

Trespass Prevention Research Study

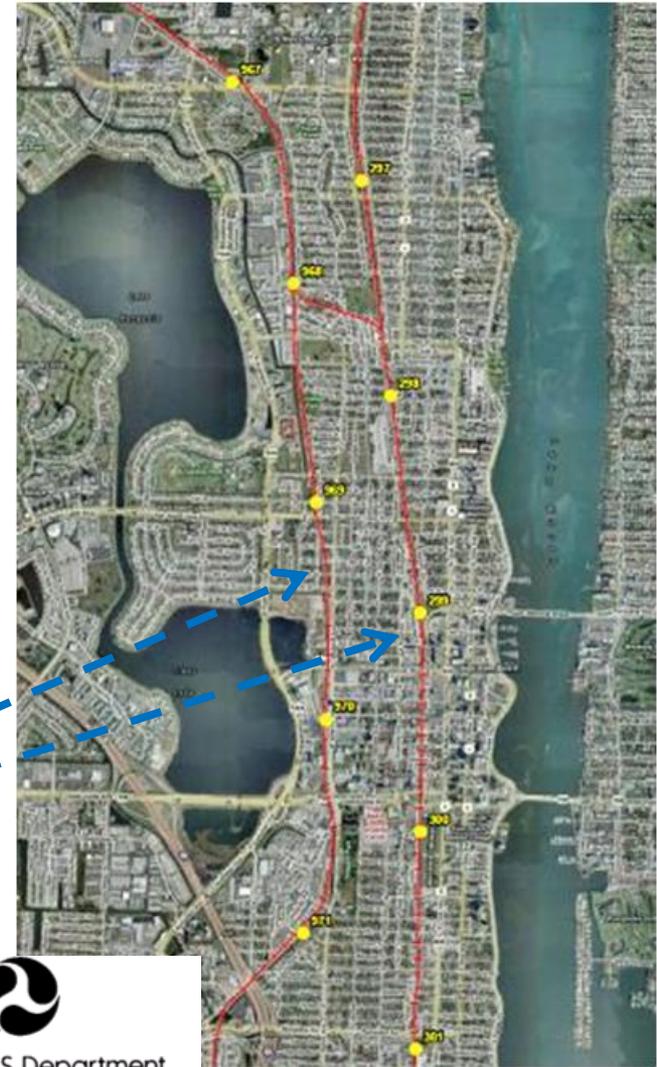
Project initiated August 2009

Objective

- Eliminate trespasser incidents and fatalities
- Provide national guidance on trespass mitigation

Study Area

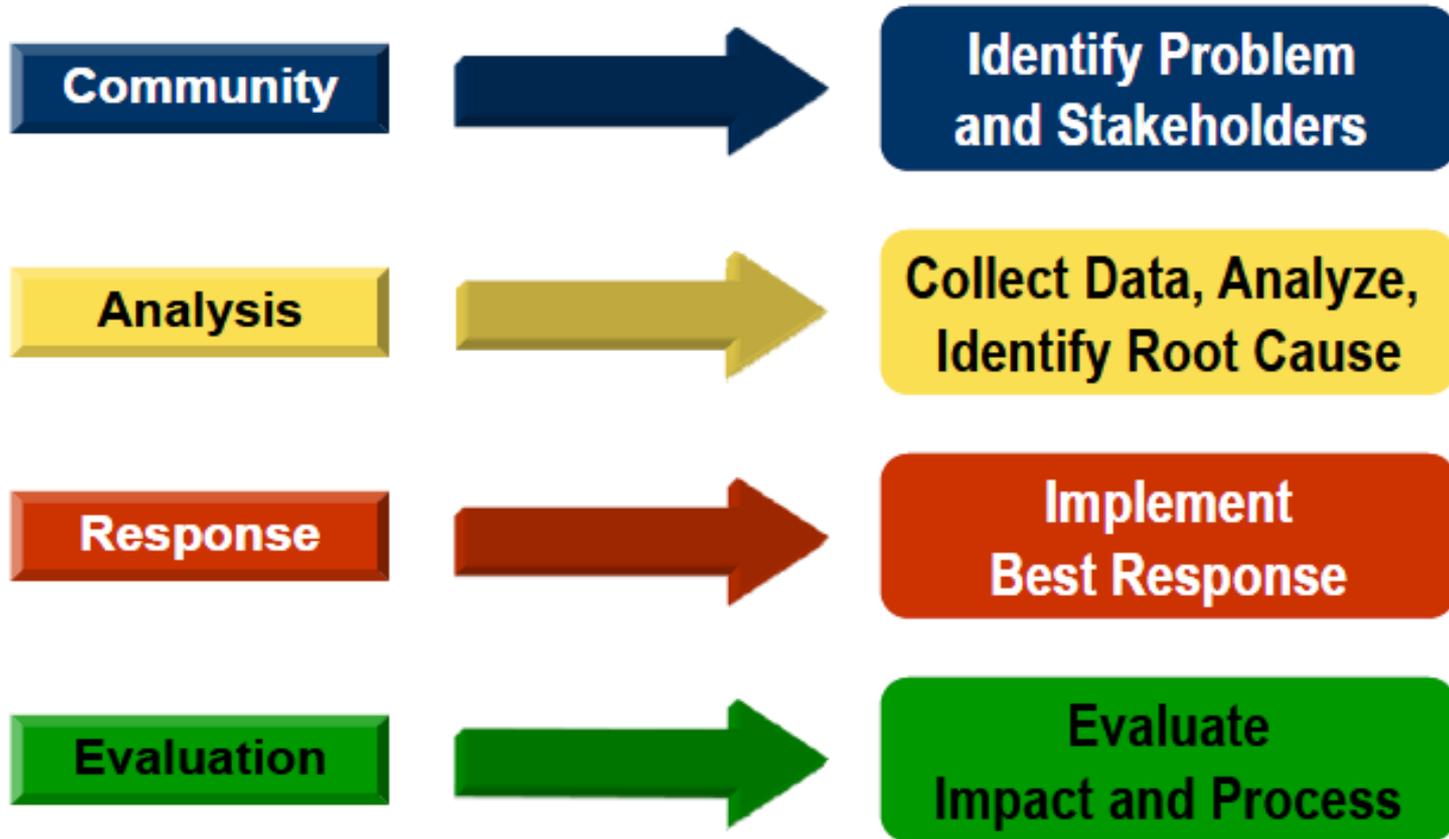
- City of West Palm Beach, FL
 - SFRTA (TriRail)/CSX/Amtrak (milepost 966-973)
 - FEC (milepost 296-301)



U.S. Department
of Transportation
**Federal Railroad
Administration**

*Sponsored by the FRA Office of Research and Development
- Signal, Train Control and Communications Division*

Trespass Prevention Research Study



Source: Canadian Pacific Police Service, Managing Risk; A model for Deterring Trespassers, Operation Lifesaver 16th International Symposium, August 31, 2010.

Stakeholders



U.S. Department
of Transportation

**Federal Railroad
Administration**



**West Palm Beach
Neighborhood Associations**



**PALM BEACH COUNTY
SHERIFF'S OFFICE**

Recent/Current Activities

- **Stakeholder Meetings**

- Oct 2009, Feb 2010, Apr 2010, July 2010, October 2010, March 2011, Sept 2011, Feb 2012, June 2012 (completed)
- Field Review (completed July 20, 2012)
- Sept/Oct 2012 (upcoming)

- **Data collection**

- Interview with individual stakeholders (completed)
- TriRail right-of-way site inspection (completed)
- FEC right-of-way site inspection (completed)
- TriRail locomotive video analysis (completed)

- **Education/outreach participation**

- Oct 2009 - Safety Blitz (completed)
- Apr 2010, June 2011, June 2012 - Train Safety Awareness Week (completed)



Incident Data Collection

Stakeholder	Data Type	Status
FRA	Incident data	✓
Volpe/FRA	Field observations	✓
SFRTA	Incident data	✓
SFRTA	Train crew observations	✓
SFRTA	Locomotive video	✓
Amtrak Police	Incident Data	✓
CSXT Police	Incident Data	
FEC Police	Incident Data	
West Palm Beach PD	Violation/Incident data	
PB County School District PD	Incident Data	

As of Aug 2012

Incident Data



6693 ft

Image © 2011 TerraMetrics

Data SIO, NOAA, U.S. Navy, NGA, GEBCO

26°42'45.06" N 80°03'29.59" W elev 23 ft

Google

Eye alt 29110 ft

Imagery Date: 1/19/2009

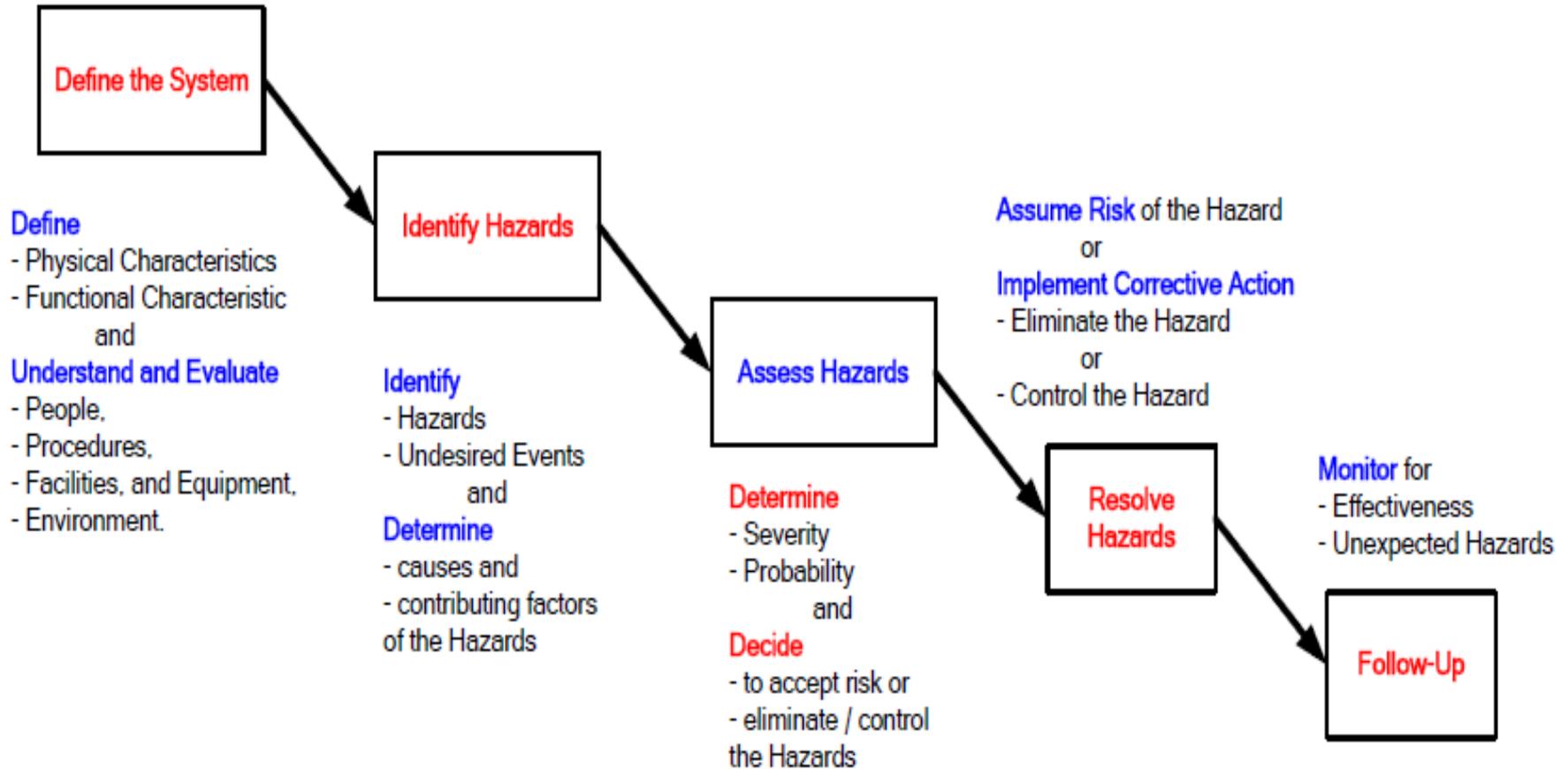
Hazard Analysis Methodology

- Uses the System Safety Program Hazard Identification/Resolution Process which is based on US-MIL Standard 882D¹
 - Used by several transit agencies, including SFRTA, within their System Safety Program
- By determining the hazard severity and probability, the hazard can be reduced to its lowest practical level
- Attempt to apply methodology to the trespass problem

¹Military Standard 882D, *System Safety Program Requirements*, Department of Defense, Washington, DC
January 19, 1993

<http://www.acq.osd.mil/atptf/policy/documents/MILSTD882D.pdf>

Hazard Analysis and Resolution Process



Source: U.S. Department of Transportation Federal Railroad Administration. 2007. "FRA Approach to managing Gap Safety."

Hazard Analysis Methodology - 3. Assess Hazards

Assessment criteria examples

- Prior incidents
- Near miss history
- Track curvature
- Sight obstructions
- Number of tracks
- Train speed
- Prevalent trespass type (along/cross)
- Attractive nuisances (schools, community centers, parks...)
- Number of daily trains
- Suicide??

Rating Scheme

- Assign weight (point rating) for each type of criteria
- Add up points, resulting in a **risk-based prioritized list**

Hazard Analysis Methodology

Trespass Severity



504Front Top Site
17 Mar 2010 17:07:21 Eastern Daylight Time



Camera07 510
13 May 2010 17:43:39 Eastern Daylight Time

Trespass Location Severity Analysis (TLSA)

Priority Score Mapping to Risk Class (proposed)

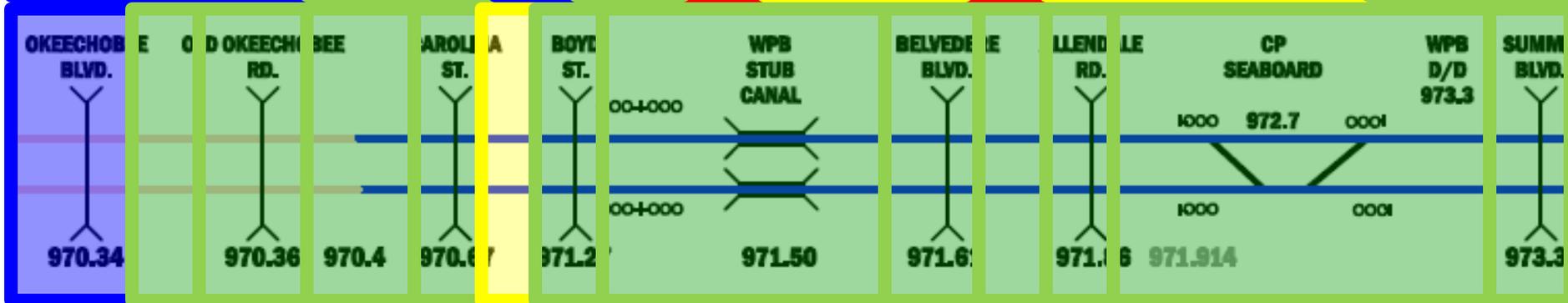
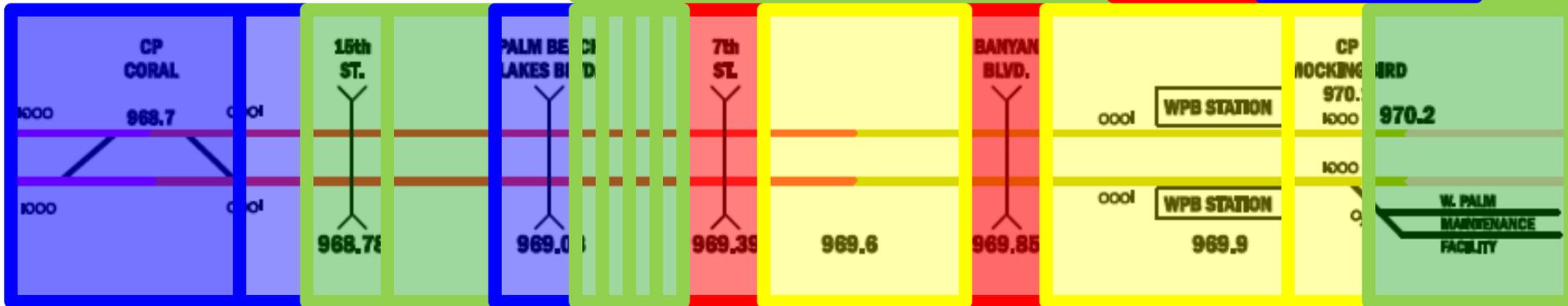
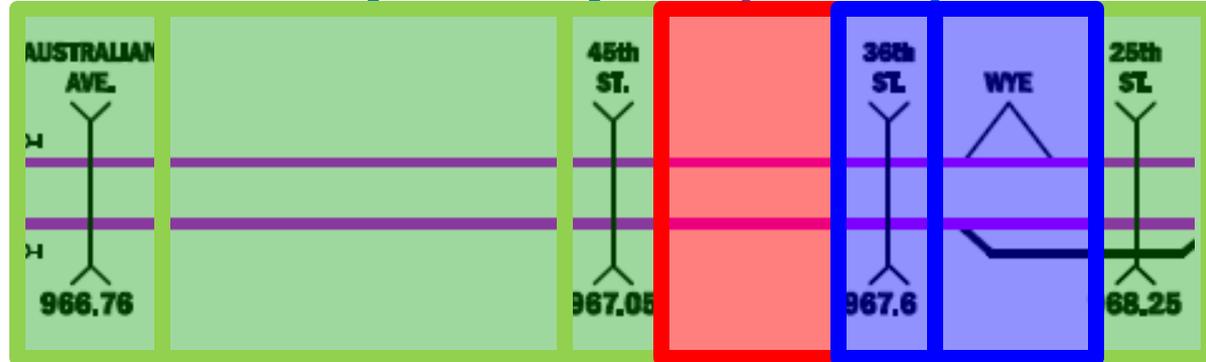
- A (high risk): PS \geq 20 3 locations
- B (medium risk): $10 \leq$ PS < 20 4 locations
- C (low risk): $5 \leq$ PS < 10 6 locations
- D (negligible risk): PS < 5 21 locations

Frequency	Consequence								
	R	C1	C2	C3	C4	C5	C6	C7	C8
	Service Related	Negligible	Minor	Minor with Medical Care	Serious Admitted to Hospital	Serious	Serious with Multiple Injuries	Critical	Disastrous
Certain	R	B	B	B	A	A	A	A	A
Likely	R	C	B	B	B	B	A	A	A
Probable	R	C	C	B	B	B	B	A	A
Unlikely	R	C	C	C	C	C	B	B	A
Rare	R	D	C	C	C	C	C	B	B
Inprobable	R	D	D	D	D	C	C	B	B
Incredible	R	D	D	D	D	D	D	C	C

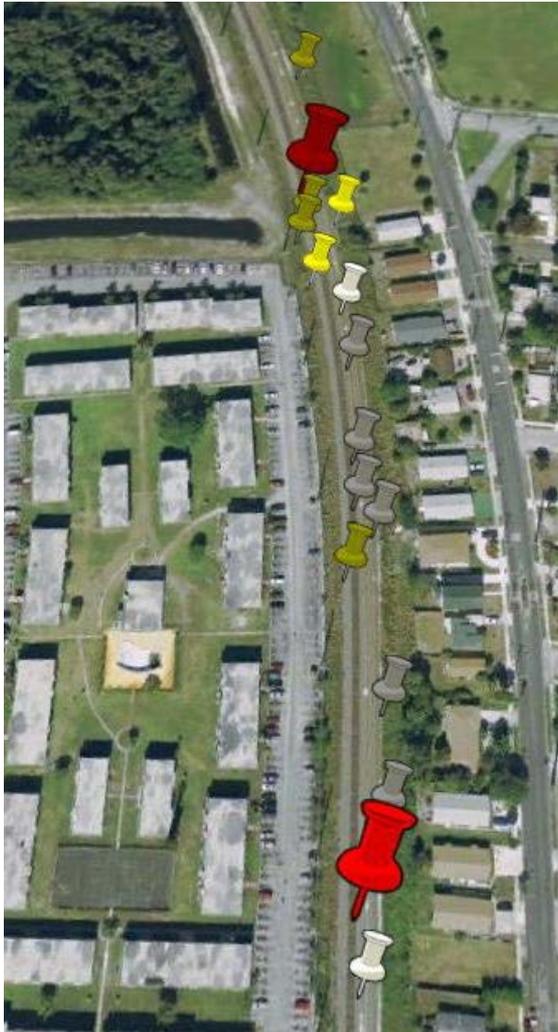
Source: U.S. Department of Transportation Federal Railroad Administration. 2007. "Collision Hazard Analysis Guide: Commuter and intercity Passenger Rail Service."

Trespass Location Severity Analysis (TLSA)

- A (high risk):
- B (medium risk):
- C (low risk):
- D (negligible risk):



TLSA – ROW between 45th and 36th

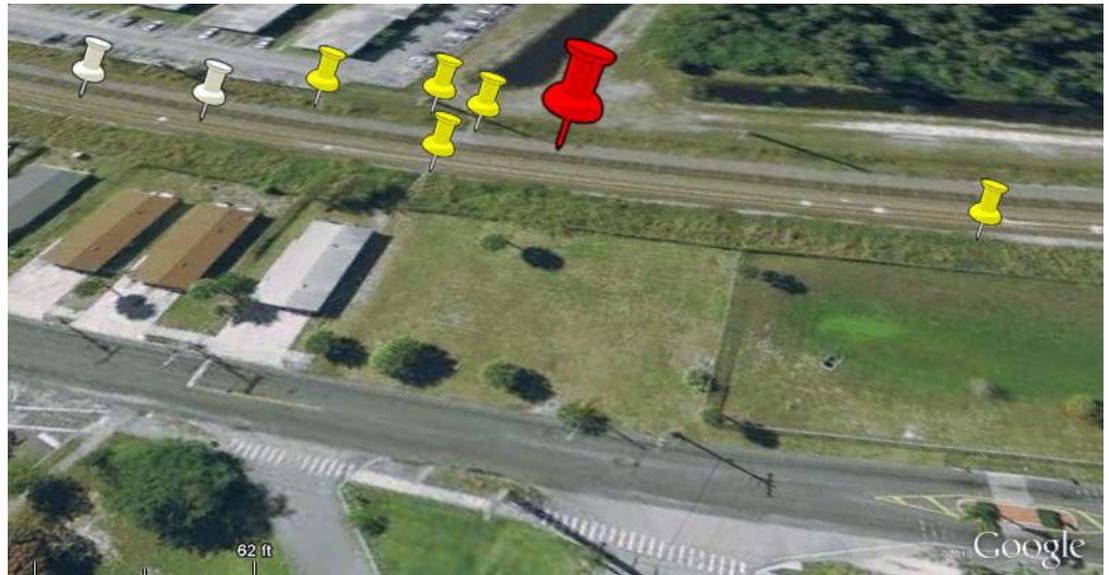


2 fatalities

14 trespass events

- 7 within 100 ft of end of canal
- All 7 between 2:14 PM and 6:03 PM
- Northmore Elementary School (and playground) on East side

Risk Class A (high risk)



TLSA – ROW between 45th and 36th



504Front Top Site
17 Mar 2010 17:07:21 Eastern Daylight Time



Recommended Mitigation Strategies (March 9, 2012)

Location ID: A16
Description: 7th Street Grade Crossing

Priority Score: 34
Risk Class: A (High Risk)



Trespass History:
1 fatality (12/04/07)
1 suicide (09/22/05)
1 attempted suicide (03/24/06)
Tri-Rail locomotive video - 14 trespass events (03/05/10-07/05/10)
3 trespass events noted via Veolia reports (04/07/10-04/19/10)



Trespass Characteristics

Most events involve pedestrians violating the pedestrian gates at the crossing.

Potential Mitigation Strategies

Engineering

- A Pedestrian Channelization System could restrict pedestrian movement to designated areas within the crossing while closing gaps in the existing fencing along the ROW.
 - o Fencing / Landscaping / Jersey Barriers
 - o Z-gates / Swing Gates
 - o Pedestrian gate skirts
- Static Wayfinding Signage along the corridor could be installed to direct pedestrians to appropriate crossing points.

Education

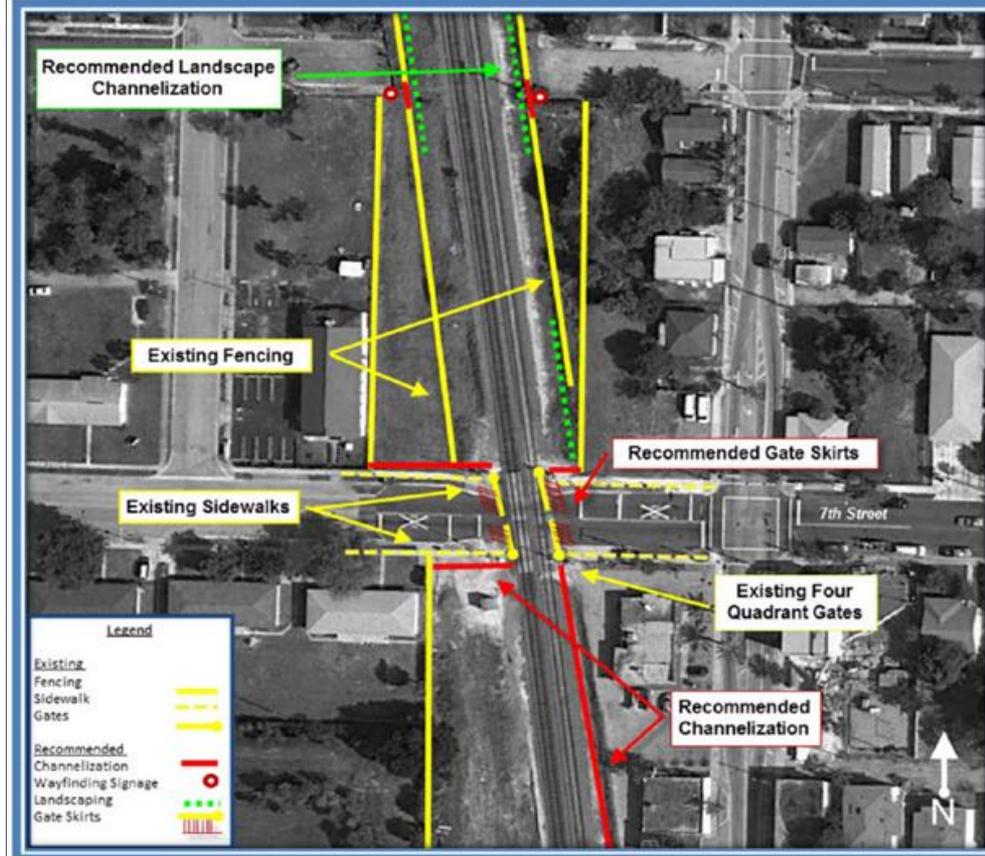
- A Targeted Pedestrian Blitz could be designed to enhance pedestrian awareness to the potential hazards of disregarding railroad warning devices.
- A System-wide Education Program could also enhance pedestrian awareness and compliance with posted signs and regulations.

Enforcement

- A Targeted Enforcement Campaign at the crossing could support an education campaign while gaining further publicity for safe crossing practices.
- Better Display of Penalties, including posted signs with signal-violation penalties, can also serve as an effective deterrent.

SUG Recommended Risk Control Measures

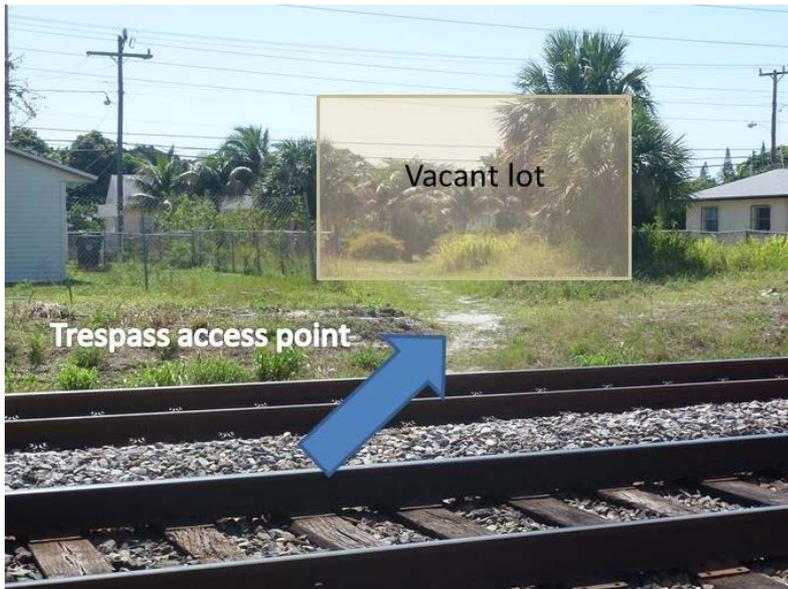
The SUG noted that in the existing channelization system allows pedestrians and vehicles to consistently violate the grade crossing warning devices. The proposed engineering treatments at 7th street included enhanced channelization using fencing or landscaping to contain crossing activity. The SUG also supported the use of gate skirts in conjunction with the channelization. The SUG endorsed wayfinding signage throughout the corridor to direct pedestrians to the nearest safe crossing point. As an education strategy, the group proposed a coordinated effort that would engage customers of the businesses located along Tamarind Avenue. The group also noted that the West Palm Beach athletic league adjacent to the crossing could offer the potential to leverage a combined education and enforcement campaign focused on 7th street.



Field Review (July 20, 2012)



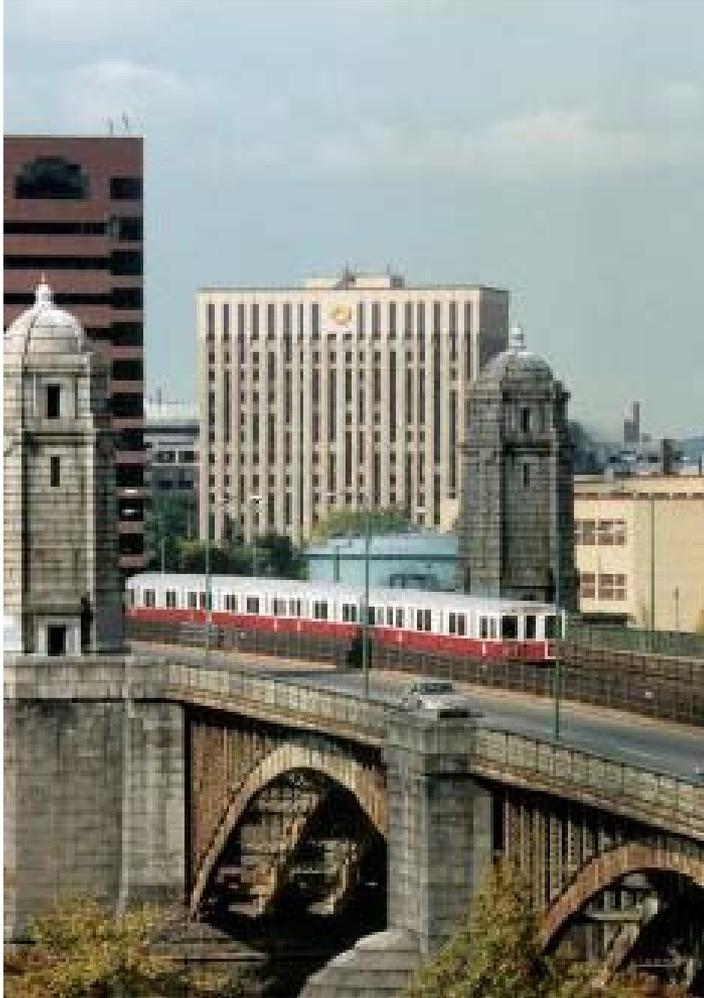
U.S. Department of Transportation



Next Steps

- ❑ Support Implementation
- ❑ Evaluation
 - Install surveillance equipment at select locations for further trespass data collection
 - Assess effectiveness of implemented treatments
- ❑ Roll-out to other high trespass areas
- ❑ Guidance/best practices





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