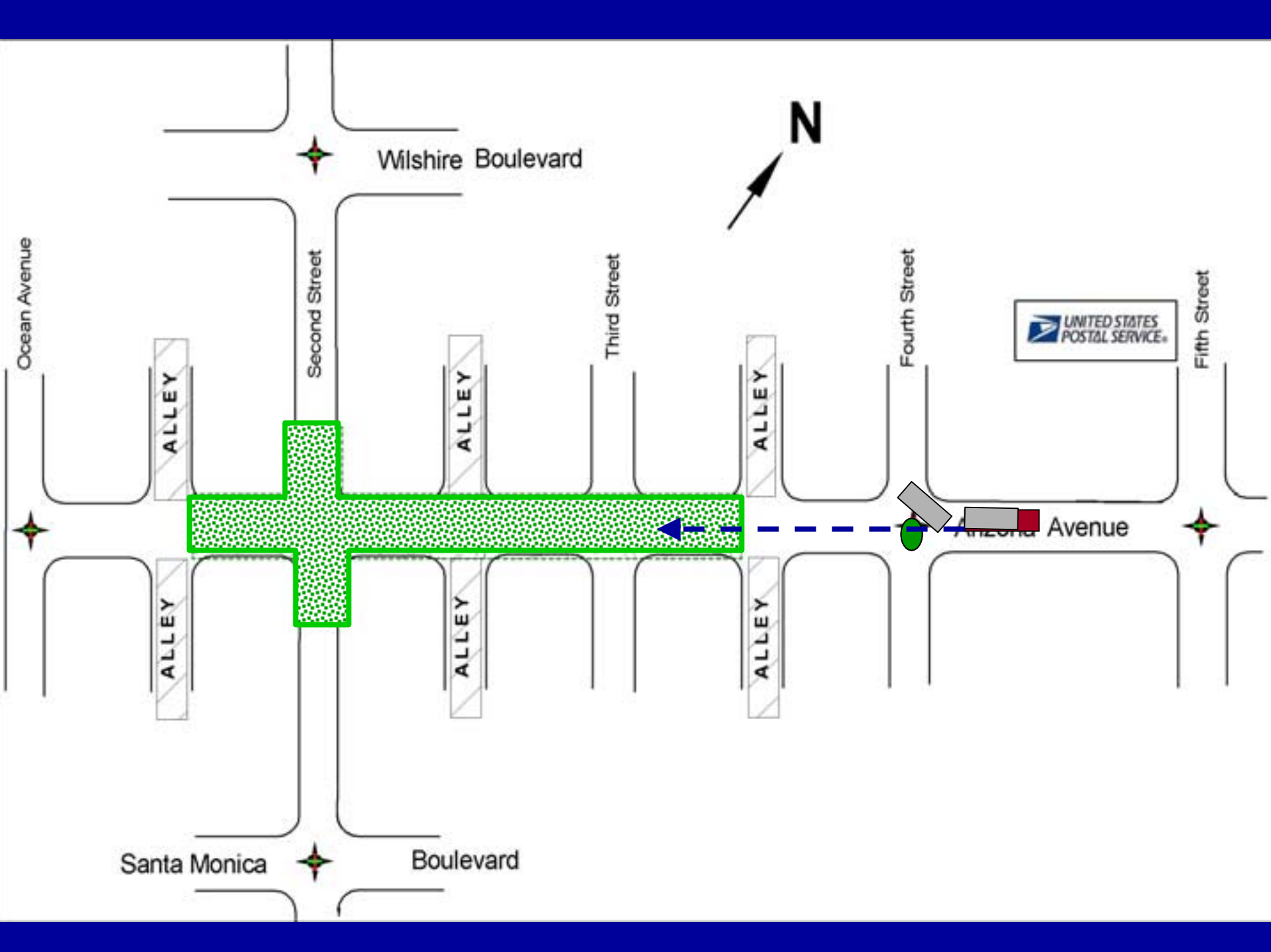




Santa Monica, California,  
Vehicle Intrusion into  
Farmers' Market

July 16, 2003





N

Wilshire Boulevard

Ocean Avenue

Second Street

Third Street

Fourth Street

Fifth Street



ALLEY

ALLEY

ALLEY

ALLEY

ALLEY

ALLEY

Santa Monica

Boulevard

Arizona Avenue





Courtesy: San Diego Union-Tribune / AP

# Santa Monica Accident

- 10 fatalities
- 63 minor to serious injuries
- Buick driver and Mercedes driver and passenger uninjured
- No problems with weather, fatigue, alcohol, or drug use by driver
- No mechanical problems with vehicle



# Issues

- Unintended acceleration
- Temporary traffic control measures
- Event data recorders





## Santa Monica, California, Farmers' Market



Courtesy: San Diego Union-Tribune / AP





# Human Performance Issues



# Driver Information

- 86-year-old male
- Long-term resident of area
- Familiar with Farmers' Market
- Owned vehicle for over 10 years
- Valid California license at time of accident



# Potential Factors

- Driver's age
- Driver's known medical conditions
- Vehicle controls
- Unintended acceleration



# Driver's Age

- 86 years old
- Physical and cognitive changes associated with age
- No evidence of cognitive deficits
- No in-depth interview with driver



# Known Medical Conditions

- Some impaired mobility but no link to driving ability or accidents
- Postaccident diagnosis of a heart condition
  - No reported loss of consciousness
  - Driver aware of market and took action
- No illicit or prescription performance-impairing substances detected



# Vehicle Controls

- Horizontal separation of 2 inches between accelerator and brake; minimum of 2 inches recommended
- No defect investigations or recalls related to pedal placement





2 inches (50.8 mm)

# Vehicle Controls

- Concern is dual activation
- Not supported by evidence
  - No brake light illumination
  - Significant acceleration and no retarding force





# Unintended Acceleration

- Vehicle accelerates suddenly for no apparent reason with seeming loss of braking
- No common mechanical defect
- Found to be driver-related
- Cognitive issue, not physical one
- Can happen to anyone



# Components of Unintended Acceleration

- Inadvertent activation
  - Usually meant to press brake
  - Due to position, force, speed, and so forth
- Failure to detect the error
  - Panic/hypervigilance
  - Habitual response
- Driver is certain correct control activated; error magnifies, increasing stress



# Unintended Acceleration in This Accident

- Mercedes violated Buick driver's expectations
- Buick driver's rapid, forceful movement to brake resulted in execution error
- Stress increased
- Did not detect he was on accelerator
- Resorted to habitual response
- Witnesses report racing and revving engine



# Highway Issues



# Highway Issues

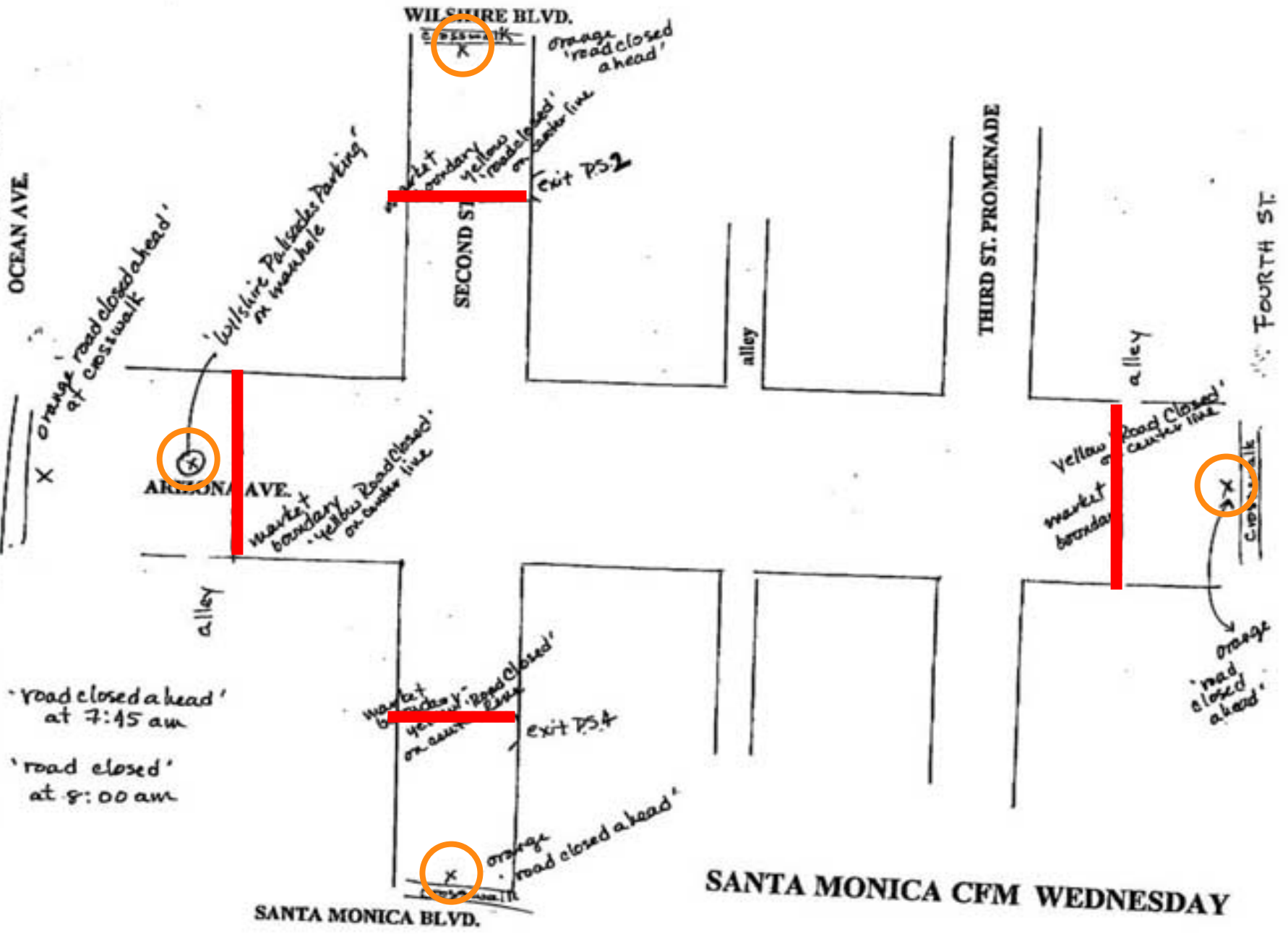
- Temporary traffic control plan for Farmers' Market
- Pedestrian protection in Farmers' Market
- Guidance for temporary road closures



# Temporary Traffic Control Plan

- Developed in 1981
- Updated in 1986
- Did not conform to MUTCD, Caltrans Traffic Manual, or Santa Monica's WATCH manual





SANTA MONICA BLVD.

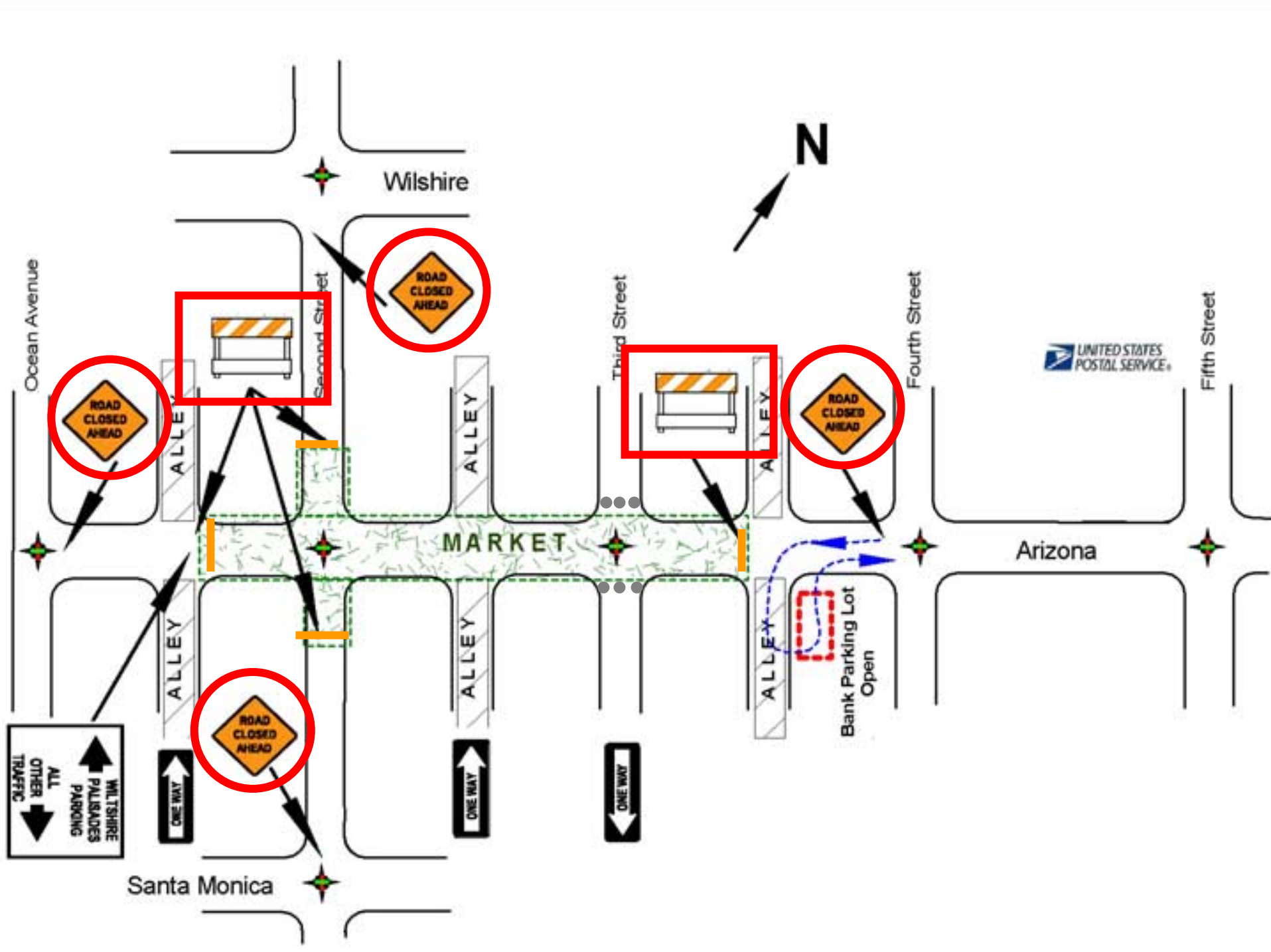
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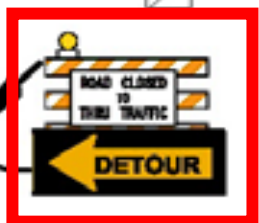
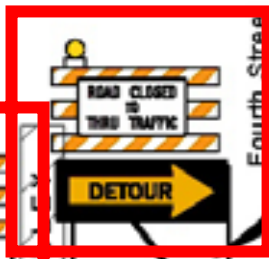
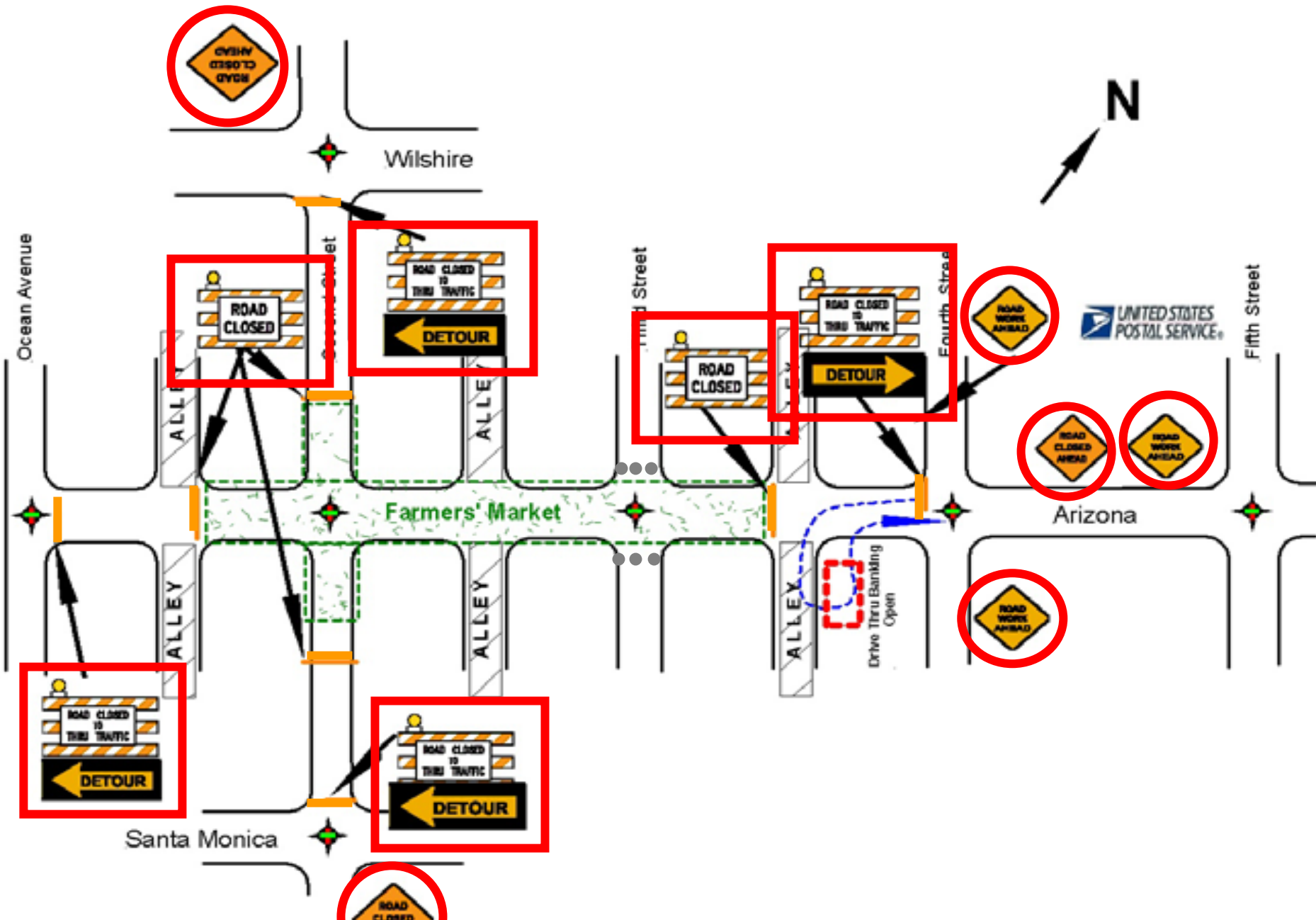






Type III Barricade





# Rigid Barrier Systems

- Additional signs and Type III barricades would not have prevented accident
- Separating pedestrians from vehicular traffic is key
- Market operated on regular basis since 1981
- Rigid but removable barrier system possible



# Bollards

Thick, low vertical post to exclude or divert motor vehicles



Santa Monica



New Orleans



# MUTCD Guidance

- Guidance to protect pedestrians in temporary traffic control areas
- Work zone emphasis
- Applicability to other street closures



# Event Data Recorders





1992 Buick LeSabre



# Additional Data from Event Data Recorder

- Driver's actions
  - As he left the post office
  - Regarding Mercedes collision
  - While traversing market
- How the vehicle was brought to a stop



# Electronic Data Recorders

- Manufacturers installing
- No standards
- Vary among manufacturers



# NTSB EDR History

- Issued six recommendations
- Hosted four forums on use of data recorders
- Participated in working groups to advance event data recording



# Current EDR Initiatives

- Society of Automotive Engineers
  - 70 data elements
  - Standard format for displaying data
  - Addressing data collection
- Institute of Electrical and Electronics Engineers
  - Standard for Motor Vehicle EDRs
  - Fault codes



# NHTSA EDR Notice of Proposed Rulemaking

- Aid in investigation of crashes and injuries
- Assist to better define and address safety problems
- Improve safety systems and standards
- No requirement for installation or use



# NHTSA EDR Notice of Proposed Rulemaking

- Data elements
- Data format
- Survivability
- Publicly available to crash investigators
- Standard statement in owner's manual
- Applicable to voluntarily installed EDRs
- No requirement for EDR installation



# EDR Benefits

- Prompt and impartial data
- Accurate data
- Improved vehicle design and occupant protection
- Emergency response and triage
- Vehicle and roadway design improvements

