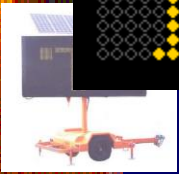




ALL INFORMATION CONTAINED  
HEREIN IS UNCLASSIFIED  
DATE 11/14/16 BY 60322 UCBAW

ENTRANCE  
REPORT  
11-21-16

WV  
COUNTER  
MEASURES





# Greetings from Iowa!! Home of “Message Monday”



# US 30 Wrong-Way Driving

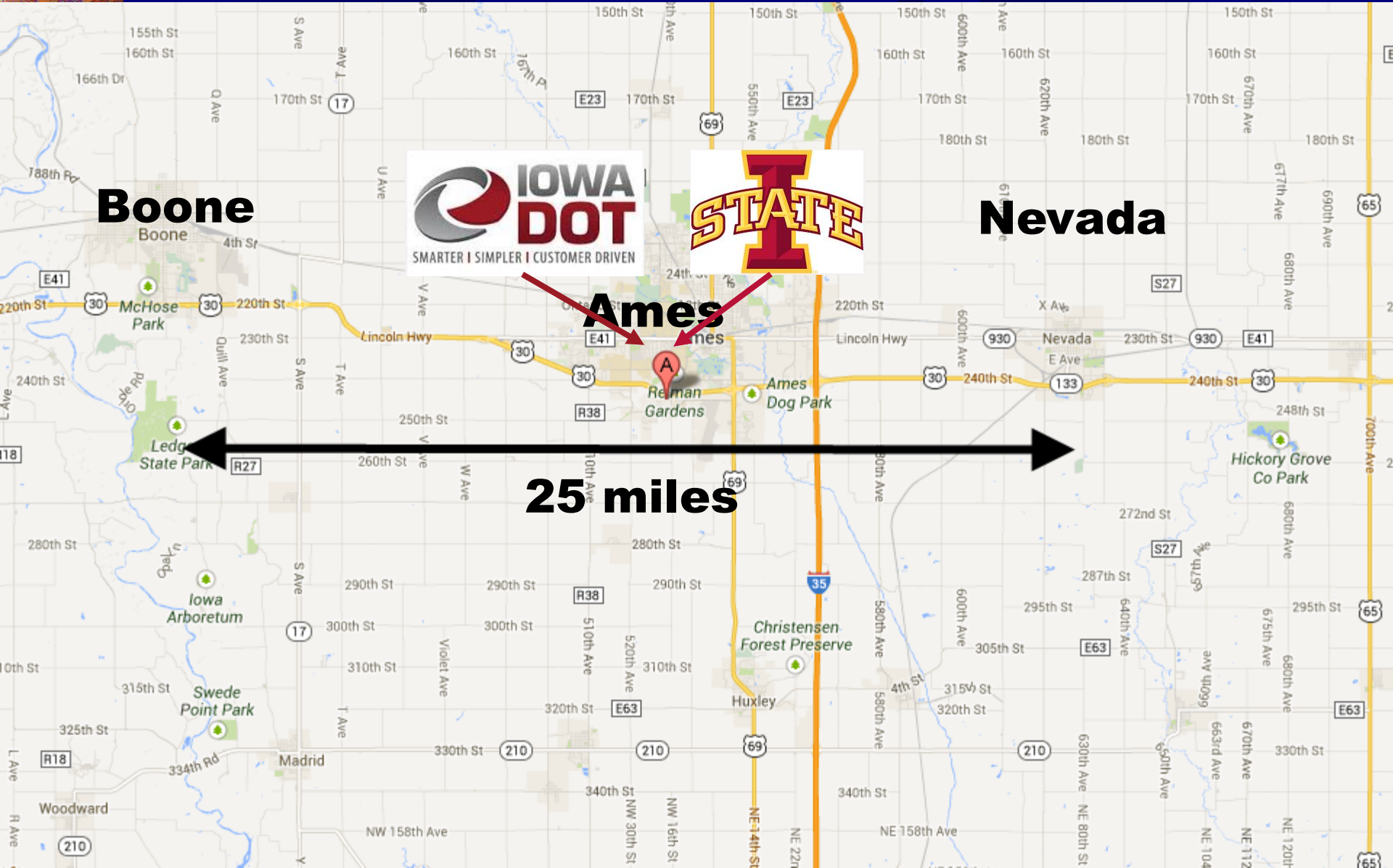




# General Location



# Project Location



**Boone**



**Nevada**

**Ames**

**25 miles**



# Situation/Background

- ★ 180+/- (911 calls & Eye Witness) Wrong Way Drivers (WWD) in the last 8½ years.
- ★ Does that mean we have had 180 WWD?
  - Probably not.
  - A Florida study showed 90% of people DO NOT call 911.
- ★ 7 WWD Crashes in last 10 years (none in last 5)
  - 2 were fatal







# Roadway Types

- Perfect mix of:
  - Interchanges and At-grade intersection



Standard Diamond



All-Way STOP



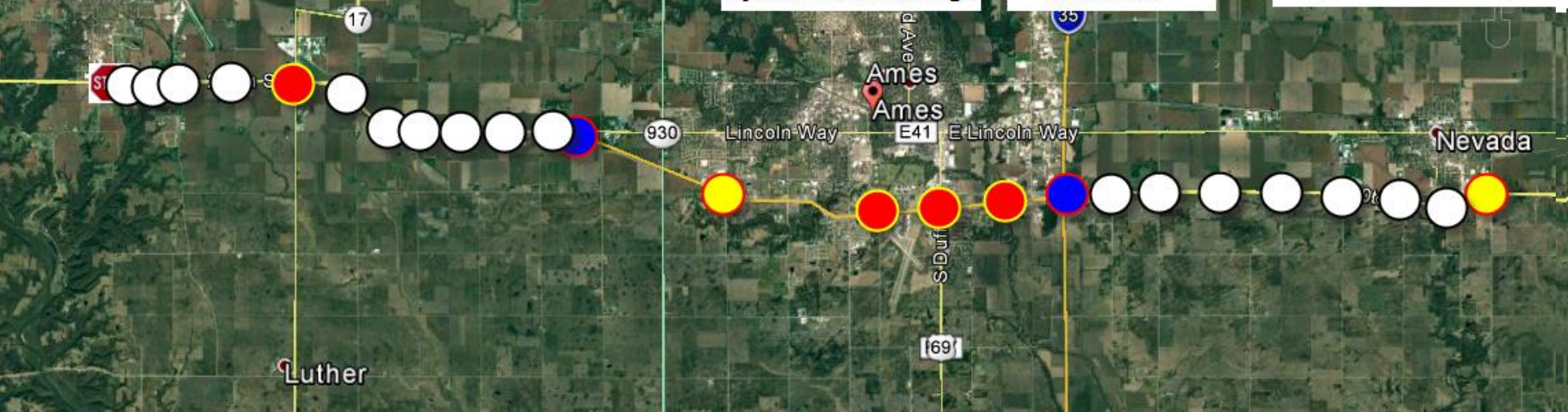
System Interchange



At-Grade



Folded Diamond





# Stages of this "Effort"

911 Data Begins

Ames PD starts to think the number of 911 calls are excessive. Asks DOT Help

DOT & City do various signing and painting enhancements

Vendor "Test Bed" begins

DOT 'upgrades' sensors to detect WWD

1/1/2008

2010 +/-

2012 +/-

8/2/2013

7/1/2014

33 - 911 calls

42 - 911 calls

WWD 911 call every 2.7 weeks





# Low-Cost / Updates in 2012

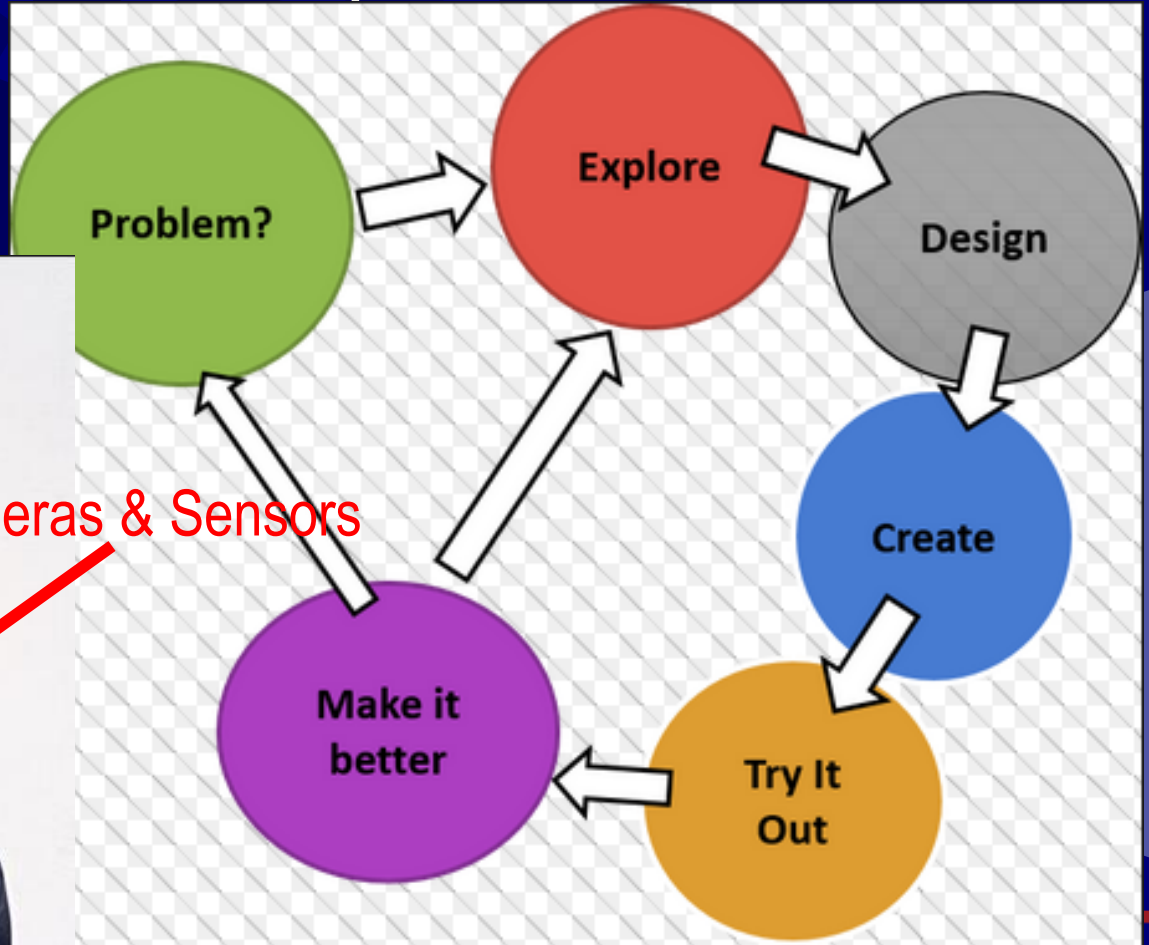


06/11/2013 16:50



# Engineering Problem Solving

★ Step 1: What is the problem?



WHAT DO WE  
NEED?

ITS  
Cameras & Sensors



MORE POWER!

# My goal....



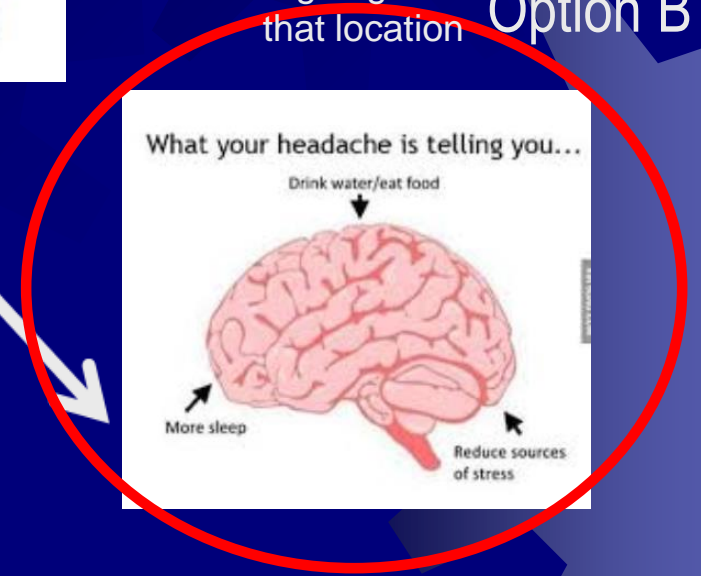
## Determine Points of Entry (fix the problem/eliminate the headache)



Specific /  
Targeted  
Signing for  
that location

Option B

Option A  
Enhanced  
Signing  
Everywhere



☀️ Solve with signing, painting & lighting

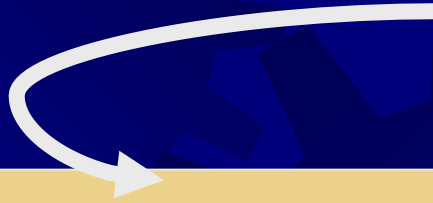






# Just how many are there?

How to you measure this?



Hard

Wrong Way Drivers on ramps/entrance points – self correct

Wrong Way Drivers on Mainline

Ease of Measuring

911 calls

Crashes

Fatal  
Crashes



Easy

++ Quantity

Quantity ++



## 2 Choices in Technology

- ☀ Cameras (with video analytics)
- ☀ Radar sensors (speed and direction)

You get:

- 1) Proof
- 2) Confirmation
- 3) Events prior to WWD





# Steps....

- ★ Need to find out if video analytics works
- ★ Initial Round:



- ★ Other Players



**BOSCH**





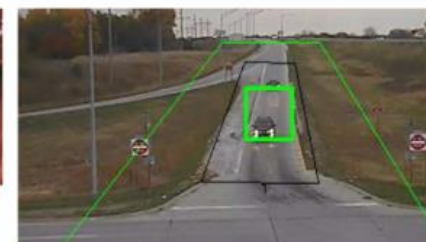


# Results....

## Video Analytics does work!

- ☀ Read the ENTERPRISE Report
- ☀ Or just ask me ;0)
- ☀ Example Videos

ENTERPRISE Transportation Pooled Fund Study TPF-5 (231)



Next Generation Traffic Data and  
Incident Detection from Video

FINAL REPORT

Prepared by  
**Athey  
Creek**  
CONSULTANTS

September 2014



VIDEO10



VIDEO IQ



[Video Link](#)





# Extreme Weather Example

108) 11-22-13 about 1\_07am

VIDEOIQ



11-22-2013 01:07:50



☀ [Link to Icy WWD Example](#)



# 6 Detections – All self correct.







# Bosch Example

[Video](#)







# Next steps....

- ✦ The Test Bed created some support.
- ✦ I asked for \$\$ for Video Analytics.
- ✦ Denied. (no crashes... no problem)
- ✦ Instead, our ITS Office offered to 'upgrade' our side-fire radar sensors to detect WWD.
- ✦ We also installed video recording cameras (without analytics)



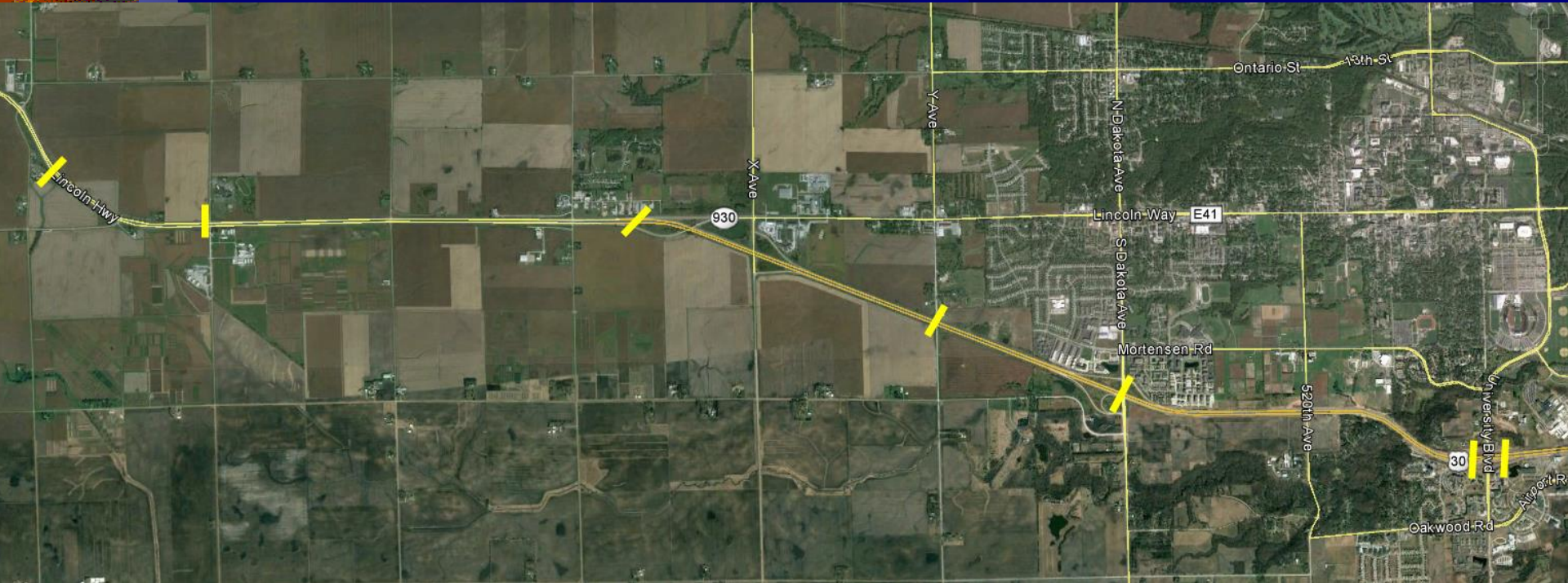
# Radar Sensors



09/11/2014 12



This is what you get.... Not what I wanted







...and so our next phase  
started July 2014



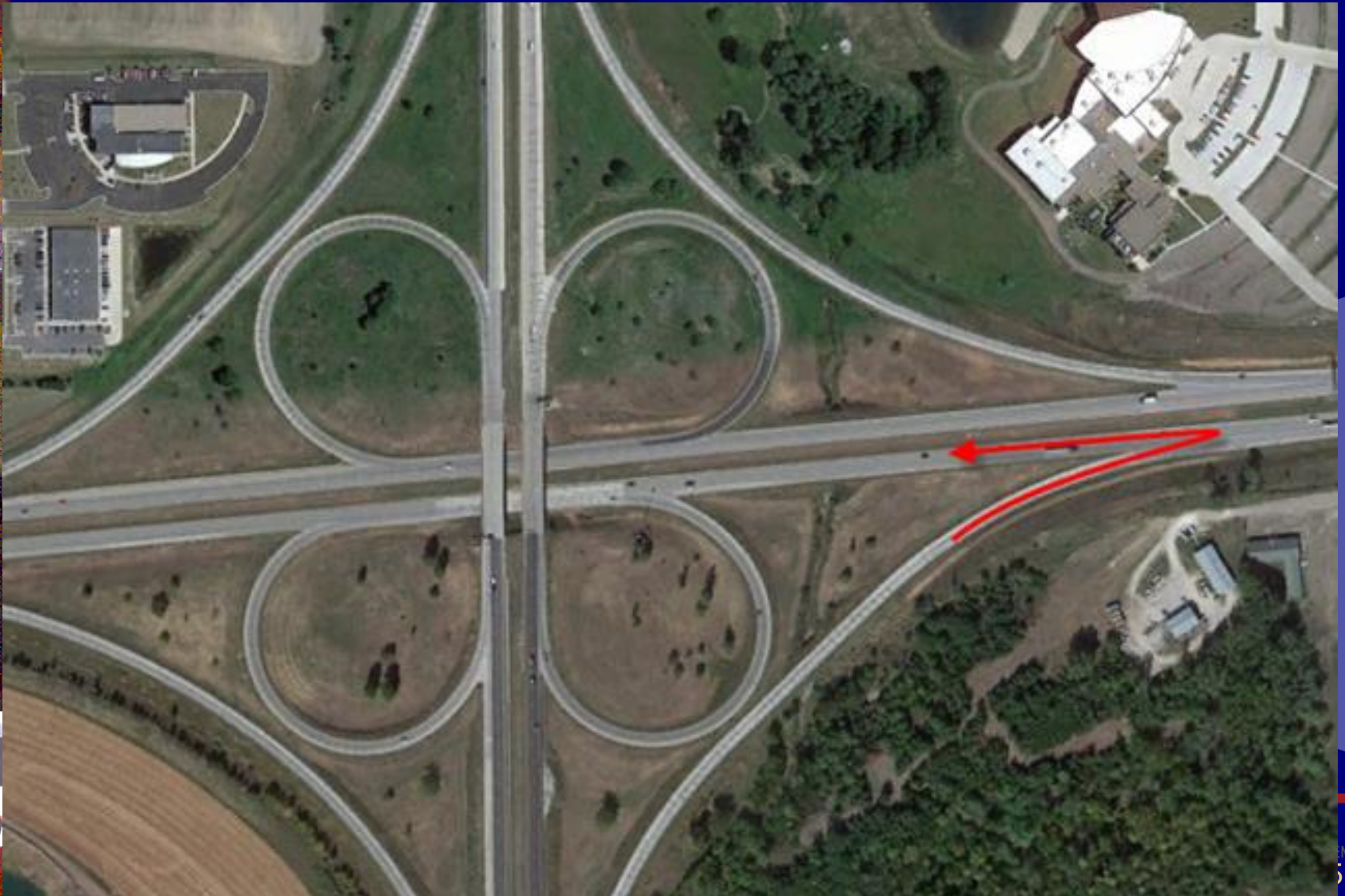
12-9-12.mp4

Exit US 30 @ W 4th St (NVTV03) 12/09/2015 12:22:15





# Have to See it to Believe it!







# About 2 weeks Later



WrongWay 7-27-14.JPG  
Type: JPEG Image  
Size: 221 KB  
Dimension: 1512 x 787 pixels





# Focusing on Specifics

☀ Once we have 2 similar WWD within 6 months, we will focus our efforts on that specific location with:

- ☀ Signing
- ☀ Painting
- ☀ Lighting (if necessary)

☀ If that is not enough...

- ☀ More expensive options
- ☀ Have not had to “go there” yet





# Examples of “Wins” for WWD Efforts



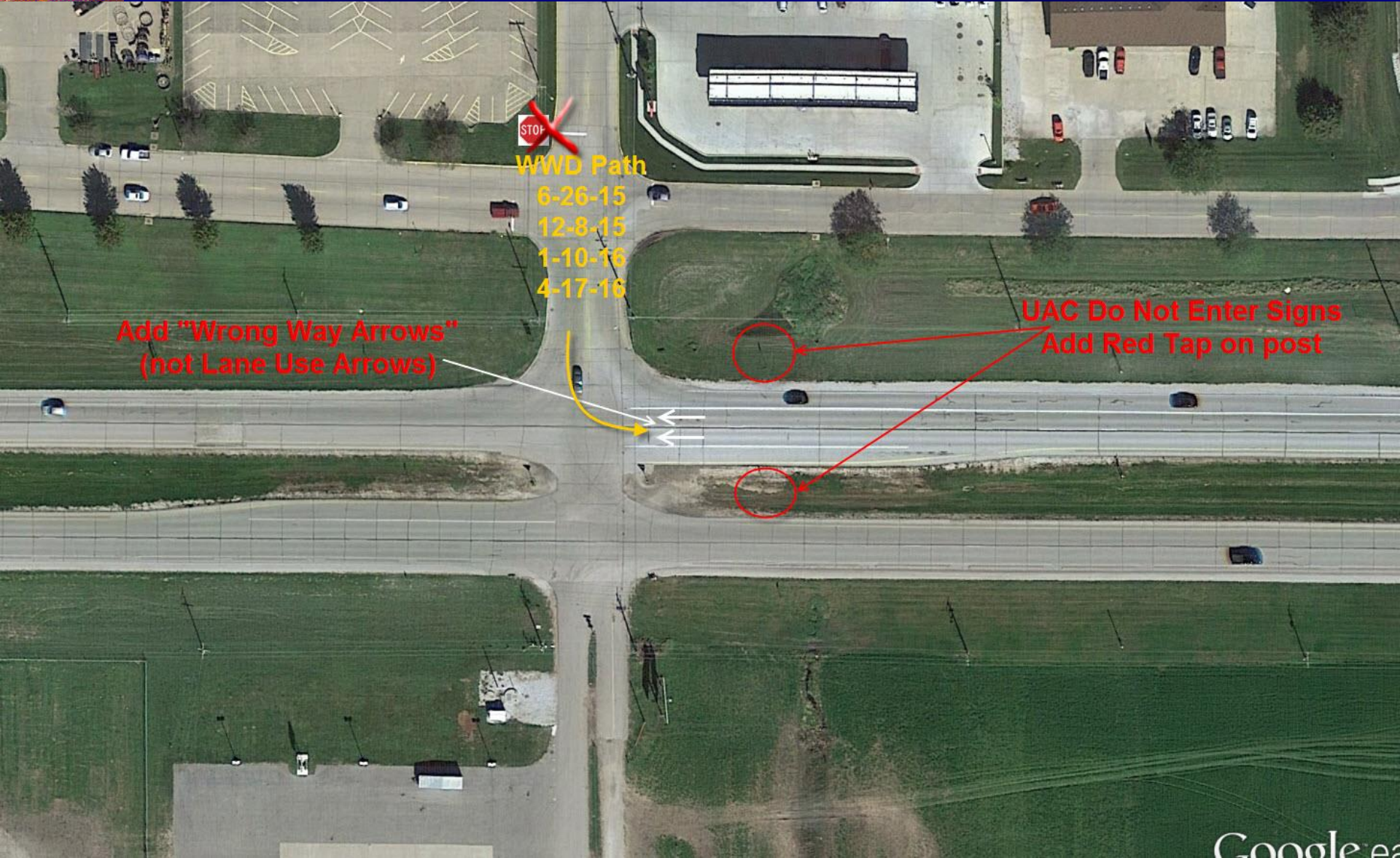


# Examples of “Wins” for WWD Efforts





# Linn St. in Boone



~~STOP~~  
WWD Path  
6-26-15  
12-8-15  
1-10-16  
4-17-16

Add "Wrong Way Arrows"  
(not Lane Use Arrows)

UAC Do Not Enter Signs  
Add Red Tap on post



# US 30 @ Linn St. (looking east)











# 5<sup>th</sup> Candidate for Enhanced Signing



Snedden Driv

3/8/16  
4/6/16  
11/11/16





# Possible Solution





# Other examples of “Winning”

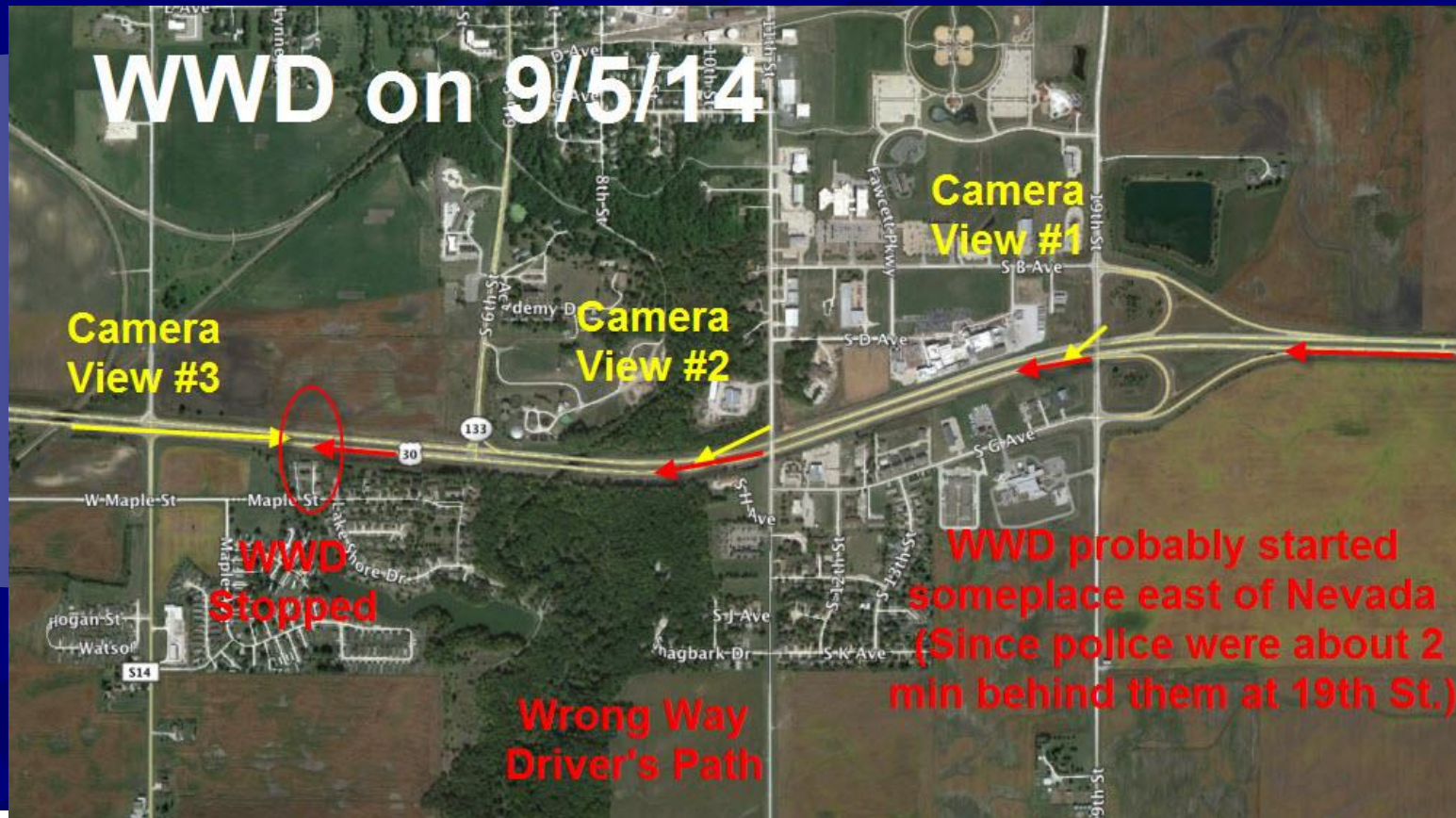
- ✦ Law Enforcement have targeted this area on weekends and slow nights
- ✦ Still no crashes







# Call in the Calvary!



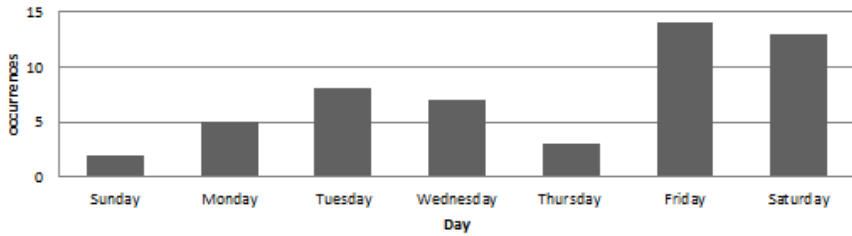
[Link: 3 police agencies converge](#)



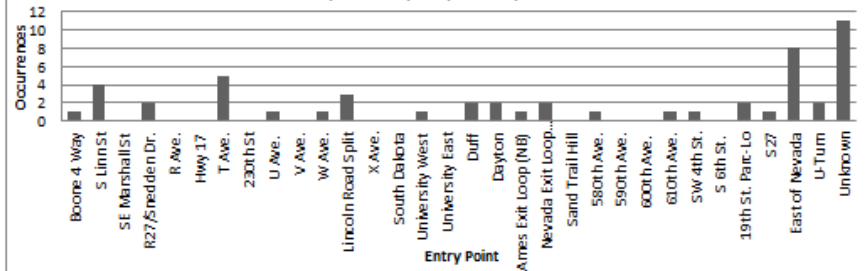
WWD HWY 30 Boone to Nevada

As of 9/23/16

Day of Week (adjusted) vs Occurrences  
(6:00 AM - 5:59 AM)

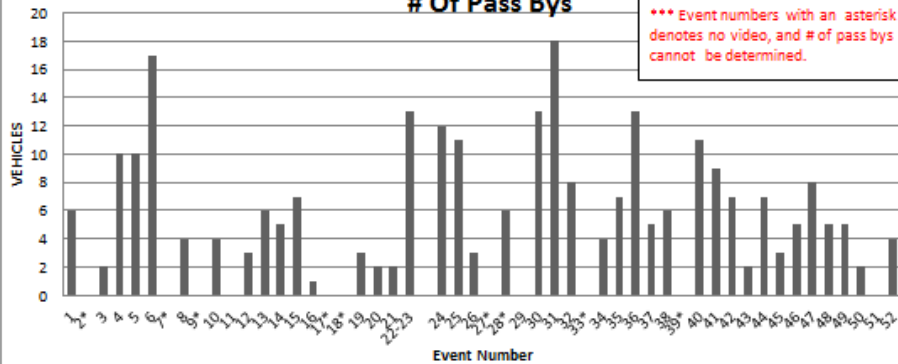


Point of Entry  
(33 of 52 (63%) known)

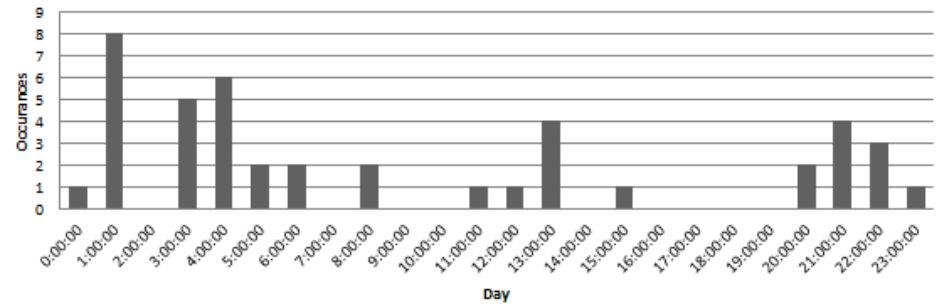


# Of Pass Bys

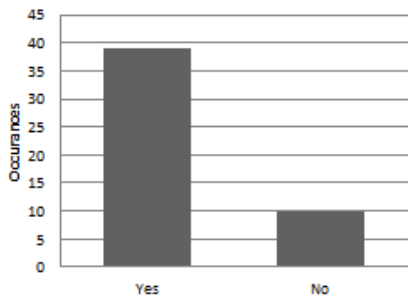
\*\*\* Event numbers with an asterisk denotes no video, and # of pass bys cannot be determined.



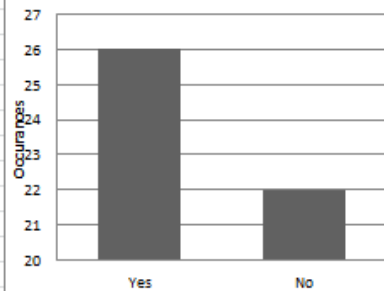
WWD by Hour



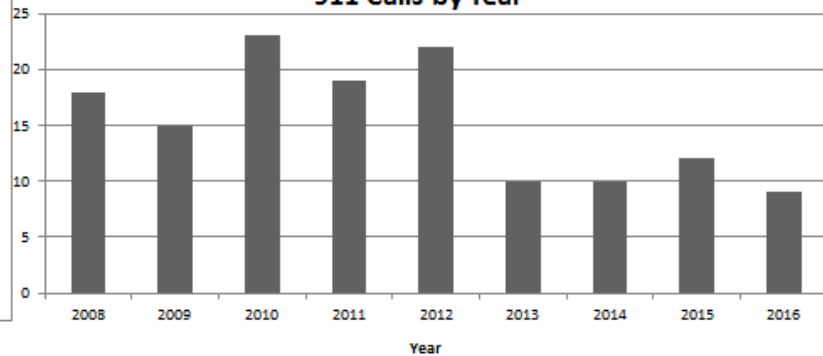
Video



911 Call



911 Calls by Year





# Stages of this "Effort"

911 Data Begins

Ames PD starts to think the number of 911 calls are excessive. Asks DOT Help

DOT & City do various signing and painting enhancements

Vendor "Test Bed" begins

DOT 'upgrades' sensors to detect WWD

1/1/2008

2010 +/-

2012 +/-

8/2/2013

7/1/2014

11/21/16

33 - 911 calls

42 - 911 calls

(today)

23 - 911 calls  
(58 known WWD)

WWD 911 call every 4.9 weeks

WWD 911 call every 2.7 weeks

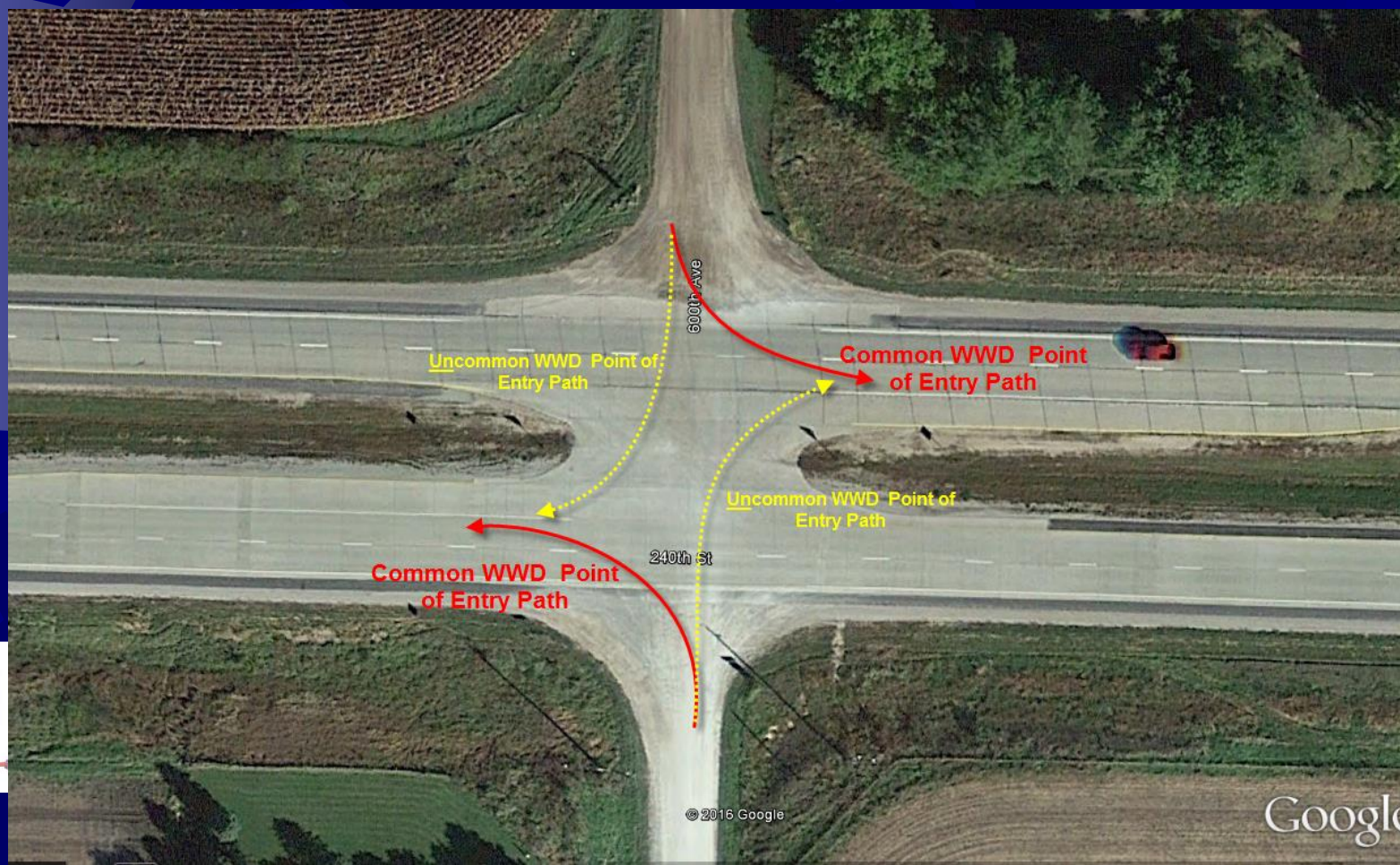






# What have we learned?

- At grade intersections
  - 69% of WWD “known point of entry” (29/42) start here



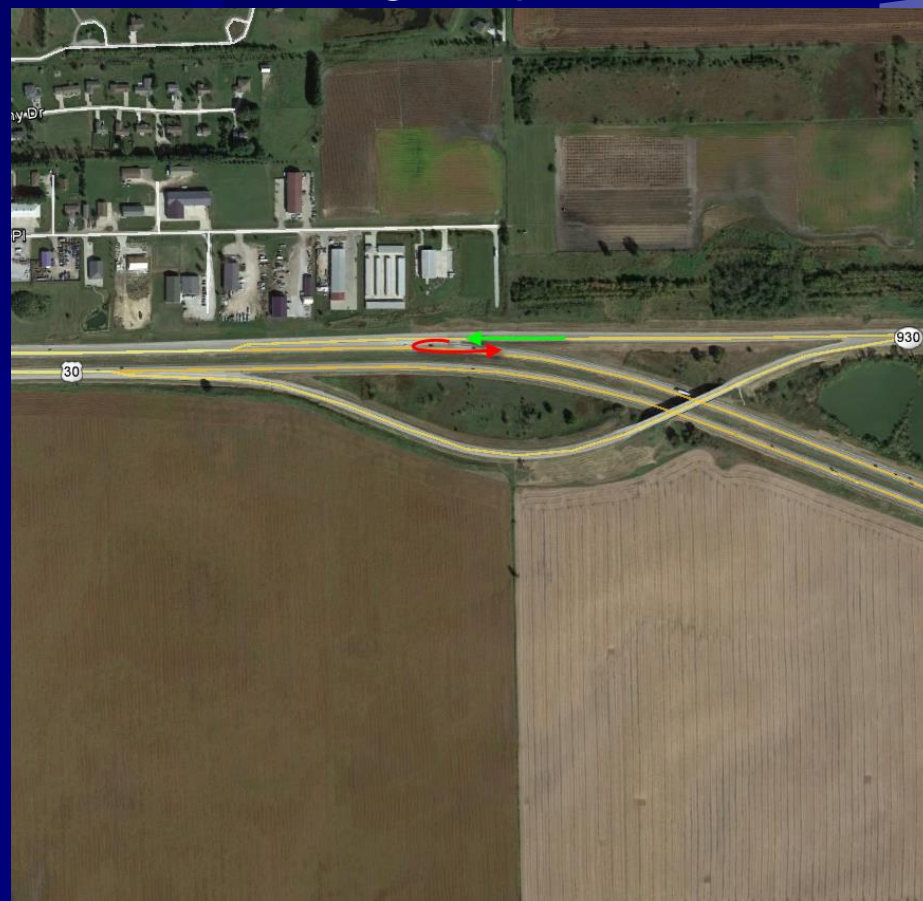
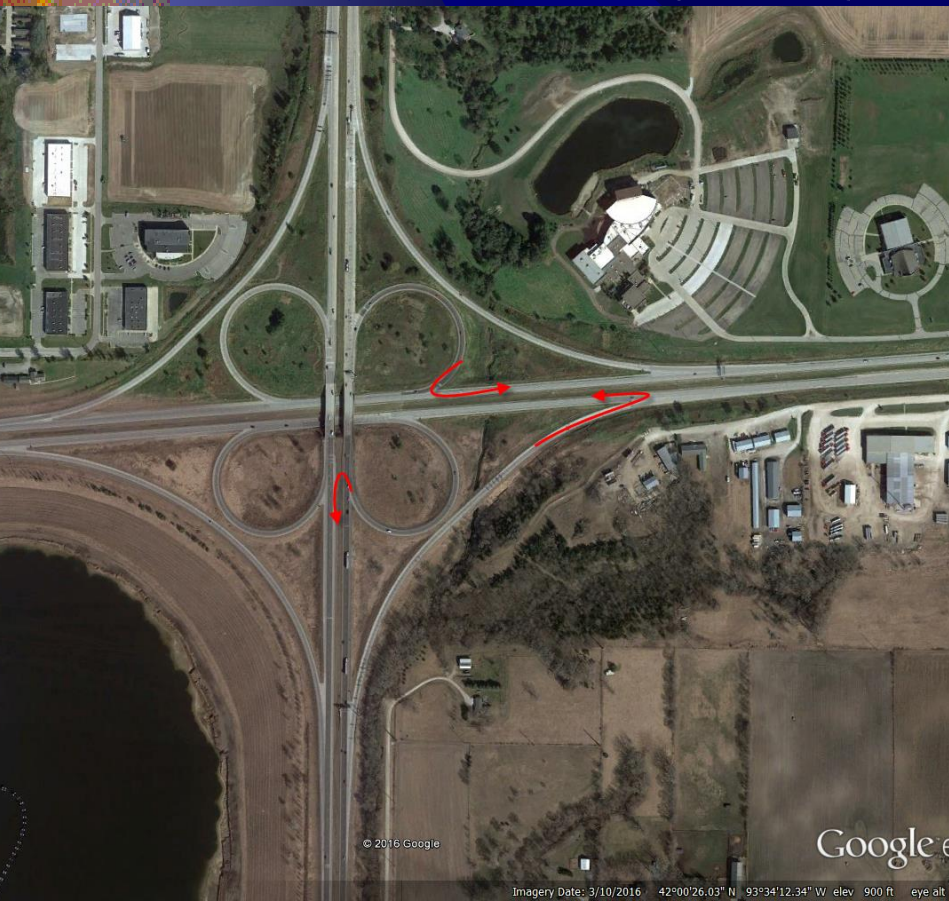




# What have we learned?

## At Ramps

- 31% of WWD “known point of entry” (13/42) start here
  - 46% of those (6 of 13) were from free-flowing ramps





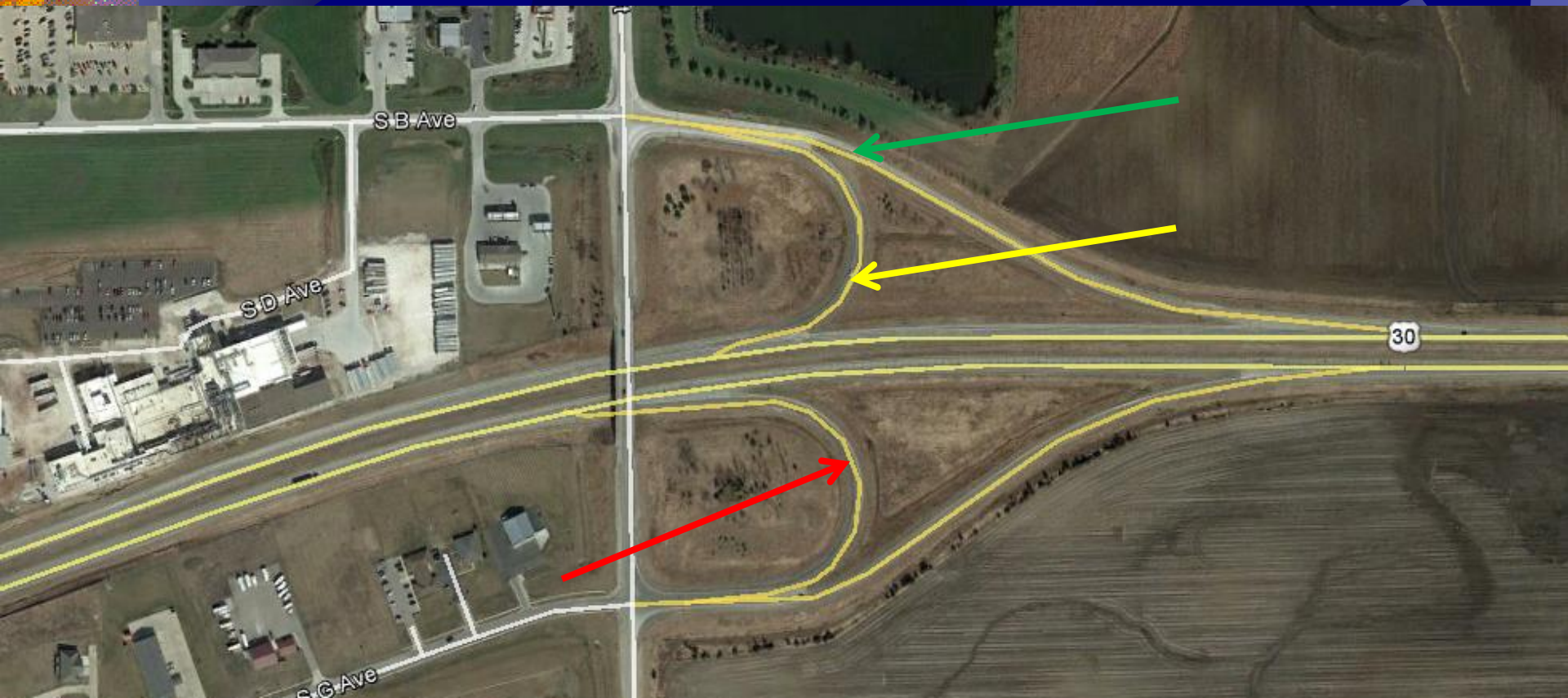


# What have we learned

Yes, these *can be* a problem

But not these.... ;0)

Still don't know about these

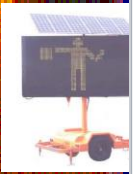






# Over 4,000 False Alarms

From	Subject	Sent	Size
alerts@trafficinfo.com	ES8510 Auto Warning Message	Tue 9/27/2016 9:59 AM	19 KB
alerts@trafficinfo.com	ES8510 Auto Warning Message	Tue 9/27/2016 9:59 AM	19 KB
Kiebel, Alex [DOT]	FW: ES8510 Auto Warning Message 9/23/16 @ SW 4th St. 4:58 am - FALSE	Tue 9/27/2016 10:00 AM	57 KB
Kiebel, Alex [DOT]	FW: ES8510 Auto Warning Message 9/23/16 @ East Ramps Duff 6:31 pm - FALSE	Tue 9/27/2016 10:14 AM	27 KB
Kiebel, Alex [DOT]	FW: ES8510 Auto Warning Message 9/23/16 @ Nevada Loop 3:23 pm - FALSE	Tue 9/27/2016 10:18 AM	443 KB
Willis, Sonya [DOT]	Daily Crash Fatalities	Tue 9/27/2016 10:24 AM	84 KB
Kiebel, Alex [DOT]	FW: ES8510 Auto Warning Message 9/23/16 @ 500th Ave 1:41 pm - FALSE	Tue 9/27/2016 10:27 AM	71 KB
Stolle, Sinclair [DOT]	RE: ENT The Future of DMS Messaging - NEED INPUT BY 9/23	Tue 9/27/2016 10:27 AM	24 KB
Schoenrock, Jim [DOT]	IM-074-1(122)0-13-82 I-74 North Section VE analysis	Tue 9/27/2016 10:37 AM	49 KB
Schnoebelen, Jim [DOT]	FW: Benton US 30, Wheeler Entrances	Tue 9/27/2016 10:38 AM	5 MB
Kiebel, Alex [DOT]	FW: ES8510 Auto Warning Message 9/24/16 @ SW 4th st. 8:26 pm - FALSE	Tue 9/27/2016 10:39 AM	504 KB
Kiebel, Alex [DOT]	FW: ES8510 Auto Warning Message 9/27/16 @ SW 4th St. 4:30 am - FALSE	Tue 9/27/2016 10:41 AM	331 KB
College Savings Iowa 529 Plan	529 Account Confirmation Available	Tue 9/27/2016 10:56 AM	15 KB
Kiebel, Alex [DOT]	RE: Video from this morning around I-80 and US 65 (East of NE Mixmaster)	Tue 9/27/2016 11:13 AM	15 KB
Amanda Brown	Solar Flashing Beacons	Tue 9/27/2016 12:13 PM	20 KB
Gustafson, Tony [DOT]	Story MBIN-35-1(505)120--0m-85 NB and SB bridge repair project on I-35 over Bear Creek.....2-21-2017 letting	Tue 9/27/2016 1:48 PM	49 KB
Laaser-Webb, Jan [DOT]	RE: Break for Capstone	Tue 9/27/2016 1:55 PM	11 KB
Olsson Associates	Olsson's Perspectives: September 2016	Tue 9/27/2016 2:08 PM	50 KB
alerts@trafficinfo.com	ES8510 Auto Warning Message	Tue 9/27/2016 2:09 PM	19 KB
alerts@trafficinfo.com	ES8510 Auto Warning Message	Tue 9/27/2016 2:09 PM	19 KB
ITS PCB Program	Reminder for Upcoming U.S. DOT Webinar: Strategies for Implementing Open and Mobile Payment Systems	Tue 9/27/2016 2:14 PM	73 KB
Popp, Deanne [DOT]	Agreement 2017-4-065 Draft (PCC Pavement Grade & Replace on U.S. 52 in Decorah)	Tue 9/27/2016 2:29 PM	1 MB
Thorson, Tyler [DOT]	I-80 @ 4 Mile Bridge Round 2	Tue 9/27/2016 2:33 PM	48 KB
Thorson, Tyler [DOT]	FW: Shoulder Closure on I-80 6 lane section, morning rush	Tue 9/27/2016 3:05 PM	138 KB
Wright, Eric [DOT]	RE: Benton US 30, Wheeler Entrances	Tue 9/27/2016 3:18 PM	65 KB
Crouch, Tim [DOT]	RE: TEI Rotational Program Kick-off	Tue 9/27/2016 3:30 PM	63 KB
McDonald, Norman [DOT]	RE: Agreement 2017-4-065 Draft (PCC Pavement Grade & Replace on U.S. 52 in Decorah)	Tue 9/27/2016 3:34 PM	49 KB
Gent, Steve [DOT]	FW: briefing paper	Tue 9/27/2016 3:46 PM	1 MB
Harle, Mark [DOT]	Final Concept for Dubuque 1217, BRFN-061-8(142)--39-31	Tue 9/27/2016 4:11 PM	73 KB
Wright, Eric [DOT]	RE: TEI Rotational Program Kick-off	Tue 9/27/2016 4:17 PM	32 KB
Wright, Eric [DOT]	RE: TEI Rotational Program Kick-off	Tue 9/27/2016 4:26 PM	34 KB
Marler, Scott [DOT]	RE: Automated Vehicles Project - Traffic Modeling kickoff workshop	Tue 9/27/2016 4:45 PM	54 KB
Bernie Wagenblast	[TCN] Tuesday, September 27, 2016	Tue 9/27/2016 5:00 PM	41 KB
Schnoebelen, Jim [DOT]	RE: Benton US 30, Wheeler Entrances	Tue 9/27/2016 5:04 PM	71 KB
alerts@trafficinfo.com	ES8510 Auto Warning Message	Tue 9/27/2016 8:24 PM	19 KB
alerts@trafficinfo.com	ES8510 Auto Warning Message	Tue 9/27/2016 8:24 PM	19 KB
<b>4 Date: Today</b>			
Institute of Transportation Engineers	All Member Forum Digest for Tuesday September 27, 2016	Wed 9/28/2016 3:31 AM	97 KB
NewsInMotion@transystems.com	News In Motion	Wed 9/28/2016 5:00 AM	60 KB
do.Iowa.gov on Yammer	Updates from All Company	Wed 9/28/2016 5:16 AM	58 KB
Stamper, Vicki [DOT]	FW: MORNING CLIPS 9.28.16	Wed 9/28/2016 6:27 AM	105 KB
Bortle, Mark [DOT]	Gridlock Guy: Transportation officials urge use of Zipper Merge   www.ajc.com	Wed 9/28/2016 6:54 AM	7 KB
donotreply@birdoghr.com	Daily Applicant notification from BirdDogHr.com	Wed 9/28/2016 7:01 AM	18 KB
NASEM Transportation Research Board	TRB Webinar: Practical Techniques for Successfully Communicating Technical Topics	Wed 9/28/2016 7:31 AM	29 KB
Gent, Steve [DOT]	FW: Flooding in Eastern Iowa	Wed 9/28/2016 7:51 AM	427 KB
NASEM Transportation Research Board	TRB Webinar: Safety on Low Volume Roads	Wed 9/28/2016 8:02 AM	28 KB
All Savio	Mercedes-Benz Extends Parking to More Vehicles with INRIX	Wed 9/28/2016 8:51 AM	109 KB
Bortle, Mark [DOT]	RE: Need Your Opinion	Wed 9/28/2016 8:52 AM	268 KB
Query, DOT [DOT]	FW: DOT Question-Comment	Wed 9/28/2016 8:55 AM	8 KB
Bramble, Tracey [DOT]	FW: TIM Awareness Week Kickoff Notes	Wed 9/28/2016 9:05 AM	31 KB
Mo Zhao	Willy, please add me to your LinkedIn network	Wed 9/28/2016 9:34 AM	37 KB
Willis, Sonya [DOT]	Daily Crash Fatalities	Wed 9/28/2016 9:46 AM	84 KB
Klemme, Jason [DOT]	Clay County, STPN-010-3(15)--2J-21, D5 ROW Submittal	Wed 9/28/2016 10:00 AM	59 KB





# 258 documented "Pass-bys"

WWD



[Link to Video](#)



# What have we learned?

- ★ WWD can start anywhere
  - Free-flow ramps
  - At grade intersections
  - Ramps
- ★ Detection at Point of Entry is the best
- ★ Video Analytics is the way to go
  - Confirmation
  - Where did they come from (Dayton example)
- ★ You can have a WWD Problem
  - without a Crash Problem







# What have we learned?

☀ Enhanced Signing & Painting DOES help!





# What have we learned?

- ★ What are you going to do on your way home on US 30 (or any 4-lane road)?





Any  
questions?

