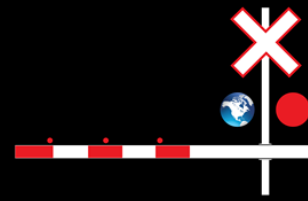




2014 Global Level Crossing Safety & Trespass Prevention Symposium Urbana, IL – University of Illinois



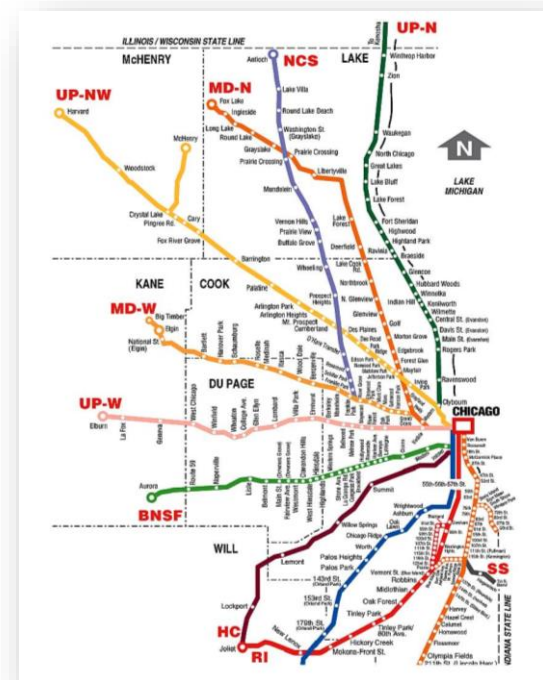
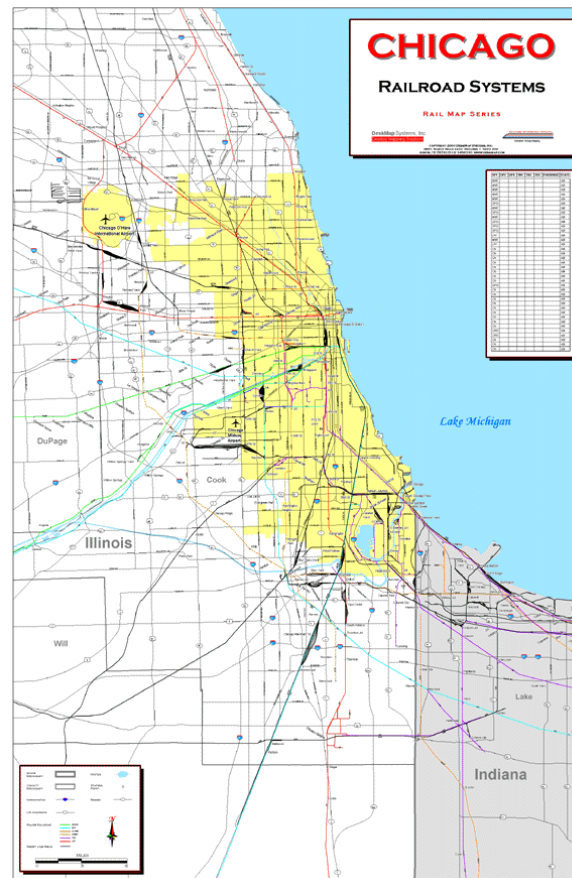
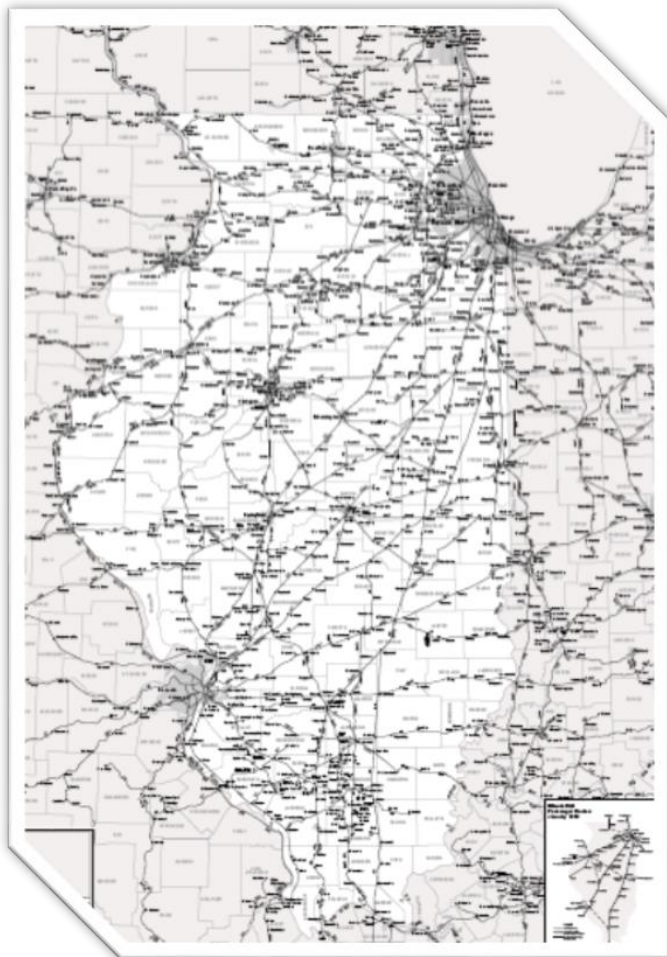
Road Intersections Near Level Crossings: Intersection Awareness in Illinois



Brian Vercruysse
Illinois Commerce Commission



Illinois Freight & Passenger Rail Systems



Metra Commuter

Illinois Rail Crossing Statistics

7,027 miles of railroad track
2nd largest by State

145,000 miles of highway
3rd largest by State

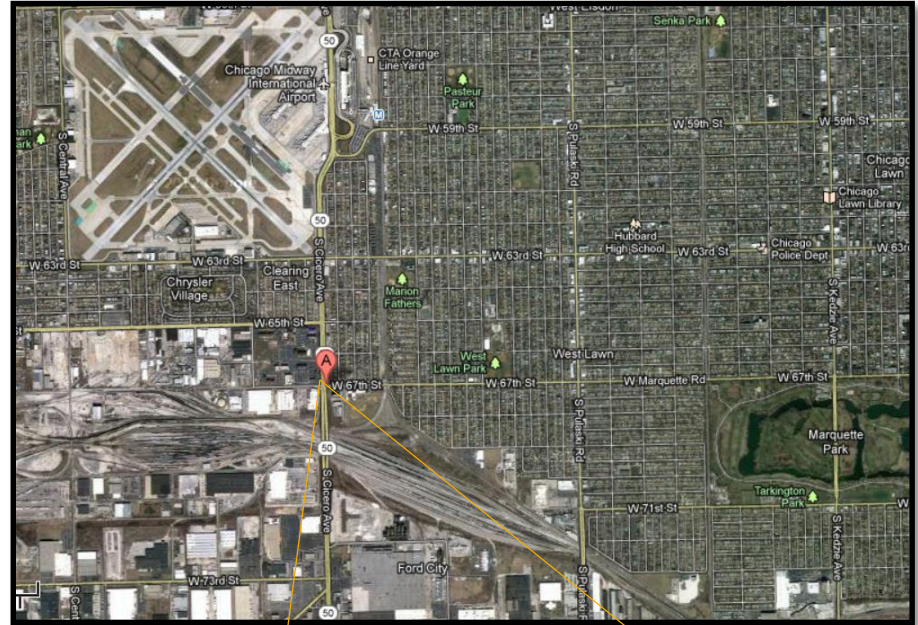
7,720 public level crossings

2670 public grade separated crossings

Over 50 Railroad Companies
6 of 7 Class I's pass through Chicago

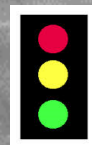


Illinois Level Crossing Characteristics



Road Intersections Near Level Crossings State of Illinois

Thousands of level crossings near intersections
(1000 feet and closer)

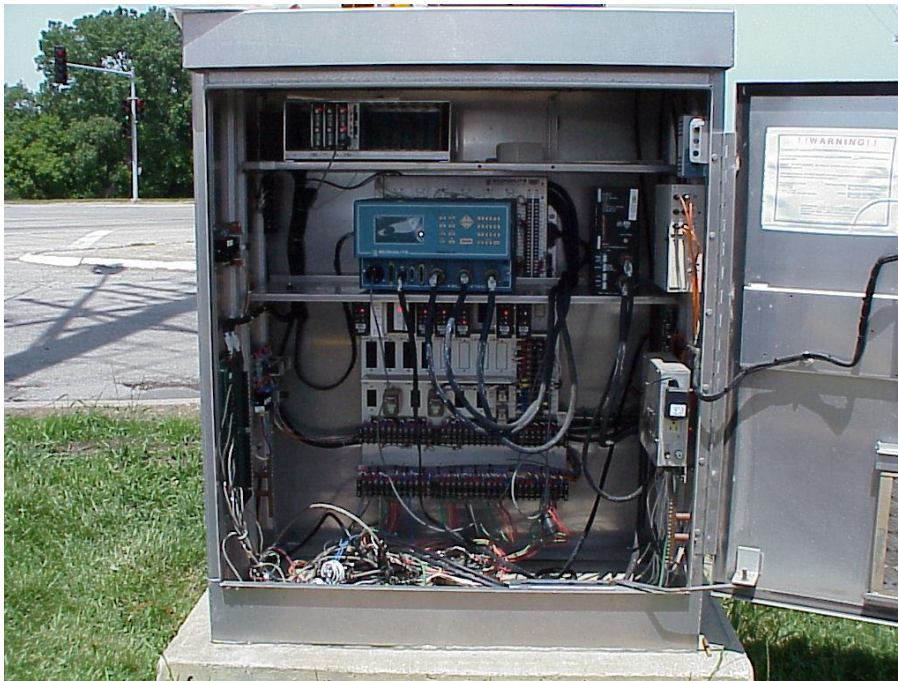


300+ Interconnects in Illinois

“Interconnect”: Location where RR Warning devices
interconnected to intersection traffic signals

Level Crossings within the intersection to 480' away from
intersection

Traffic Signal Interconnect - At Its Most Basic -



Traffic Signal Interconnect - At Its Most Basic -



Traffic Signal Interconnect - At Its Most Basic -



Interconnect Awareness

October 25, 1995 – Fox River Grove, Illinois

Tragic Event That Focused Global Attention on Interconnects

Train – School Bus Crash with 7 fatalities and many injuries

Was the start in finding operational and safety concerns, and developing new standards and procedures.



Interconnect Complexities

Found after 10/25/95 – Fox River Grove, Illinois

Railroad Warning Device and Traffic Signal Critical Components

- ***Insufficient Warning Time and Inconsistent Warning Times***
- ***Commuter Train Operating Practices (Acceleration within Starts)***
- ***Gate Operation Versus Release of Preemption***
- ***Traffic Signal Controller - Software Limitations***
 - No Re-Service to Handle 2nd Train Move or Multiple Preemption Events
 - Ability to Easily Modify Critical Timing Data – Lack of Security
- ***Criteria & Design: Use of Pre-Signals , Pavement Markings, Signing***
- ***Interconnect via 2-wire cable (Simple Short → No RR Preempt)***

Interconnect Improvements in Illinois

By Year 2000, Majority of Interconnects Upgraded

ICC Regulatory Authority – New Legislation

Formal Process: Petitions, Hearings, Orders

Increase Warning Time & Reduce Variability

Engineering Study Based on Field Conditions Each Interconnect

~\$300M+ Spent to Upgrade RR Circuits Alone

Improve Design & Operation of RR Devices: Constant Warning Time

Simultaneous Preemption

Traffic Signal Controller – New IL Software

Re-Service to Handle 2nd Train Move or Multiple Preemption Events

Special Software to Secure Critical Timing and Phase Data – CRC and T&F Security

Shop test all TS Cabinets and Controllers before installation – Review all Intervals

Remote Monitoring (Traffic Signal and RR Devices)

Traffic Signal Cabinet Safeguard – Not able to Install Improper Spare Controller with a Failure

Pre-Signals, Geometric Changes, Signing & Striping

Interconnect via 3-wire cable for Supervisory Circuit

Continued Work

“Interlock” – First Line of Defense

(Monitor the Preemption Input to the Traffic Signal Controller)

2002 – Advance Preemption Demonstration Project

Account for varying train operations on Commuter Corridors

3 years for vendor to make RR circuit operational

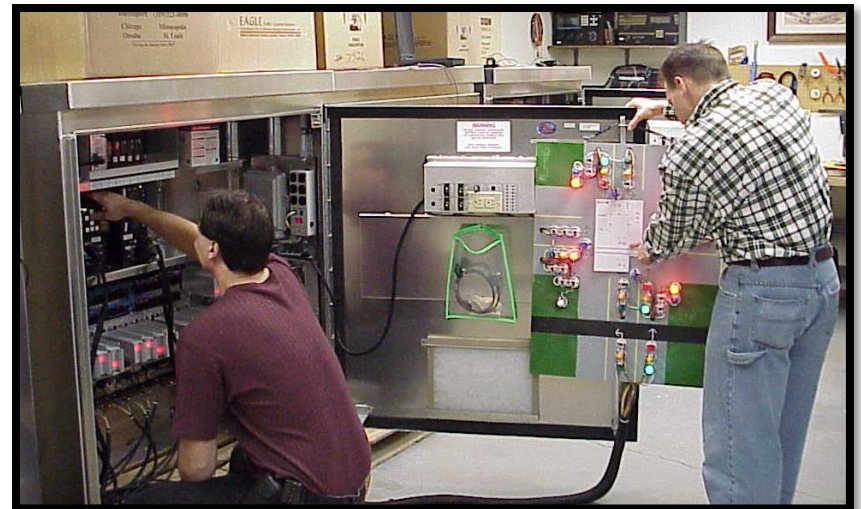
Use Simultaneous Preemption in Illinois

Battery Back-up and LED's

Traffic Signal Phasing

Left on Arrow Only

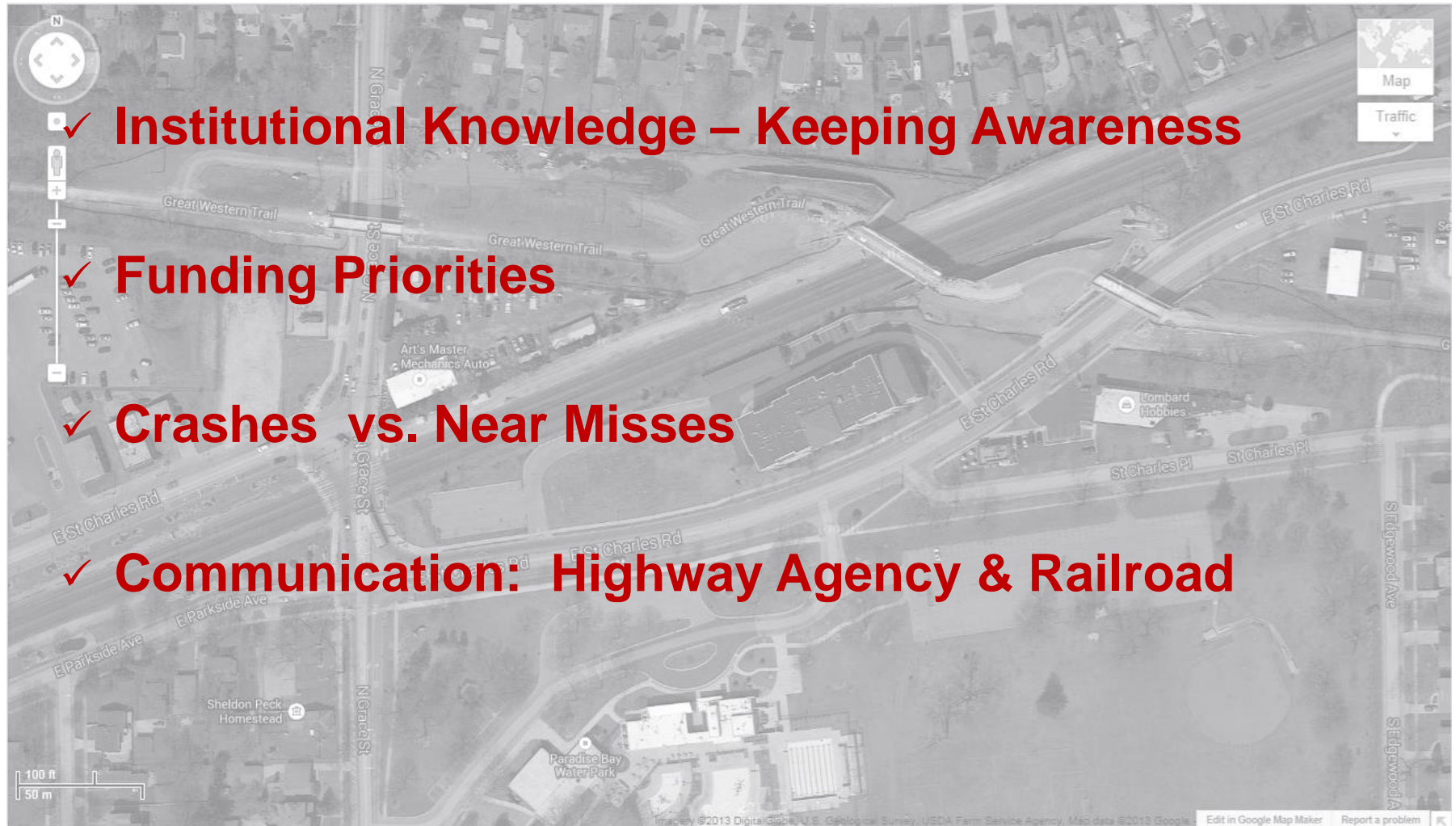
Split Phasing



Continued Vigilance

- ✓ Monitoring Existing Interconnects
 - Yearly Reviews
 - New Development near Level Crossings
 - Changes in Traffic or Train Operations
 - Pavement Marking, Crossing Condition
- ✓ New Traffic and RR Controllers
- ✓ Handling Legacy Equipment/Spares

Continued Vigilance



Summary – Interconnect Awareness

- ✓ Address New Challenges or Concerns
- ✓ Persistence to Address the Continuing Problems
- ✓ Awareness \neq Crash
 - ✓ Near Miss
 - ✓ Conflicting traffic and/or development
 - ✓ Proactive
- ✓ Provide Barrier (RR Gate) as quickly as possible
 - ✓ Limit Downstream Variables
- ✓ Protect Critical Timing, Phasing, and Circuits
- ✓ Vigilance and Communication

Brian Vercruysse
Senior Rail Safety Specialist
Illinois Commerce Commission
527 E. Capitol Avenue
Springfield, IL 62701
(312) 636-7760
bvrecrui@icc.illinois.gov
www.icc.illinois.gov

End Session 1 – Enjoy Illinois and the Chicago Review



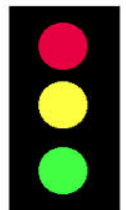
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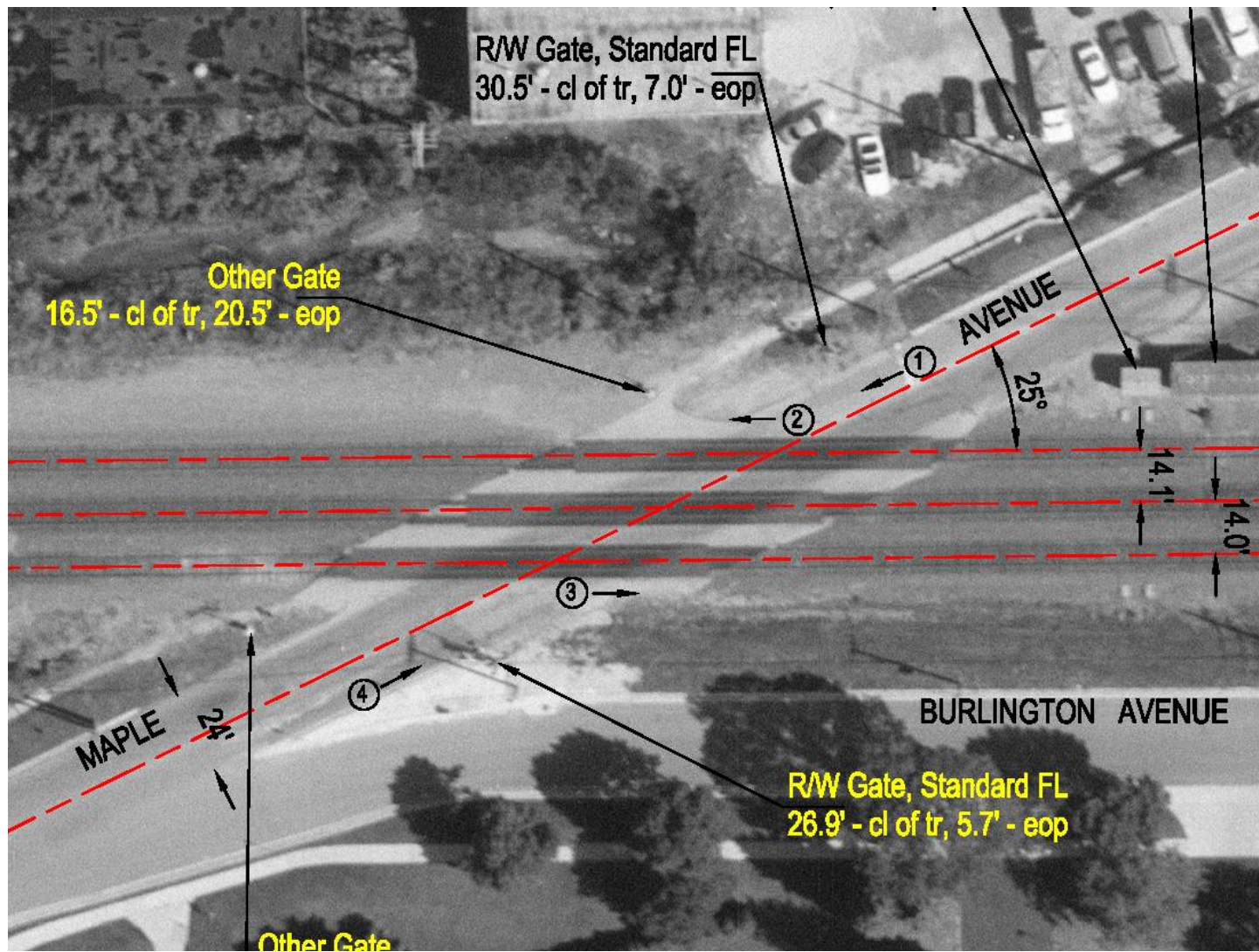
Illinois Case Studies

Road Intersections Near Level Crossings

1. Non-Interconnect
2. Interconnect but No Active RR Devices
3. New Interconnect (Over 200' Away from Crossing)
4. Capacity Upgrades at Existing Interconnect (Pre-Signal)
5. Triangle Configurations with Adjacent Crossings



1. Non-Interconnect Roadway Intersections near Level Crossings



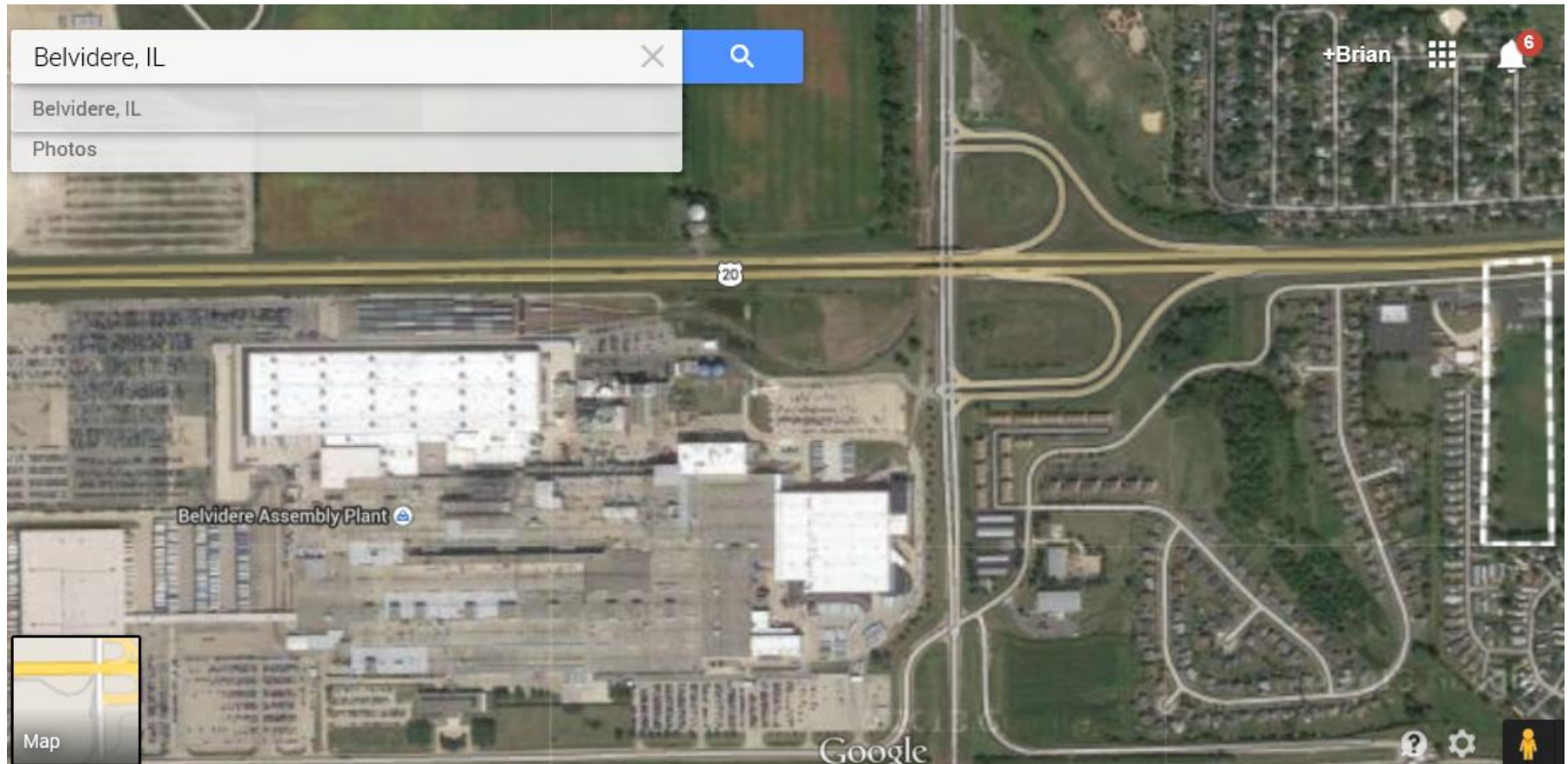
1. Non-Interconnect Roadway Intersections near Level Crossings



1. Non-Interconnect Roadway Intersections near Level Crossings



2. Interconnect – No Active RR Devices Roadway Intersections near Level Crossings

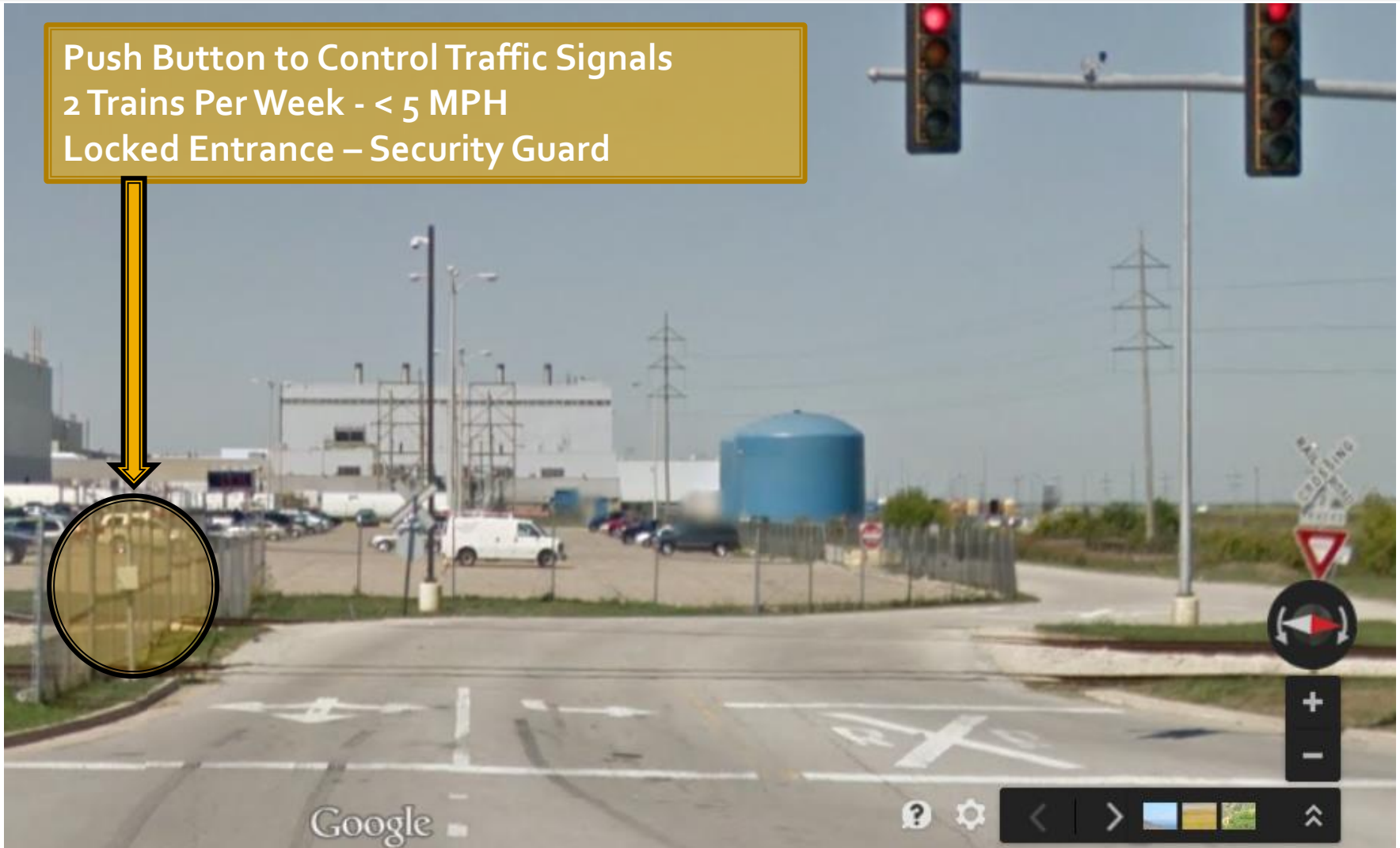


2. Interconnect – No Active RR Devices Roadway Intersections near Level Crossings



2. Interconnect – No Active RR Devices Roadway Intersections near Level Crossings

Push Button to Control Traffic Signals
2 Trains Per Week - < 5 MPH
Locked Entrance – Security Guard



3. New Interconnect Roadway Intersections near Level Crossings



NEWS RELEASE

April 20, 2006
FOR IMMEDIATE RELEASE

Contact: Jevelyn Kott
Communications and Marketing
Coordinator
(630) 620-5718

Downtown Lombard Traffic Eased, Improved Signals For Pedestrians

LOMBARD, Illinois—Several improvements have been made to traffic signals in the downtown area, as well as new LED pedestrian signals.

The improvements to the downtown Lombard traffic signals involved the inter-connection of six signalized intersections along St. Charles Road and Main Street. These include St. Charles and Crescent, St. Charles and Elizabeth, St. Charles and Park, St. Charles and Main Street, Main Street and Parkside and Main Street and Maple. Radio antennas and transmitters were installed so that the intersections may be controlled from the Public Works Department facility. "This type of interconnection is one of the first in the county," according to Nick Hatfield, Civil Engineer with the Public Works Department. The interconnection allows Public Works to ensure that traffic is moving smoothly through this stretch of downtown.

New LED pedestrian signals were also installed at St. Charles and Elizabeth, St. Charles and Park, St. Charles and Main and Main Street and Parkside. These are brighter and easier to see and provide the countdown to pedestrians on the changing of the signals.

Other improvements were also made at Elizabeth and St. Charles involving a new detector loop which will help facilitate traffic over the tracks and prevent any northbound traffic from getting "trapped" on the railroad tracks.

...a new detector loop
that will help facilitate
traffic over the tracks...

3. New Interconnect Roadway Intersections near Level Crossings

Field Review:

One Detector Loop

Input Not Programmed in Traffic Signal Controller

No Remote Monitoring or Security

NO TRACK CLEAR GREEN



3. New Interconnect Roadway Intersections near Level Crossings



HIGHWAY-RAIL GRADE CROSSING – STATE OF ILLINOIS TRAFFIC SIGNAL PREEMPTION GUIDELINES & WORKSHEET

Any highway agency in Illinois seeking to install or modify a traffic signal in proximity of a highway-rail grade crossing shall receive the approval of the Illinois Commerce Commission. This follows Public Act 91-0725 and 625 ILCS 5/18c-7401 of the Illinois Vehicle Code.

For new traffic signals proposed to be interconnected with railroad warning devices, a Traffic Signal/Railroad Report, Intersection Design Study (if applicable), Traffic Signal Plans, formal Petition, and Commission Order are required. For significant reconstruction/modifications, these deliverables may also be requested. Example cases are available at:

<http://www.icc.illinois.gov/>

Look for "e-Docket" at right/top of page

Next to "Case Search," Type "T05-0005" and click the "Go" button

Click the "Documents" tab along the top right section to provide the petition, order, supplemental info, etc.

Other case example: "T07-0121"

Design

- The attached worksheet must be completed (or updated for existing locations), and sent to the ICC, the highway agency with jurisdiction over the traffic signals, and the RAILROAD Signal Engineering Office.

The traffic controller circuitry requires railroad preemption contacts to interconnect with the railroad active warning system. Per RAILROAD standard, a normally closed "dry" preemption relay will be provided to interconnect the railroad active warning system to the Road Authority's traffic signal controller assembly. These contacts are rated at 4 amps. With no trains in the area, these contacts remain closed.

Simultaneous preemption shall be utilized and the preemption relay will be designed so that the crossing warning devices activate any time the traffic signals are preempted (3-wire connected to the XR, or the Preempt Relay before the XR).

- The MUTCD, 2009 or latest edition shall be utilized for necessary definitions, requirements, and guidance: <http://mutcd.fhwa.dot.gov/index.htm>.
- The Illinois Department of Transportation's, "Standard Specifications for Road and Bridge Construction, Adopted January 1, 2007" or latest edition shall be adhered to for design, testing, and installation. <http://www.dot.state.il.us/desenv/stdspecs07.html> (Section 800, Section 1074 et al). Also see Highway Standard "857006-01, Supervised Railroad Interconnect Circuit." <http://www.dot.state.il.us/SupervisedRRIInterconnectCircuit.pdf>



TRAFFIC SIGNAL PREEMPTION GUIDELINES & WORKSHEET PAGE 2 of 2

Installation

- Prior to installation, the highway agency shall shop test its traffic controller and cabinet at the equipment vendor's facility with Staff of the ICC present.
- The highway agency will be responsible for installing the interconnect cable to the crossing warning signal control housing. The RAILROAD Signal Department will be responsible for terminating the cable at the railroad equipment. Any future modification or relocation by the highway agency or RAILROAD requires coordination amongst the parties. The interconnect cable shall be enclosed in conduit as a single continuous run from the railroad signal control house to the traffic signal control cabinet. Splicing, and/or intermediate termination points are not allowed.
- The RAILROAD, when modifying the warning system shall file a Form 1 or Form 3 as necessary for approval by the Commission. When the work is complete, the RAILROAD shall provide a Form 2, Completion Notice.
- The highway agency will be responsible for coordinating the required testing and installation of the interconnect cable to the crossing warning signal control housing. Representatives from the highway agency, its contractor, the traffic controller manufacturer, ICC, and RAILROAD Signal Department must be in attendance for the turn-in inspection.

Inspections

- Routine inspections will be coordinated by the highway agency, and will be coordinated with the RAILROAD Area Signal Manager and ICC Staff. The attached worksheet includes a section for recording the inspection dates and personnel present.

Contacts

RAILROAD Signal Engineering Office (913) 577-5570

RAILROAD Area Signal Managers

_____ () _____

_____ () _____

Illinois Commerce Commission

Stan Milewski (815) 463-8387

Dan Powers (847) 516-0733

Brian Verduysse (312) 636-7760

3. Capacity Upgrades at Existing Interconnect (Pre-Signal)



3. Capacity Upgrades at Existing Interconnect (Pre-Signal)

MWT (TS) = 1s Delay + 1s Min Green + Yellow + All Red + Track Clear Green

Half Day Rd

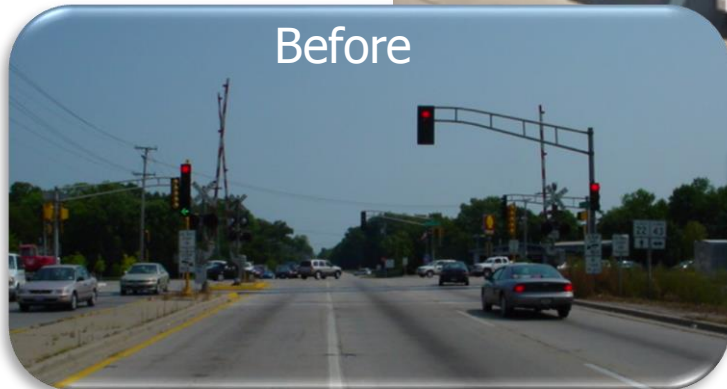
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Increased Clearance Intervals (Yellow & All Red)
Coordinated Increase of Warning Time with RR

Pane

3. Capacity Upgrades at Existing Interconnect (Pre-Signal)



Traffic Signals on Railroad Signal Bridge
Stop Bar to Allow for Sight Lines Along Tracks
“You build it and they will come.”

3. Capacity Upgrades at Existing Interconnect (Pre-Signal)



Don't Forget the Small Items → Big Impact

Reflective Delineators - Reducing Cars Driving Onto Tracks

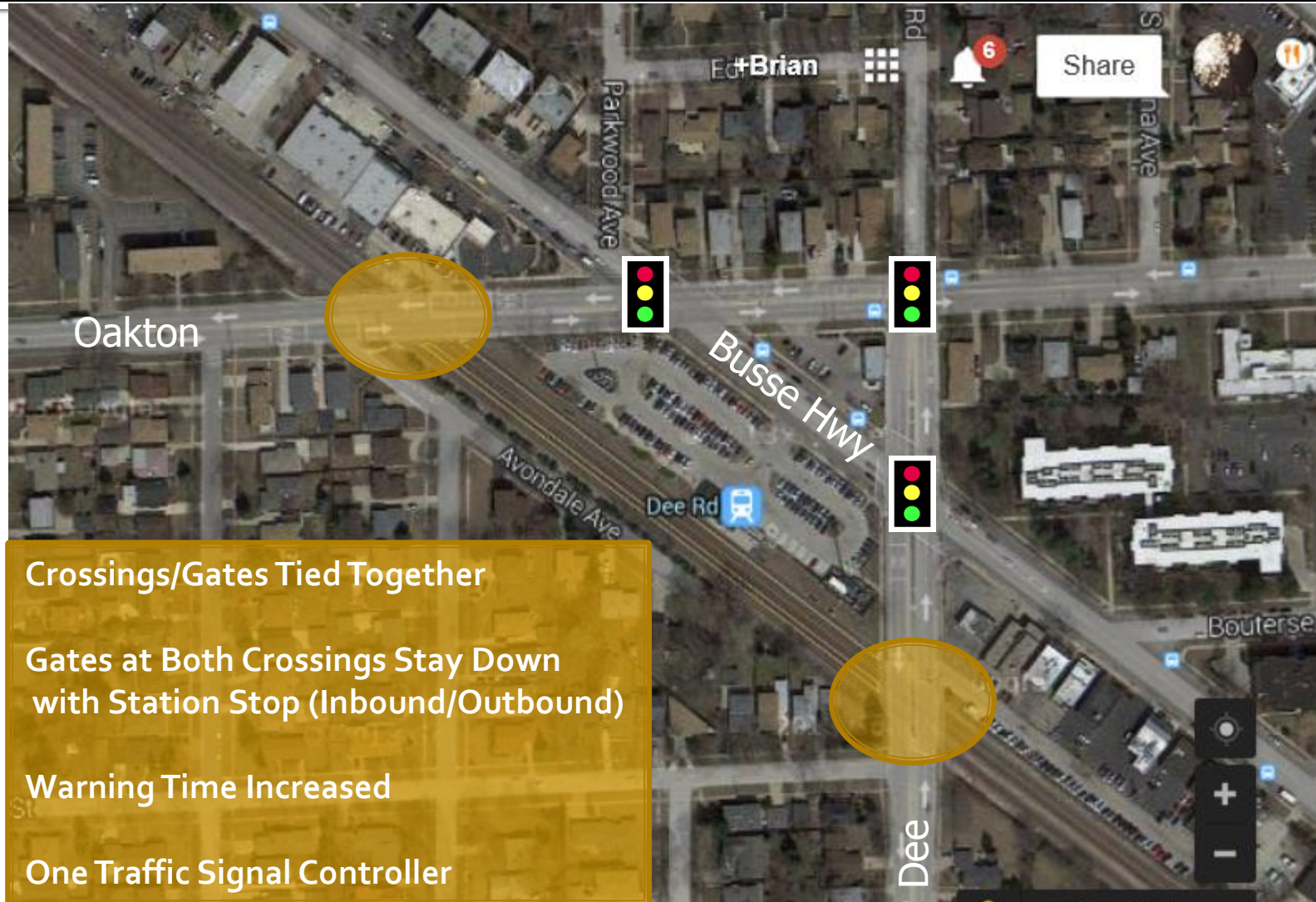
3. Triangle Interconnect Upgrade Roadway Intersections near Level Crossings



Right Turn Bypass Lane
Photo Enforcement

Level Crossings Tied Together (RR Gates Descend and Ascend Together)
Warning Time Increased to Clear Both Legs of the Triangle
1 to 2 Train-Vehicle Crashes Per Year (20 years) → 0

3b. Triangle Interconnect Upgrade - Illinois Case Studies-



Summary - Illinois Case Studies

Road Intersections Near Level Crossings

1. Non-Interconnect – Geometric Changes/Incidents away from Crossing
2. Interconnect but No Active RR Devices – Consider RR Operations
3. New Interconnect – Awareness of Rail and Highway Operations
4. Capacity Upgrades at Existing Interconnect – Check the Timing
5. Triangle Configurations - Simplify/Limit Downstream Movements,
Tie Crossings Together

