrastructure**

**Maximizing Information *Transportation* Infrastructure**





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The NPRM states: ***“in order for the Crossing Inventory to serve as an effective database, States and railroads need to exchange information with each other and promptly update the crossing data records as changes occur.”***

Docket No. FRA–2011–0007, National Highway-Rail  
Crossing Inventory Reporting Requirements

### Three Sides of Hosted Web-based Solutions

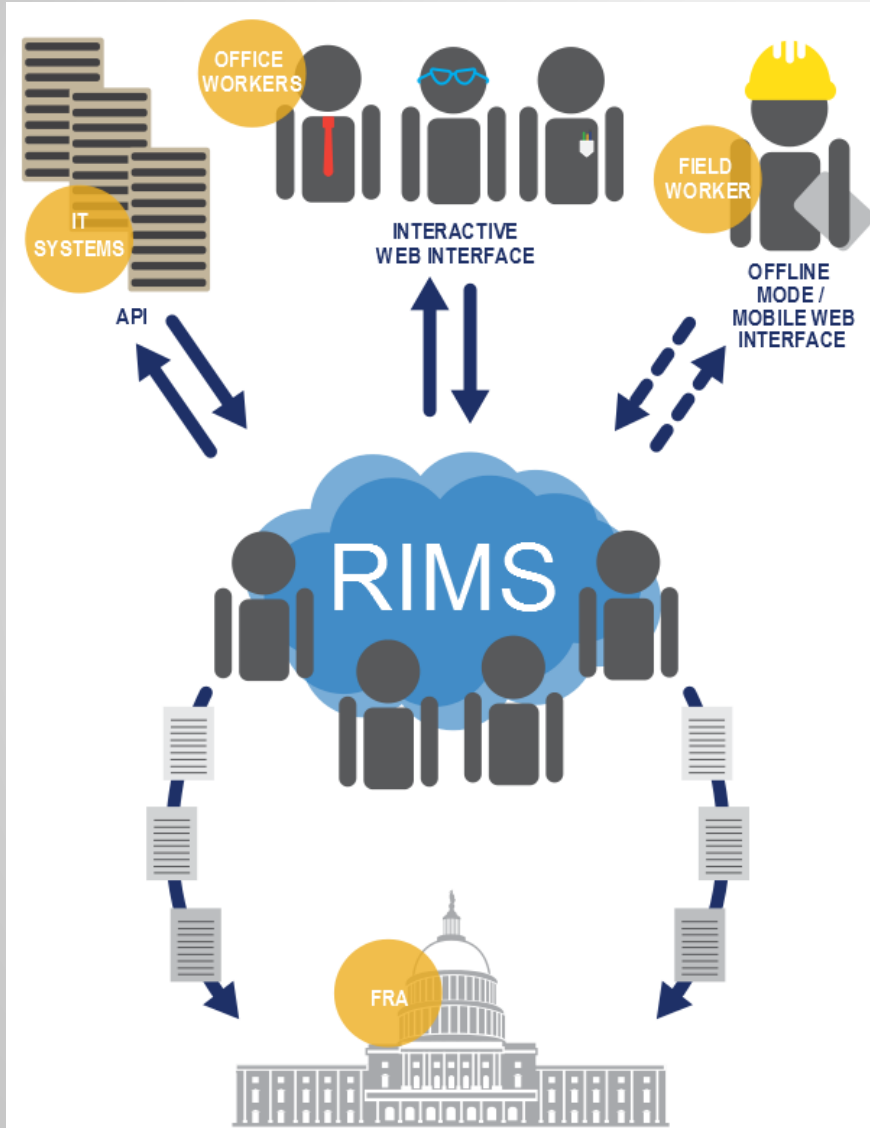
- I. ***Data Service***
- II. ***Data Collection***
- III. ***Analytical Tools***

The screenshot shows a web interface for managing crossing inventory. At the top, there is a navigation bar with a back arrow, a dropdown menu for 'Crossing 427386H', a title 'Approved Inventories for 427386H —...', and a 'Drafts & Approved' button. Below the navigation bar, the main content area displays the crossing ID '427386H' with status tags 'Public', 'At Grade', and 'Changed'. The location is 'S. Ave. E - Near Crowley, LA' and the date is '2012-05-29'. A 'Submitted Aug. 7, 2012, 6:29 p.m.' message is shown, along with 'Approved on Behalf of State' and 'Verified or Resolved: 100.0%'. A 'View Inventory' button is present. Below this, a section titled 'Changed FRA Fields' contains a table with one entry: 'Year for AADT' with a sub-range '1996 → 2010' and a 'Verified/Resolved' status.

Changed FRA Fields	
Year for AADT 1996 → 2010	Verified/Resolved



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## Three Sides of Hosted Web-based Solutions

- I. *Data Service*
- II. *Data Collection*
- III. *Analytical Tools*





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## DATA SERVICE





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CRWSD Parcel Search Map Downloads

## Parcel Search Results

Change Search Query

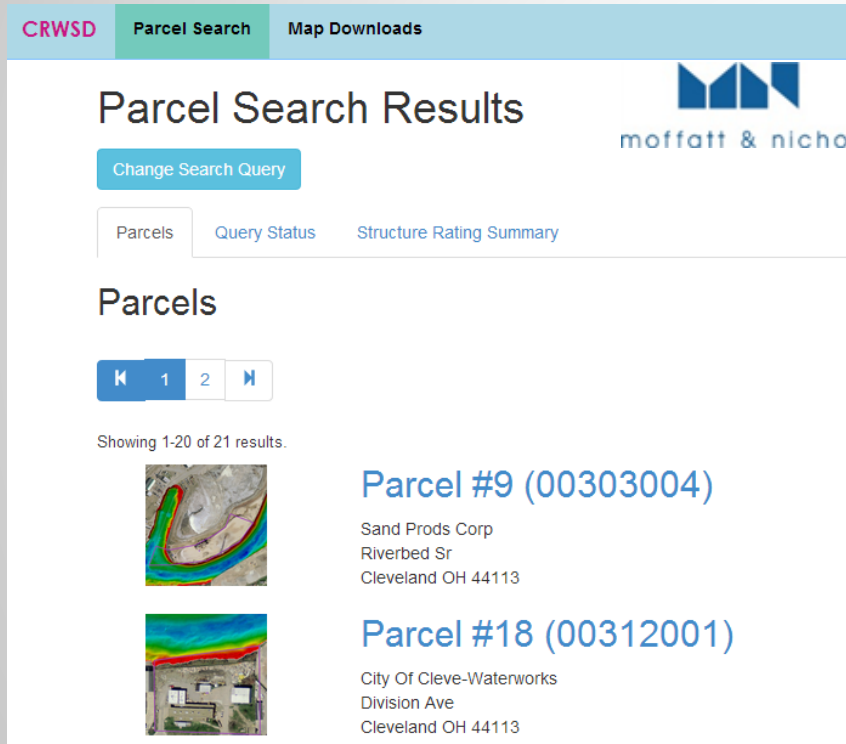
Parcels Query Status Structure Rating Summary

### Parcels

Showing 1-20 of 21 results.

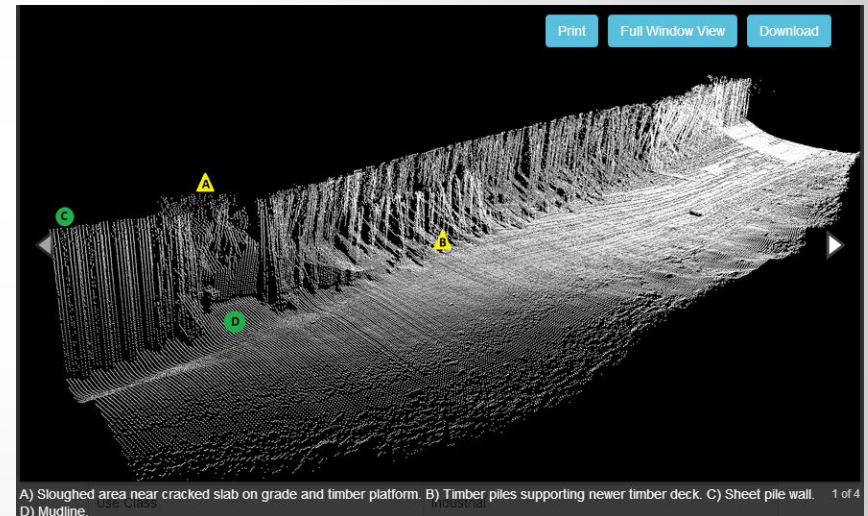
**Parcel #9 (00303004)**  
Sand Prods Corp  
Riverbed Sr  
Cleveland OH 44113

**Parcel #18 (00312001)**  
City Of Cleve-Waterworks  
Division Ave  
Cleveland OH 44113



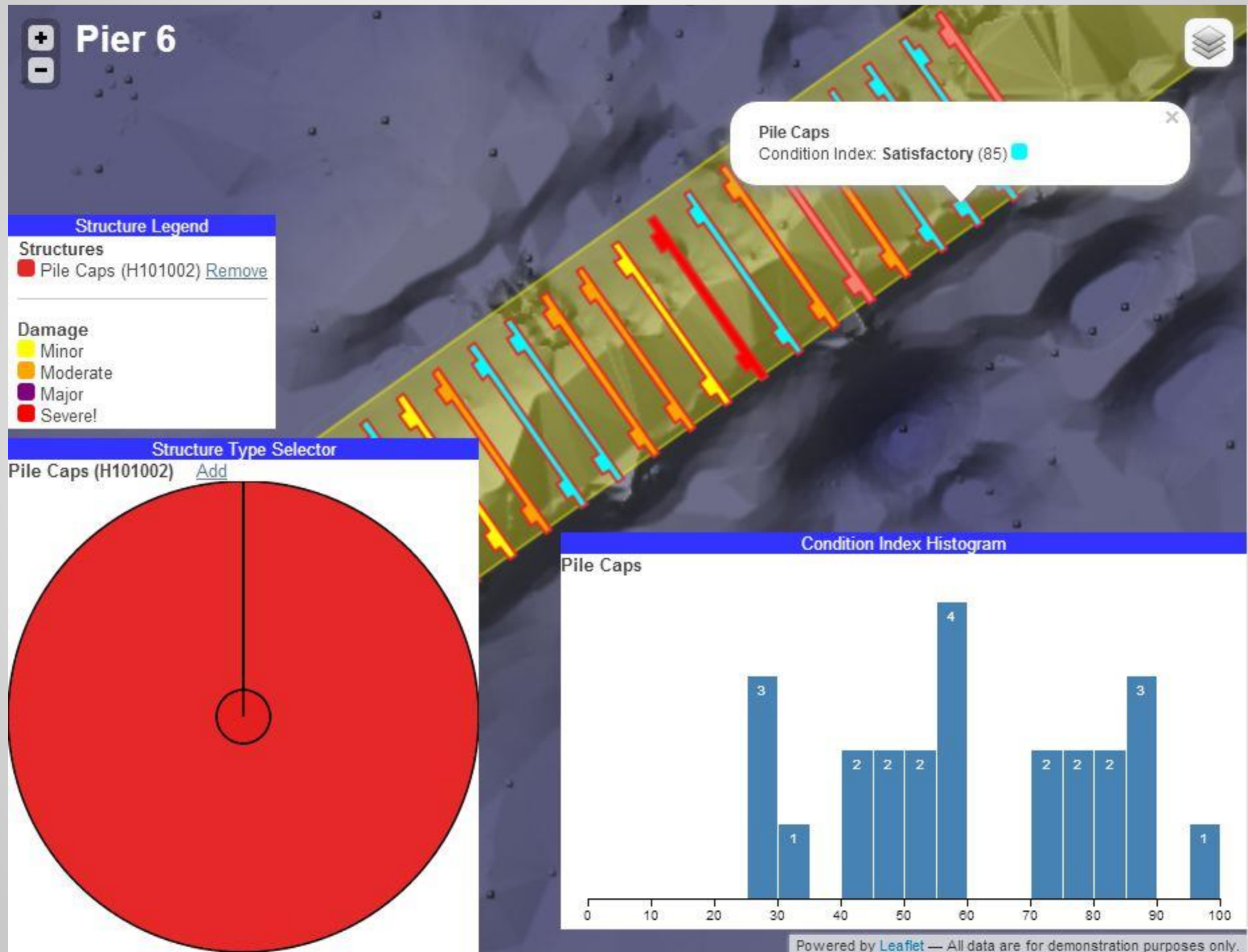
- Cuyahoga River Waterfront Structure Database
- Searchable report of bulkhead data including:
  - *Attribute data*
  - *GIS parcel data*
  - *Inspection photos*
  - *Underwater point cloud imagery*

- Underwater point cloud images display the condition of the structures below the waterline
- Condition and structure notes are highlighted
- Future versions could include an interactive 3D model





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## DATA COLLECTION





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**Understanding  
our  
Capabilities**



# Understanding our Capabilities



The screenshot displays a web application interface. At the top left, a "Google Earth - New Placemark" dialog box is open, showing the following fields:

- Name:
- Latitude:
- Longitude:

Below the dialog is a sidebar menu with the following sections and items:

- Crossing Inventory**
  - Crossing Search
  - Incomplete Crossings
  - Nationwide Crash Report Form Search
  - GIS/Web Map View
- Offline Module**
  - Check-out Data
  - View/Edit Offline Data
  - Discard Data
- User Functions**
  - Notices
  - Administration
  - Change Password
  - Logout

The background of the interface is an aerial satellite view of a road intersection. A yellow placemark pin is placed on the road, with a yellow square box around it and the text "Untitled Placemark" next to it.



# Understanding our Capabilities



RIMS Home ▼ **RIMS Web Map — Texas User** 319 Crossings in Filter

### Crossing 598330J

NINTH ST  
FORT WORTH, TX

- Public
- At Grade
- Changes in Existing Crossing Data
- AADT: 550

[Go to Crossing Page](#)

[Zoom into Crossing](#)

#### Legend

- Public
- Private
- Pedestrian
- At-Grade
- Grade-Separated
- ✕ Closed

Leaflet | Map data © OpenStreetMap contributors, CC-BY-SA



# Understanding our Capabilities



- |   |                                                                                                                    |                                                               |   |
|---|--------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------|---|
| 5 | <b>816772S</b> <span>Public</span> <span>At Grade</span> <span>Changed</span><br>Ames Ave N - Near Omaha, NE       | 2012-08-07<br>NDOR Mainframe Import - Feb. 5, 2013, 6:51 p.m. | ➤ |
| 4 | <b>816772S</b> <span>Public</span> <span>At Grade</span> <span>Changed</span><br>Ames Ave N - Near Omaha, NE       | 2010-01-01<br>FRA - Foreign Files - Dec. 3, 2010, midnight    | ➤ |
| 3 | <b>816772S</b> <span>Public</span> <span>At Grade</span> <span>Changed</span><br>Ames Ave Nr 11th - Near Omaha, NE | 1983-08-24<br>FRA - Unknown - Aug. 24, 1983, midnight         | ➤ |
| 2 | <b>816772S</b> <span>Public</span> <span>At Grade</span> <span>Changed</span><br>Ames Ave - Near Omaha, NE         | 1982-08-11<br>FRA - Unknown - Aug. 11, 1982, midnight         | ➤ |
| 1 | <b>816772S</b> <span>Public</span> <span>At Grade</span> <span>Changed</span><br>Ames Ave - Near Omaha, NE         | 1976-07-01<br>FRA - Unknown - July 1, 1976, midnight          | ➤ |

Showing 1-5 of results.

✕
Flag Issue — state\_agent2

Target:

Shared With Other Agency (Railroad) ▼

Subject:

Passenger Service Example Flag

Message:

This may be a case where a state knows about a passenger service, but the field is marked as none by the railroad.

Flag "Type of Passenger Service" Field





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## ANALYTICAL TOOLS



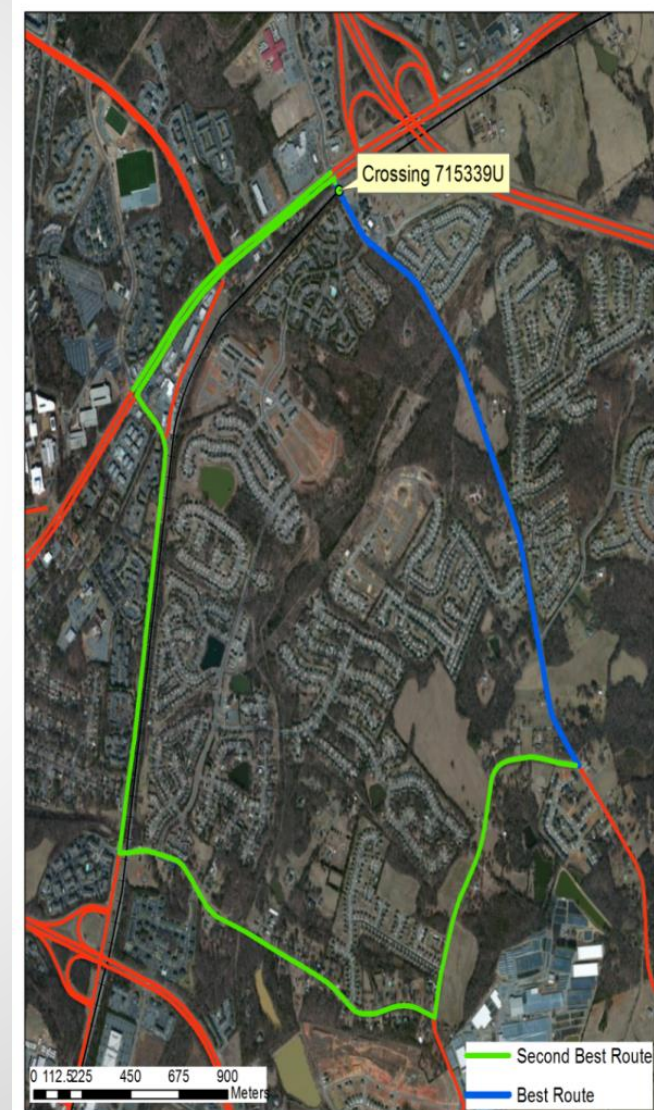
# ts ANALYSIS - Expected At-grade Rail Crash Cost-Based Screening



- **Cost Based Screening uses the expected cost of a crash at an at-grade-crossing that has three components:**

**Expected crash cost = crash probability \* (primary effect costs + secondary effect costs)**

- **Cost Based Screening is a data intensive process**
  - *Rail infrastructure inventory;*
  - *Crash history;*
  - *Traffic volumes;*
- **While not necessary in the screening process, GIS platforms can significantly improve the initial steps of the safety improvement process;**





## ANALYSIS - Application to Cost Benefit Analysis



- Identify potentially high risk crossing based on the expected crash costs;
- This approach can help in identifying potentially high-reward (crossings with most improvements) crossings for future investigations;
- Additional elements need to be included in order to estimate a full-blown cost benefit ratio.







# Transportation Infrastructure – Project Prioritization



**Additional funding sources  
and Strategies**

**Grade crossing projects  
included within  
highway projects**

**Benefit / Cost  
Justification**

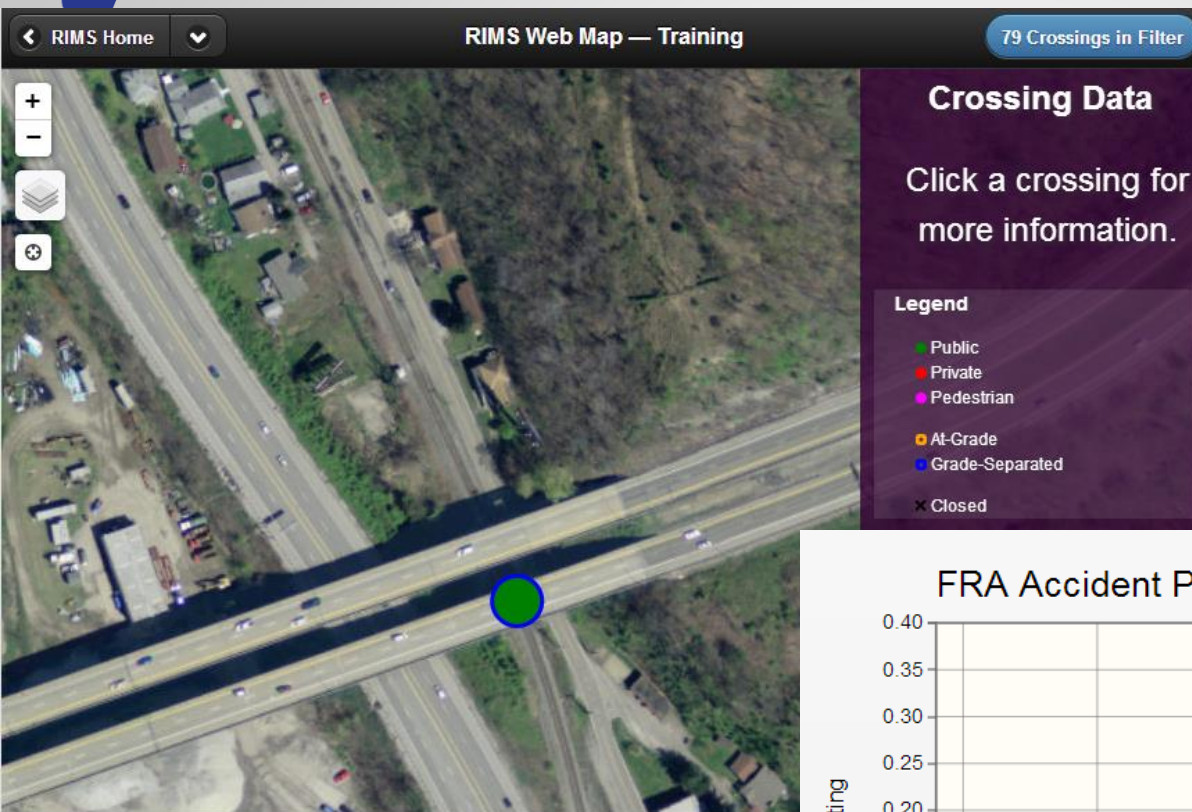
**Infrastructure  
Report Card**

**Funding Validation**



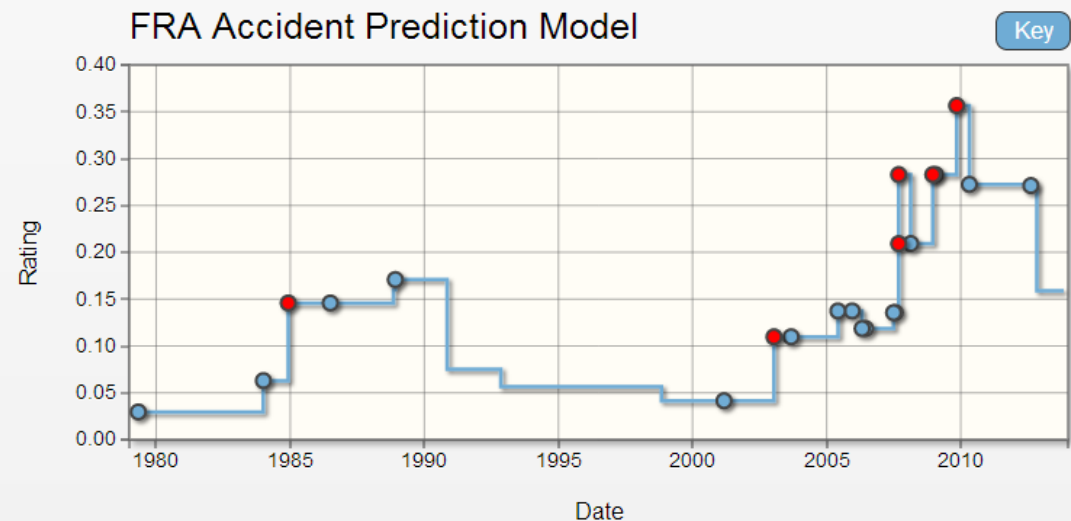


# ANALYSIS - Transportation Project Prioritization

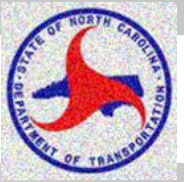


## Project Approach:

- Analysis of current data systems
- Analyze current prioritization processes
- Recommend improvement to processes



Rating: 0.1591  
Date: 2013-11-04



## Method of Implementation:

- Develop B/C models
- Design Web based application

### Project Criteria Summary

[Back to Home](#)

#### Total Scores

Project	Base Score	Division	Regional
RUS test 1	220.167847767	30.2122912954	42.7052008843
Lexington Test 1	118.467664978	17.4356497467	27.660449561

#### Specific Criteria Scores

##### Passenger Station Connectivity

Rank	Project	Base Score	Division	Regional
1	RUS test 1	52.4377173913	5.24377173913	5.24377173913
2	Lexington Test 1	6.6	0.66	0.66

##### Passenger Station Mobility

Rank	Project	Base Score	Division	Regional
1	RUS test 1	81.782068974	12.2673103461	16.3564137948
2	Lexington Test 1	19.1493336717	2.87240005076	3.82986673435

##### Passenger Station Capacity & Congestion

Rank	Project	Base Score	Division	Regional
1	Lexington Test 1	92.6283313065	13.894249696	23.1570828266
2	RUS test 1	82.1280614013	12.3192092102	20.5320153503

##### Benefit-Cost

Rank	Project	Base Score	Division	Regional
1	RUS test 1	3.82	0.382	0.573
2	Lexington Test 1	0.00	0.000	0.0135





## CONCLUSIONS:

- **Emphasis on electronic communication requirements/capabilities**
  - *Federal Railroad Administration*
  - *Railroads*
  - *State Agencies*
- **Update economic factors for Cost/Benefit approaches**
  - *Prioritization Models*
  - *Corridor Approach*
  - *Infrastructure management*
- **Spatial Analysis and Data Integration**
  - *GIS Rail and Highway LRS*
  - *Scenario based modeling*



## QUESTIONS/DISCUSSION...?

Presenters:

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