

WRONG-WAY CRASH STUDY ON INTERSTATES AND OTHER FREEWAYS FOR CALENDAR YEAR 2011



June 2013

Table of Contents

	Page
Overview	1
Wrong-Way Crash Analysis Summary, Calendar Year 2011	3

List of Tables

Table 1. Summary of Wrong-Way Crash Analysis in Calendar Year 2011	3
Table 2. Wrong-Way Crashes 2009-2011	3
Table 3. List of Wrong-Way Crashes on Interstates and Other Freeways in Calendar Year 2011	4
Table 4. Summary of Interchanges Reviewed for Wrong-Way Crashes for Calendar Year 2011	7

List of Appendices

Appendix A Act 641

Appendix B Minute Order 2009-035

Appendix C Crash Location Maps, Photos of Interchanges and Crash Reports

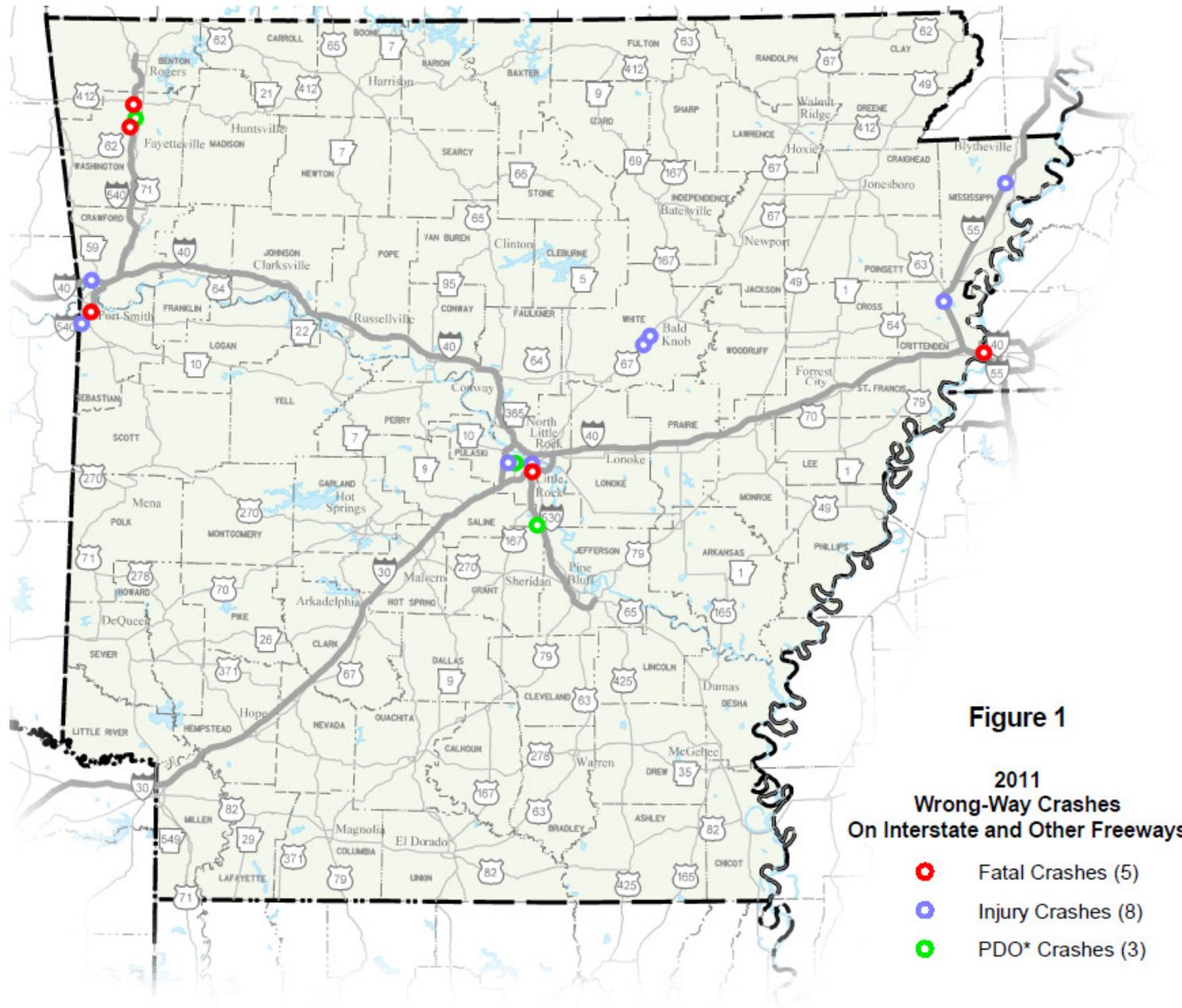
Overview

Act 641 of the 87th Arkansas General Assembly requires the Arkansas State Highway and Transportation Department (AHTD) to analyze all wrong-way crashes on the Interstate and other freeways with full control of access and to prepare an annual report. Furthermore, the Act requires that based on the findings in the report, the AHTD will implement appropriate countermeasures when warranted to reduce the possibility of wrong-way crashes. Accordingly, Minute Order 2009-035 was adopted by the Arkansas State Highway Commission on February 25, 2009. This Minute Order authorized an annual analysis of wrong-way crashes on these routes to determine if additional traffic control devices are warranted. Copies of Act 641 and Minute Order 2009-035 are shown in the Appendices.

A crash analysis was completed and showed 16 wrong-way crashes occurred on the Interstate and other freeways with full control of access in 2011 (See Figure 1). These 16 crashes consisted of five fatal crashes (with seven fatalities) and four incapacitating injury crashes. Crash location maps, along with diagrams of the interchanges and the crash reports are included in Appendix C.

During May 2013, the AHTD completed an investigation of the locations where the wrong-way crashes occurred in 2011. The investigations consisted of reviewing the traffic control for compliance with the minimum requirements of the *Manual on Uniform Traffic Control Devices for Streets and Highways* (MUTCD, 2009 Edition) as well as compliance with AHTD practices. Current AHTD signing practice is to “gate” the minimum required signs by installing the same signs on both sides of the roadway, and to use the oversized signs allowed by the MUTCD (Table 2B-1). This practice enhances the conspicuity of the signage and provides added protection to ensure that the minimum required signage is in place should one of the sign assemblies be damaged or destroyed. Consequently, a total of 19 interchange off-ramps were reviewed that resulted in the following findings:

1. Eighteen of the nineteen off-ramps were in compliance with the MUTCD minimum requirements.
2. Ten of the ramps had the correct signs to be in compliance with the MUTCD minimum requirements, but were not in compliance with current AHTD signing practices. All of the sign corrections are scheduled to be implemented by statewide signing crews as soon as possible.



*Property Damage Only

Wrong-Way Crash Analysis Summary Calendar Year 2011

In accordance with Minute Order 2009-035, a crash analysis has been prepared that showed 16 wrong-way crashes occurred on Interstates and other freeways that are divided with full control of access for the period January 1, 2011 through December 31, 2011. A summary of the crash analysis is shown in Table 1. It should be noted that this summary only includes crashes that involved a vehicle traveling in the wrong direction. Crossover crashes are not included. A comparison of wrong-way crashes from 2009 through 2011 is shown in Table 2. The List of Wrong-Way Crashes on Interstates and Other Freeways in 2011 is shown in Table 3.

TABLE 1. Summary of Wrong-Way Crashes in Calendar Year 2011

Crash Severity	5 fatal crashes (7 fatalities)				
	8 nonfatal injury crashes that include:	4 incapacitating injury crashes			
		3 incapacitating injury crash			
		1 possible injury crash			
3 property damage only (PDO)					
Crash Type	Head on	8	Road Surface Condition	Dry	16
	Sideswipe	8		Wet	0
Light Conditions	Dark	11	Contributing Factors	Alcohol	5
	Daylight	3		Drugs	1
	Dark but Lighted	1		None	4
	Dusk	1		Unknown	5
				Illness	1

TABLE 2: Wrong-Way Crashes 2009-2011

Year	Total Wrong Way Crashes	Fatal Crashes	Fatalities	Serious Injury Crashes	Number of Dark Crashes	Driver Impaired Drugs or Alcohol	Fatal Crashes Driver Impaired on Drugs or Alcohol
2009	12	3	7	4	8	6	0
2010	14	2	2	7	8	9	2
2011	16	5	7	4	11	6	4

TABLE 3. List of Wrong-Way Crashes on Interstates and Other Freeways in Calendar Year 2011

Crash #	County	Rte	Sec	LM	Sev. ¹	# Fat.	# Inj.	Type	Date	Time	Urban /Rural	Light Condition	Surf. Cond.	Impaired	System
201179645	Crawford	40	11	4.03	2	0	1	Head On	8/30/2011	5:01 AM	Urban	Dark	Dry	Unknown	Interstate
201182537	Crittenden	40	52	283.00	1	1	0	Head On	11/8/2011	9:55 PM	Rural	Dark	Dry	Yes	Interstate
201170927	Crittenden	55	11	21.10	3	0	1	Sideswipe	1/20/2011	1:00 AM	Rural	Dark	Dry	Yes	Interstate
201182975	Mississippi	55	12	57.83	2	0	2	Head On	11/17/2011	5:20 PM	Rural	Dusk	Dry	Unknown	Interstate
201179473	Pulaski	440	01	1.63	1	1	1	Head On	8/21/2011	5:17 AM	Urban	Dark	Dry	Yes	Interstate
201183349	Pulaski	30	23	139.52	2	0	2	Sideswipe	11/30/2011	12:45 AM	Urban	Dark But Lighted	Dry	Unknown	Interstate
201173672	Pulaski	630	21	4.50	5	0	0	Sideswipe	3/23/2011	12:30 PM	Urban	Daylight	Dry	No	Interstate
201171121	Pulaski	630	176 ²	0.19 ²	2	0	1	Head On	1/19/2011	7:15 AM	Urban	Dark	Dry	No ³	Interstate
201180736	Pulaski	530	03	14.96	5	0	0	Sideswipe	9/25/2011	12:34 AM	Urban	Dark	Dry	Unknown	Interstate
201177980	Sebastian	540	01	0.72	4	0	1	Sideswipe	7/12/2011	12:55 AM	Urban	Dark	Dry	Unknown	Interstate
201170036	Sebastian	540	01	5.18	1	2	3	Head On	1/3/2011	1:33 PM	Urban	Daylight	Dry	No	Interstate
201175706	Washington	540	04	63.39	1	2	1	Head On	5/15/2011	1:50 AM	Urban	Dark	Dry	Yes	Interstate
201173500	Washington	540	04	66.30	5	0	0	Sideswipe	3/21/2011	1:50 AM	Urban	Dark	Dry	No	Interstate
201182958	Washington	540	04	70.56	1	1	1	Head On	11/18/2011	3:21 AM	Urban	Dark	Dry	Yes	Interstate
201173574	White	67	12	20.30	3	0	2	Sideswipe	3/22/2011	11:04 AM	Urban	Daylight	Dry	No	U.S. Highway
201181251	White	67	12	17.33	3	0	1	Sideswipe	10/08/2011	3:01 AM	Urban	Dark	Dry	Yes	U.S. Highway

¹ Crash Severity: 1-fatal crash; 2-incapacitating injury crash; 3-capacitating injury crash; 4-possible injury crash; and 5-property damage only.

² The crash occurred on the ramp. The equivalent location to the mainlanes is Section 21, LM 5.51.

³ Due to illness

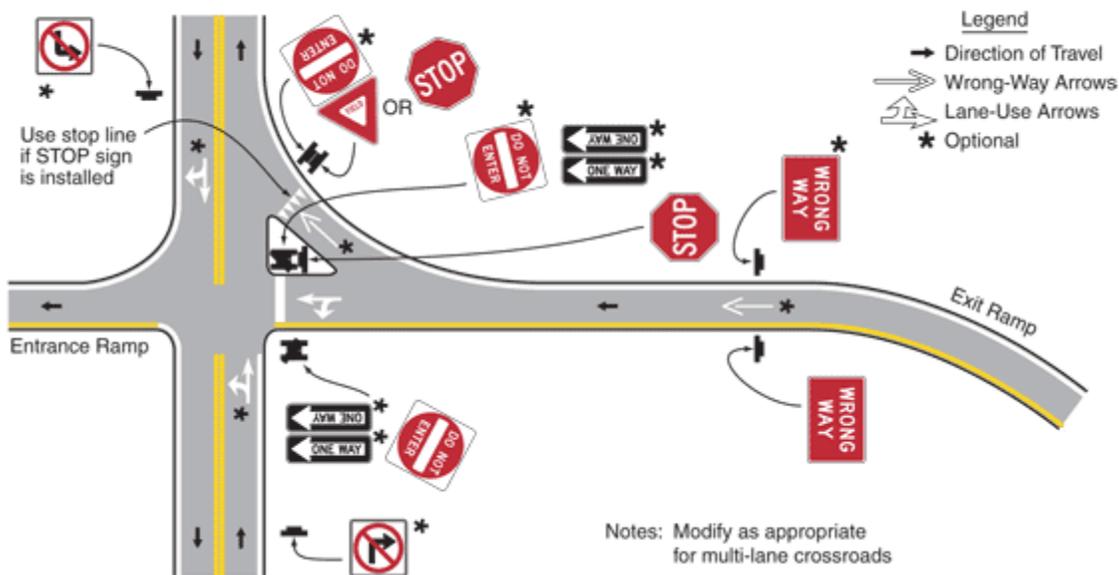
During May 2013, the AHTD conducted an investigation of the locations where the wrong-way crashes occurred in 2011. The investigations consisted of reviewing the traffic control for compliance with the minimum requirements of the most current MUTCD as well as compliance with current AHTD practices.

The minimum requirements as specified in Section 2B.41 of the MUTCD 2009 Edition include the following:

1. At least one “ONE WAY” sign placed for each direction of travel on the crossroad placed where the exit ramp intersects the road.
2. At least one “DO NOT ENTER” sign placed near the end of the exit ramp in positions appropriate for full view of a motorist.
3. At least one “WRONG WAY” sign placed on the exit ramp facing a motorist traveling in the wrong direction.

The current AHTD practice is to install the minimum required signs and markings from the MUTCD plus additional optional signs and markings as shown in Figure 2B-18 of the MUTCD 2009 Edition. Current AHTD practice is to also install oversized signs as shown in Table 2B-1 in the MUTCD. This practice enhances the conspicuity of the signage and provides added protection to ensure that the minimum required signage is in place should one of the sign assemblies be damaged or destroyed.

Figure 2B-18. Example of Application of Regulatory Signing and Pavement Markings at an Exit Ramp Termination to Deter Wrong-Way Entry



Source: *Manual on Uniform Traffic Control Devices for Streets and Highways (MUTCD) 2009 Edition*

Consequently, a total of 19 interchange off-ramps were reviewed that resulted in the following findings:

1. Eighteen off-ramps were in compliance with the MUTCD minimum requirements.
2. Ten of the ramps had the correct signs to be in compliance with the MUTCD minimum requirements, but not were not in compliance with current Department signing practices. See Table 4. All of the sign corrections are scheduled to be implemented by statewide signing crews as soon as possible.

Appendix C includes the crash location maps, photos of the interchanges reviewed and the crash reports.

It should be noted that the AHTD is conducting a statewide review of all interchanges on fully-controlled access highways to ensure the signing at exit ramps meet current standards.

TABLE 4. Summary of Interchanges Reviewed for Wrong-Way Crashes for Calendar Year 2011

County	Route	Section	Exit Numbers	Do Signs Meet MUTCD Requirements?	Do Signs Meet AHTD Practice?
Crawford	40	11	5	YES	NO
Crittenden	40	NA*	1	YES	NA*
Crittenden	55	11	21	YES	YES
Crittenden	55	11	23	YES	YES
Mississippi	55	12	53	YES	YES
Mississippi	55	12	57	YES	YES
Pulaski	440	1	3	YES	NO
Pulaski	30	23	140	YES	NO
Pulaski	630	21	5	NO	NO
Pulaski	630	21	6A	YES	NO
Pulaski	530	3	15	YES	YES
Pulaski	530	5	20	YES	YES
Sebastian	540	1	14	YES	NO
Sebastian	540	1	9	YES	NO
Washington	540	4	62	YES	NO
Washington	540	4	66	YES	NO
Washington	540	4	72	YES	YES
White	67	12	42	YES	NO
White	67	12	46	YES	NO

* Ramp is in Memphis, TN

APPENDIX A

Act 641

Stricken language would be deleted from and underlined language would be added to the law as it existed prior to this session of the General Assembly.

Act 641 of the Regular Session

1 State of Arkansas
2 87th General Assembly
3 Regular Session, 2009

A Bill

HOUSE BILL 1961

4
5 By: Representative Pyle
6
7

For An Act To Be Entitled

8
9 AN ACT TO REQUIRE THE ARKANSAS STATE HIGHWAY AND
10 TRANSPORTATION DEPARTMENT TO ANALYZE WRONG-WAY
11 CRASHES ON INTERSTATES AND OTHER FREEWAYS THAT
12 ARE A PART OF THE STATE HIGHWAY SYSTEM; TO
13 IMPLEMENT WARRANTED AND FEASIBLE COUNTERMEASURES
14 THAT MAY REDUCE THE POSSIBILITY OF WRONG-WAY
15 CRASHES; AND FOR OTHER PURPOSES.
16

Subtitle

17
18 TO REQUIRE THE ARKANSAS STATE HIGHWAY
19 AND TRANSPORTATION DEPARTMENT TO ANALYZE
20 WRONG-WAY CRASHES ON INTERSTATES AND
21 OTHER FREEWAYS THAT ARE A PART OF THE
22 STATE HIGHWAY SYSTEM.
23
24

25 BE IT ENACTED BY THE GENERAL ASSEMBLY OF THE STATE OF ARKANSAS:
26

27 SECTION 1. Arkansas Code Title 27, Chapter 65, Subchapter 1 is amended
28 to add an additional section to read as follows:

29 27-65-144. Additional annual reporting.

30 (a) The Arkansas State Highway and Transportation Department shall
31 analyze all reported wrong-way crashes on interstate highways and other
32 freeways that are a part of the state highway system to determine whether the
33 installation of additional traffic control devices is warranted and feasible
34 in order to reduce the possibility of future wrong-way crashes.

35 (b) Any additional traffic control devices installed under subsection



03-05-2009 11:39 JSE199

1 (a) of this section shall conform to the Manual on Uniform Traffic Control
2 Devices for Streets and Highways, approved by the Federal Highway
3 Administration as the national standard in accordance with 23 U.S.C. 109(d),
4 23 U.S.C. 114(a), 23 U.S.C. 217, 23 U.S.C. 315, and 23 U.S.C. 402(a), 23
5 C.F.R. 655, and 49 C.F.R. 1.48(b)(8), 1.48(b)(33) and 1.48(c)(2), and is the
6 manual adopted by the State Highway Commission under § 27-52-104.

7 (c) A person may not file a legal action as a result of the
8 implementation of any recommendations made from studies conducted under this
9 section.

10
11 SECTION 2. DO NOT CODIFY. This act shall begin with a reporting
12 period in 2009 and annually thereafter.

13
14 **APPROVED: 3/27/2009**
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36

APPENDIX B

Minute Order 2009-035

2009-035

WHEREAS, the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users of 2005 (SAFETEA-LU) requires each state to develop and implement a Strategic Highway Safety Plan (SHSP) that involves a comprehensive and collaborative approach to highway safety; and

WHEREAS, Minute Order 2007-091 adopted Arkansas' SHSP as a planning guide for improving highway safety in the State; and

WHEREAS, one emphasis area identified in Arkansas' SHSP is to reduce the number of head-on crashes; and

WHEREAS, head-on crashes occur from time to time on Interstates and other freeways as a result of wrong-way travel on these fully access controlled routes.

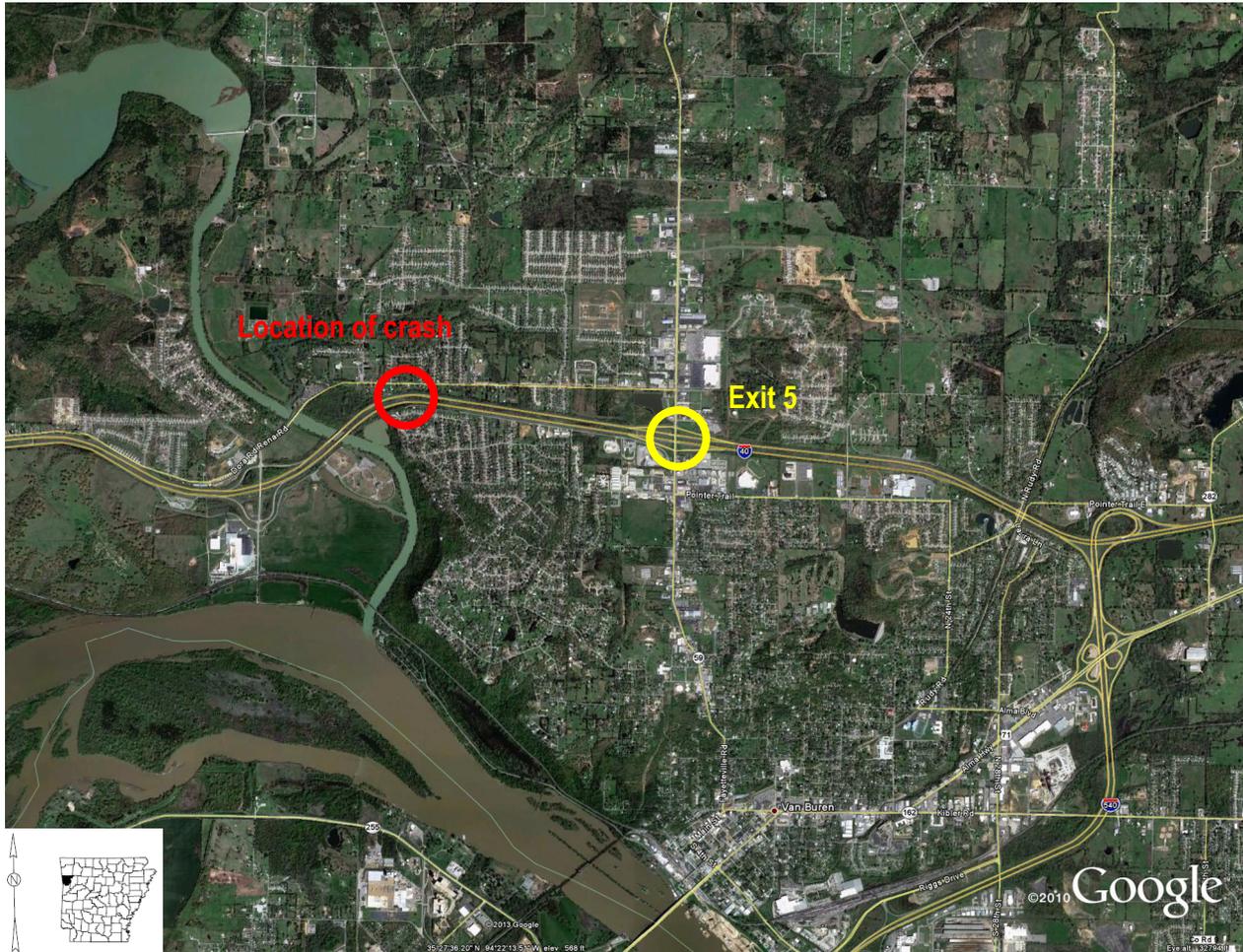
NOW THEREFORE, the Director is authorized to conduct an annual analysis, beginning with the 2009 reporting period, of all reported wrong-way crashes on Interstate highways and other freeways that are a part of the state highway system to determine whether the installation of additional traffic control devices is warranted and feasible to reduce the possibility of future wrong-way crashes.

FURTHERMORE, any additional traffic control devices installed as a result of the annual analysis will conform to the Manual on Uniform Traffic Control Devices for Street and Highways, which is approved by the Federal Highway Administrator as the National Standard in accordance with Title 23 U. S. Code, Sections 109(d), 114(a), 217, 315, and 402(s), 23 CFR 655, and 49 CFR 1.48(b)(8), 1.48(b)(33), and 1.48(c)(2), and is the manual adopted by the Arkansas Highway Commission pursuant to Arkansas Code Annotated Section 27-52-104.

APPENDIX C

Crash Location Maps,
Photos of Interchanges, and Crash Reports

Interstate 40, Section 11, Exit 5 in Crawford County



Maintenance Review

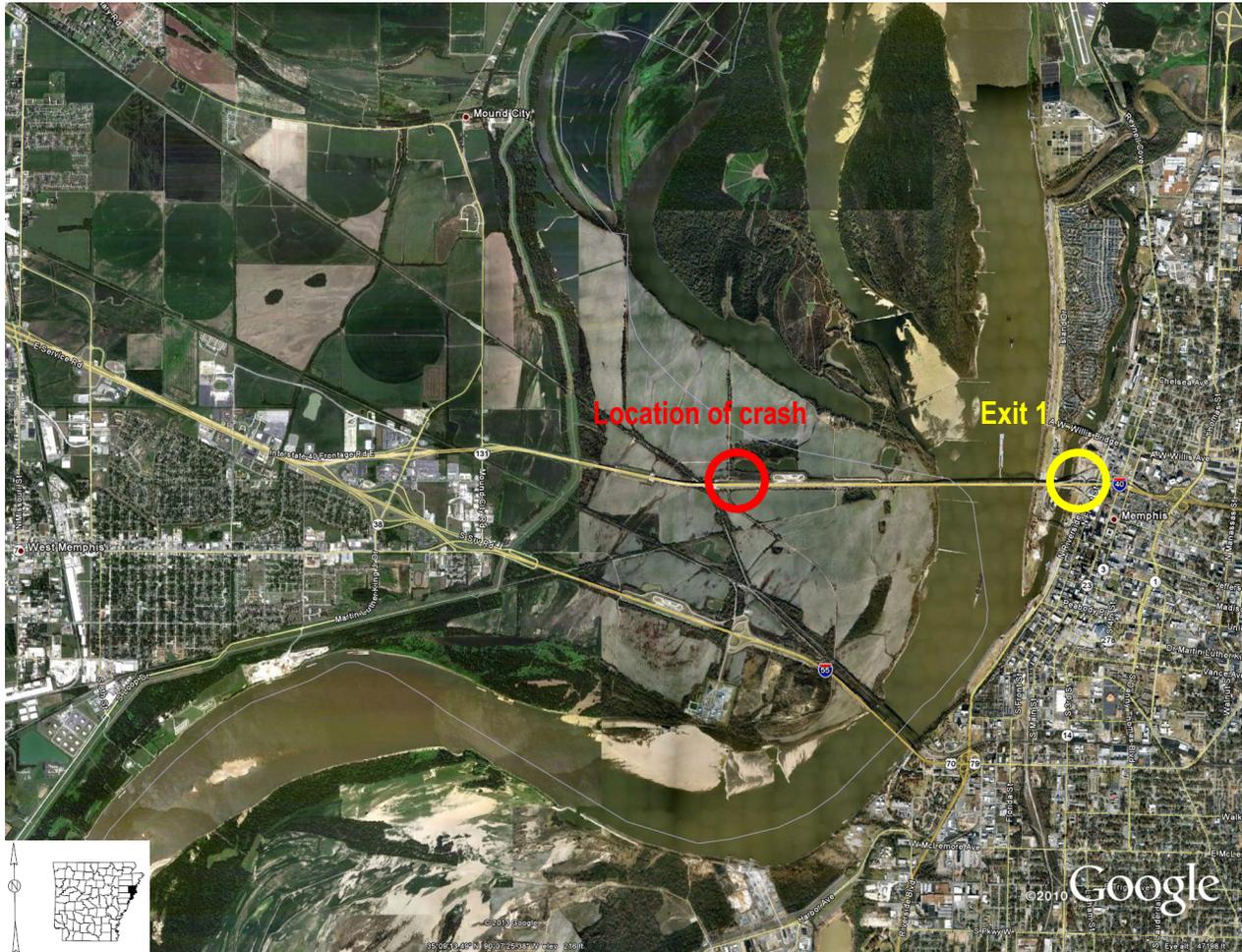
The driver accessed I-40 east and traveled west in the eastbound lanes of traffic from Exit 5. The driver was involved in a head-on crash in Crawford County at Log Mile 4.03.

Maintenance Review Results

The interchange at Exit 5 was examined and all pavement markings and signs were in place and were in conformance with MUTCD standards. However, some of the signs were the incorrect size to meet AHTD standards and will be replaced. These changes are scheduled to be implemented by statewide forces.



Interstate 40, Exit 1 in Shelby County, TN



Maintenance Review

The driver accessed I-40 possibly at Exit 1 in Memphis, Tennessee and traveled west in the eastbound lanes of traffic. The driver was involved in a head-on fatal crash in Crittenden County at Log Mile 283.00.

Maintenance Review Results

The interchanges at Exit 1A and 1B in Memphis were examined and all pavement markings and signs were in place and were in conformance with the MUTCD and AHTD standards.

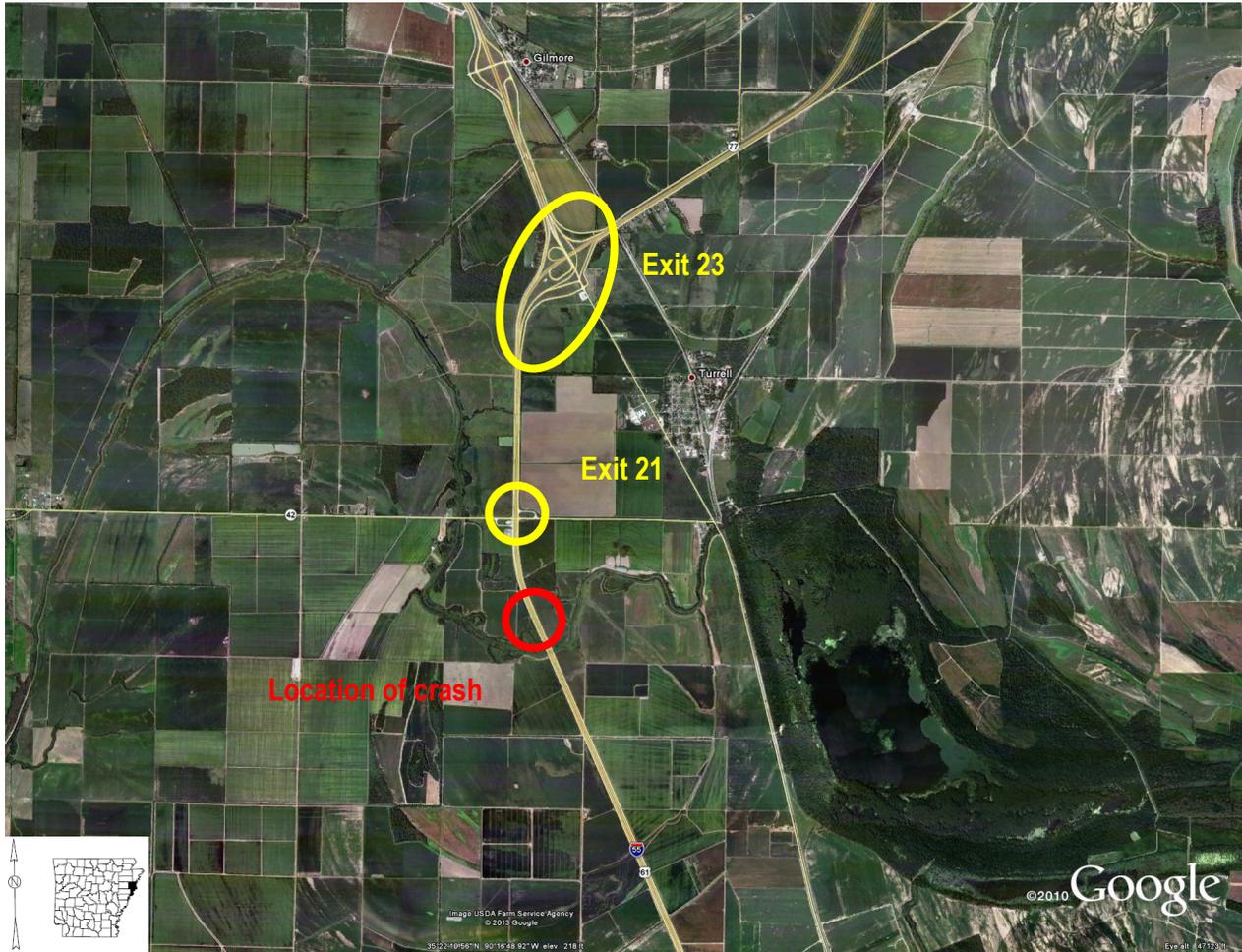








Interstate 55, Section 11, Exits 21 & 23 in Crittenden County



Maintenance Review

The driver accessed I-55 north and traveled south in the northbound lanes of traffic from possibly Exit 21 or Exit 23. The driver was involved in a sideswipe opposite direction crash in Crittenden County at Log Mile 21.10.

Maintenance Review Results

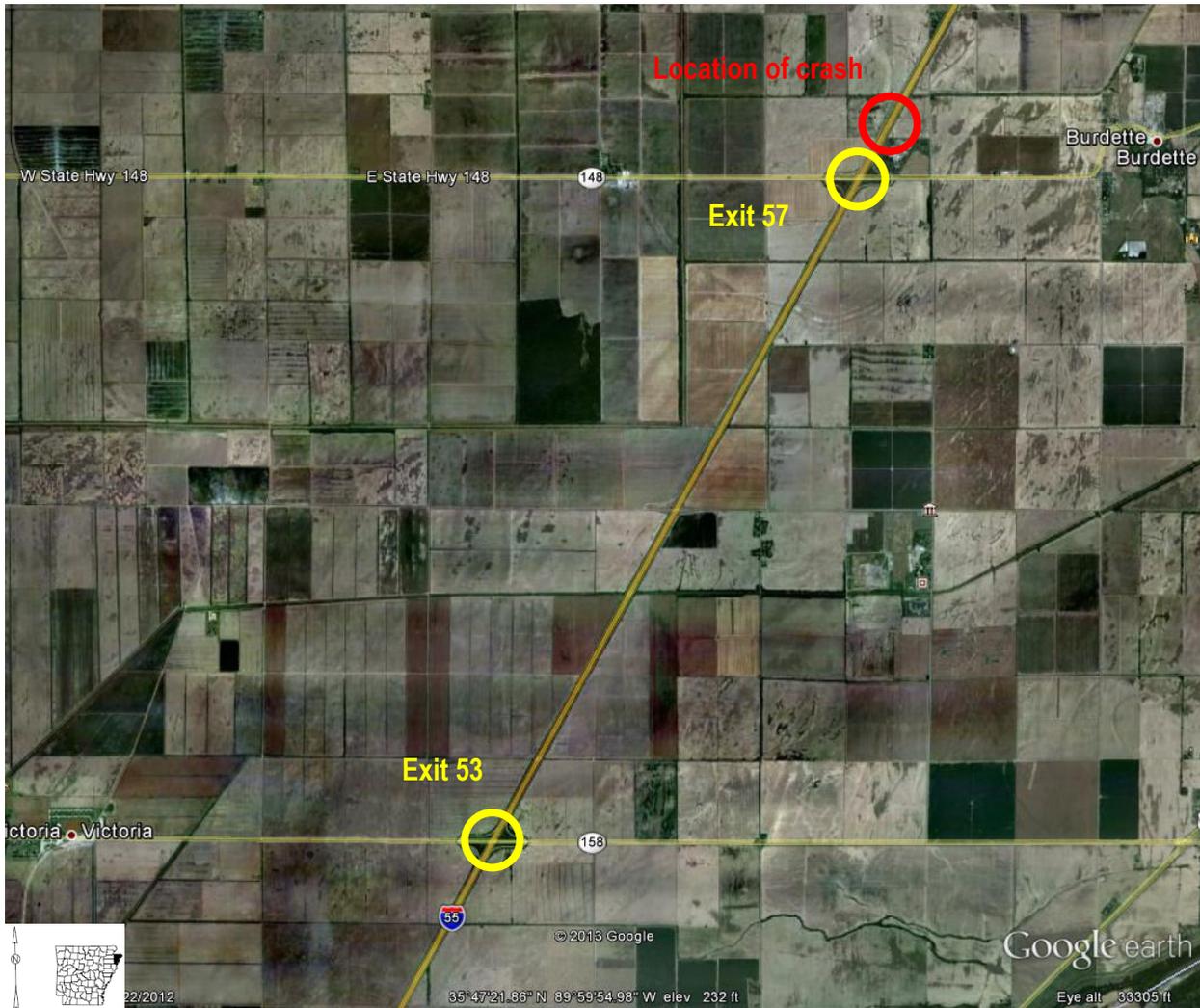
The interchanges at Exit 21 and Exit 23 were examined and all pavement markings and signs were in place and were in conformance with the MUTCD and AHTD standards. No modifications are recommended at this time.







Interstate 55, Section 12, Exits 53 & 57 in Mississippi County



Maintenance Review

The driver accessed I-55 north and traveled south in the northbound lanes of traffic from possibly Exit 53 or Exit 57. The driver was involved in a head on crash in Mississippi County at Log Mile 57.83.

Maintenance Review Results

The interchanges at Exit 53 and Exit 57 were examined and all pavement markings and signs were in place and were in conformance with the MUTCD and AHTD standards. No modifications are recommended at this time.















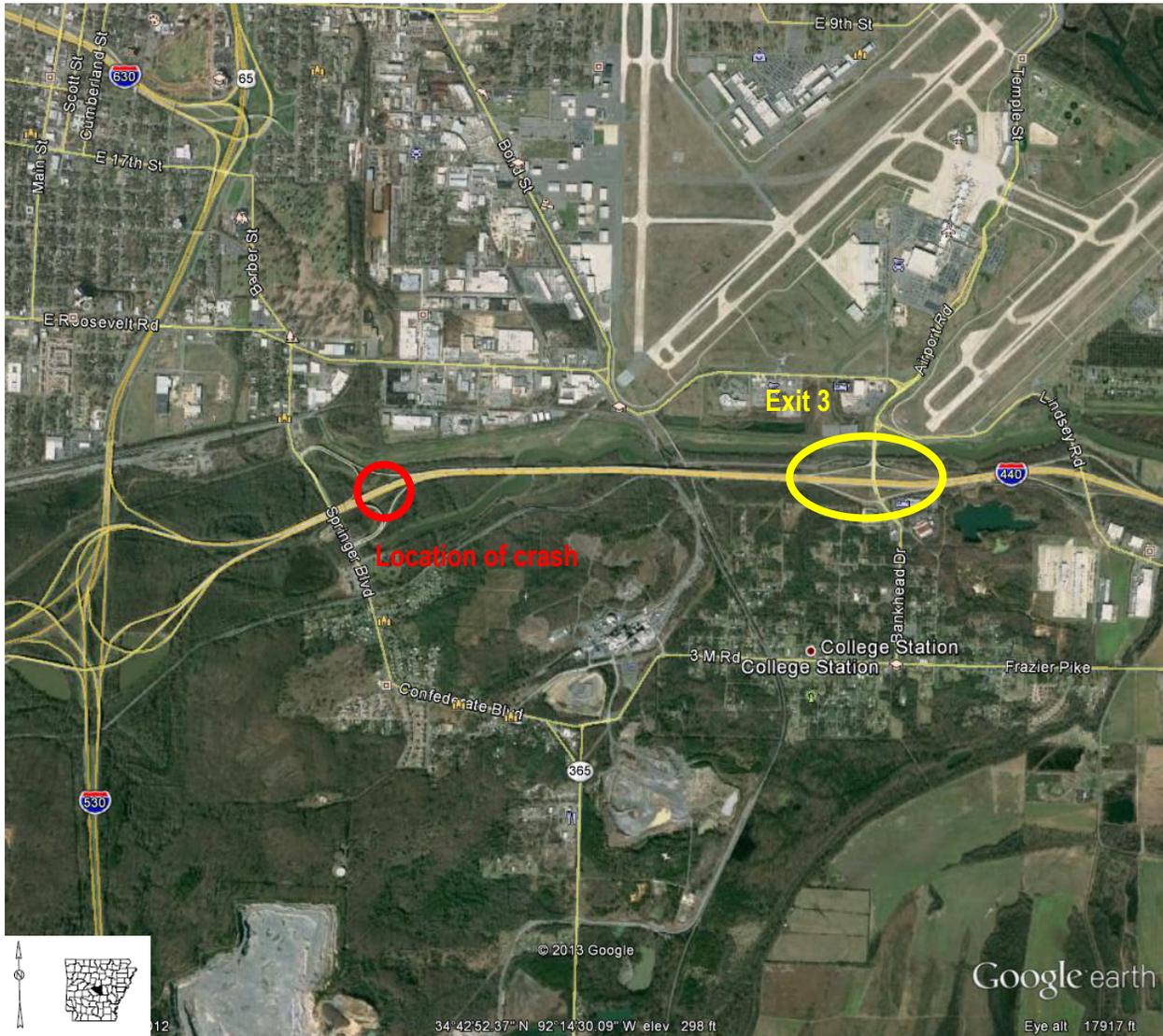








Interstate 440, Section 1, Exit 3 in Pulaski County



Maintenance Review

The driver accessed I-440 east and traveled west in the eastbound lanes of traffic from possibly Exit 3. The driver was involved in a fatal head on crash in Pulaski County at Log Mile 1.63.

Maintenance Review Results

The interchange at Exit 3 was examined and all pavement markings and signs were in place and were in conformance with MUTCD standards. However, some of the signs were the incorrect size to be in conformance with AHTD standards and will be replaced. These changes are scheduled to be implemented by statewide forces.



Interstate 30, Section 23, Exit 140 in Pulaski County



Maintenance Review

The driver accessed I-30 east and traveled west in the eastbound lanes of traffic from possibly Exit 140. The driver was involved in a sideswipe opposite direction crash in Pulaski County at Log Mile 139.52.

Maintenance Review Results

The interchange at Exit 140 and the connecting frontage road were examined and all pavement markings and signs were in place and were in conformance with MUTCD standards. However, some additional signs are needed and some signs need to be replaced to be in conformance with AHTD standards. These changes are scheduled to be implemented by statewide forces.



EAST BOUND OFF RAMP





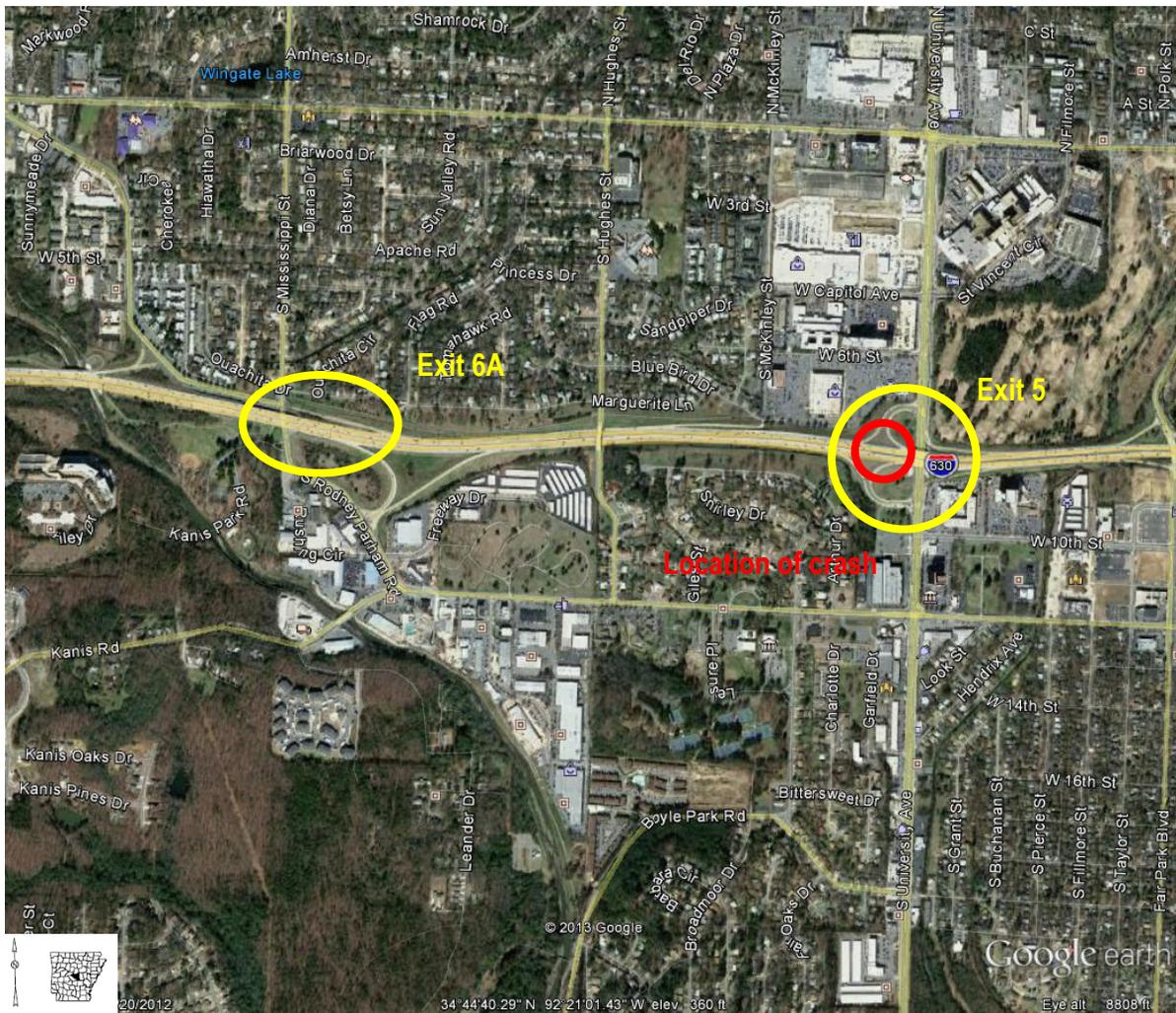








Interstate 630, Section 21, Exits 5 and 6A in Pulaski County



Maintenance Review

The driver accessed I-630 west and traveled east in the westbound lanes of traffic from possibly Exit 6A. Exit 5 was also examined but it is unlikely that the driver entered the roadway at this location due to a concrete median barrier that is in place. The driver was involved in a sideswipe opposite direction crash in Pulaski County at Log Mile 4.50

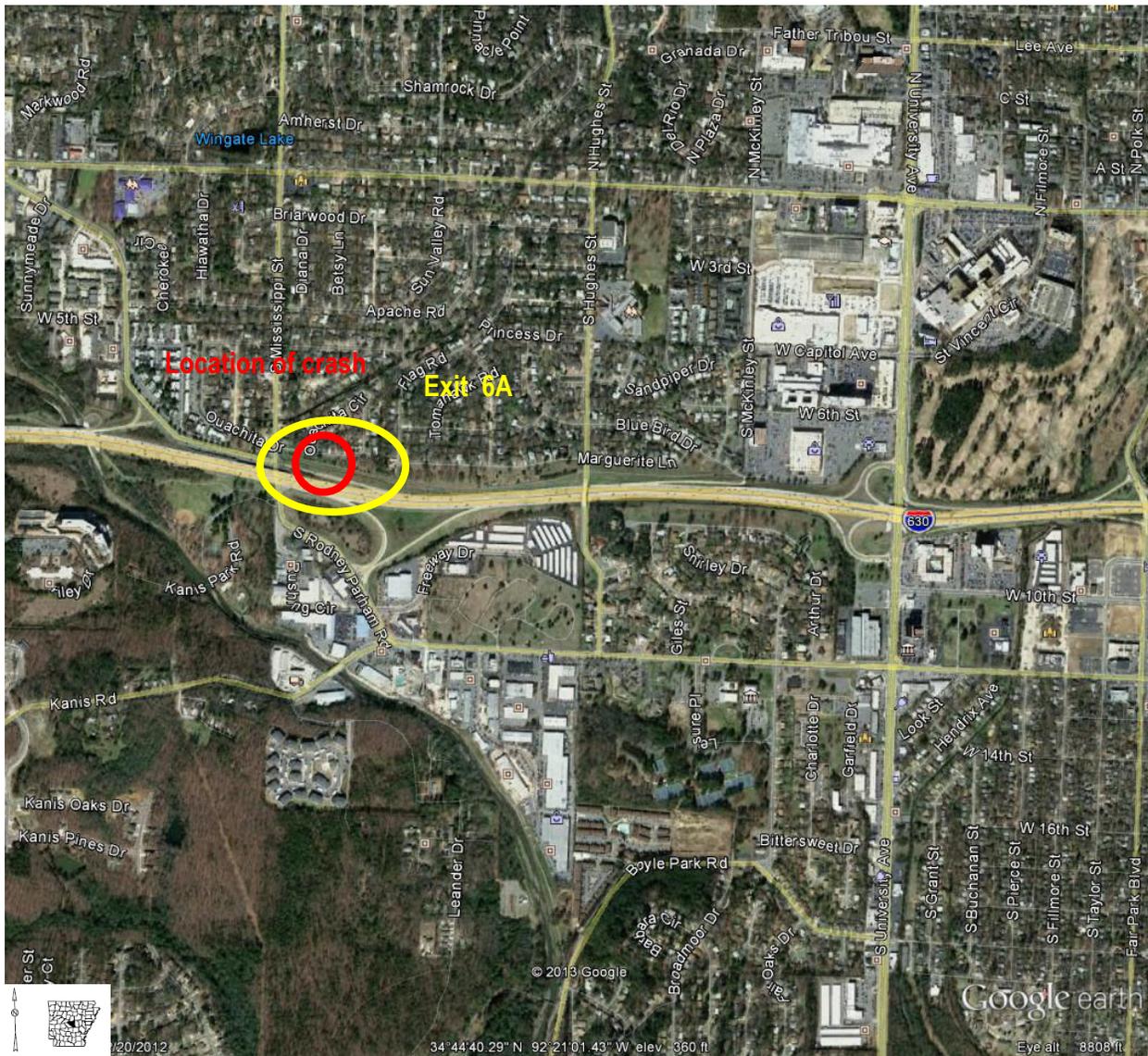
Maintenance Review Results

The interchanges at Exit 6A and 5 were examined and all pavement markings were in place and were in conformance with MUTCD standards at Exit 6A. However, some signage modifications and additions are needed to bring the Exit 5 interchange up to MUTCD and AHTD standards. Some signage modifications are also needed to bring the Exit 6A interchange up to AHTD standards. These changes will be implemented by statewide forces.





Interstate 630, Section 21, Exit 6A in Pulaski County



Maintenance Review

The driver traveled eastbound up the westbound exit ramp at Exit 6A. The driver was involved in a head on crash in Pulaski County at Section 176, Log Mile 0.19 on the exit ramp. The equivalent mainlanes location is Log Mile 5.51 on Section 21.

Maintenance Review Results

The interchange at Exit 6A was examined and all pavement markings were in place and were in conformance with MUTCD standards. However some signage modifications and additions are needed to bring the interchange up to AHTD standards. These changes will be implemented by statewide forces.











Interstate 530, Section 3, Exits 15 and 20 in Pulaski County



Maintenance Review

The driver accessed I-530 south and traveled north in the southbound lanes of traffic from possibly Exit 15 or Exit 20. The driver was involved in a sideswipe opposite direction crash in Pulaski County at Log Mile 14.96

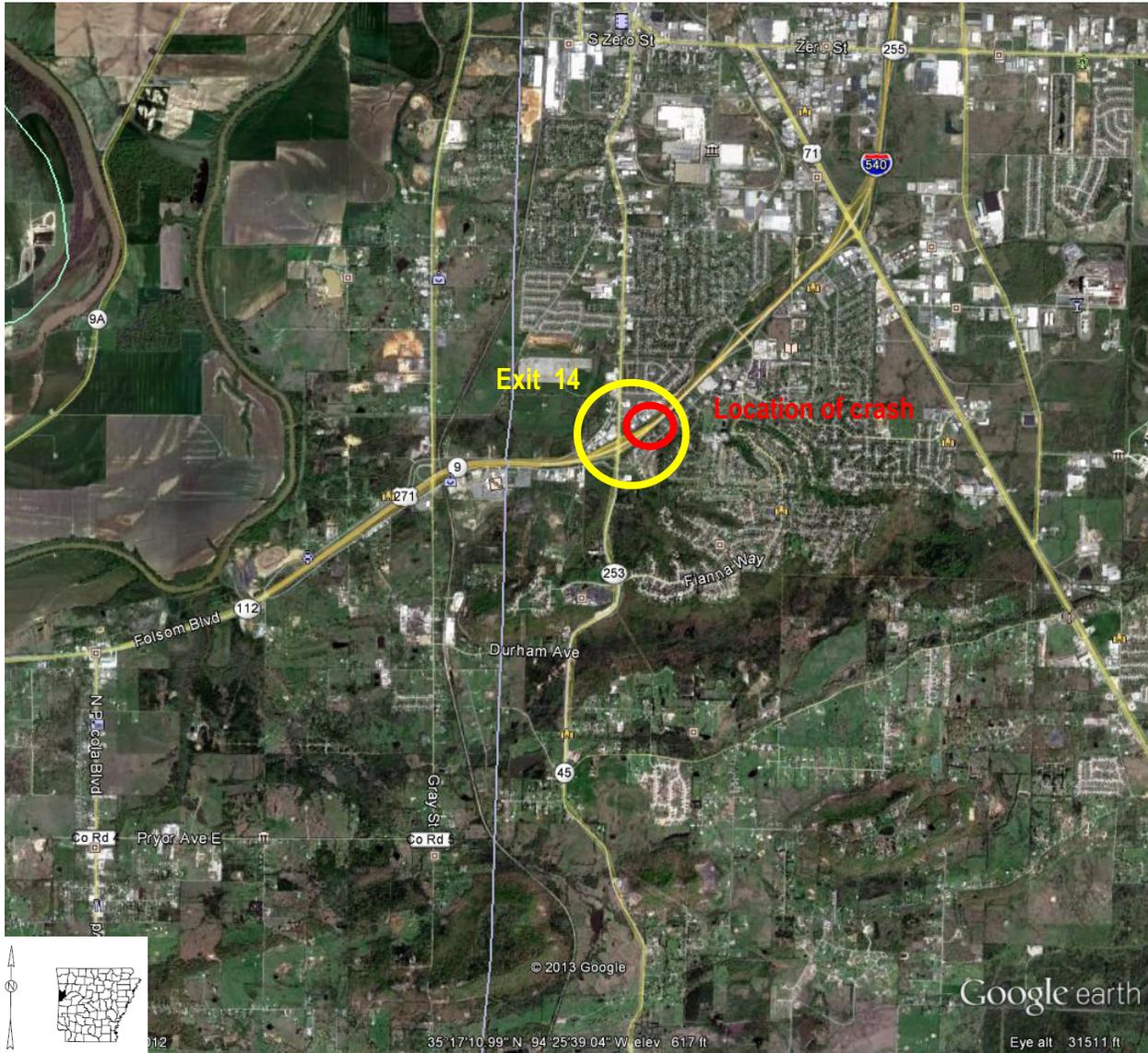
Maintenance Review Results

The interchanges at Exits 15 and 20 were examined and all pavement markings and signs were in place and were in conformance with the MUTCD and AHTD standards. However a yield sign is in need of replacement at Exit 15 to be in conformance with AHTD standards. This sign replacement will be implemented by statewide forces.





Interstate 540, Section 1, Exit 14 in Sebastian County



Maintenance Review

The driver accessed I-540 south and traveled north in the southbound lanes of traffic from possibly Exit 14. The driver was involved in a sideswipe opposite direction crash in Sebastian County at Log Mile 0.72.

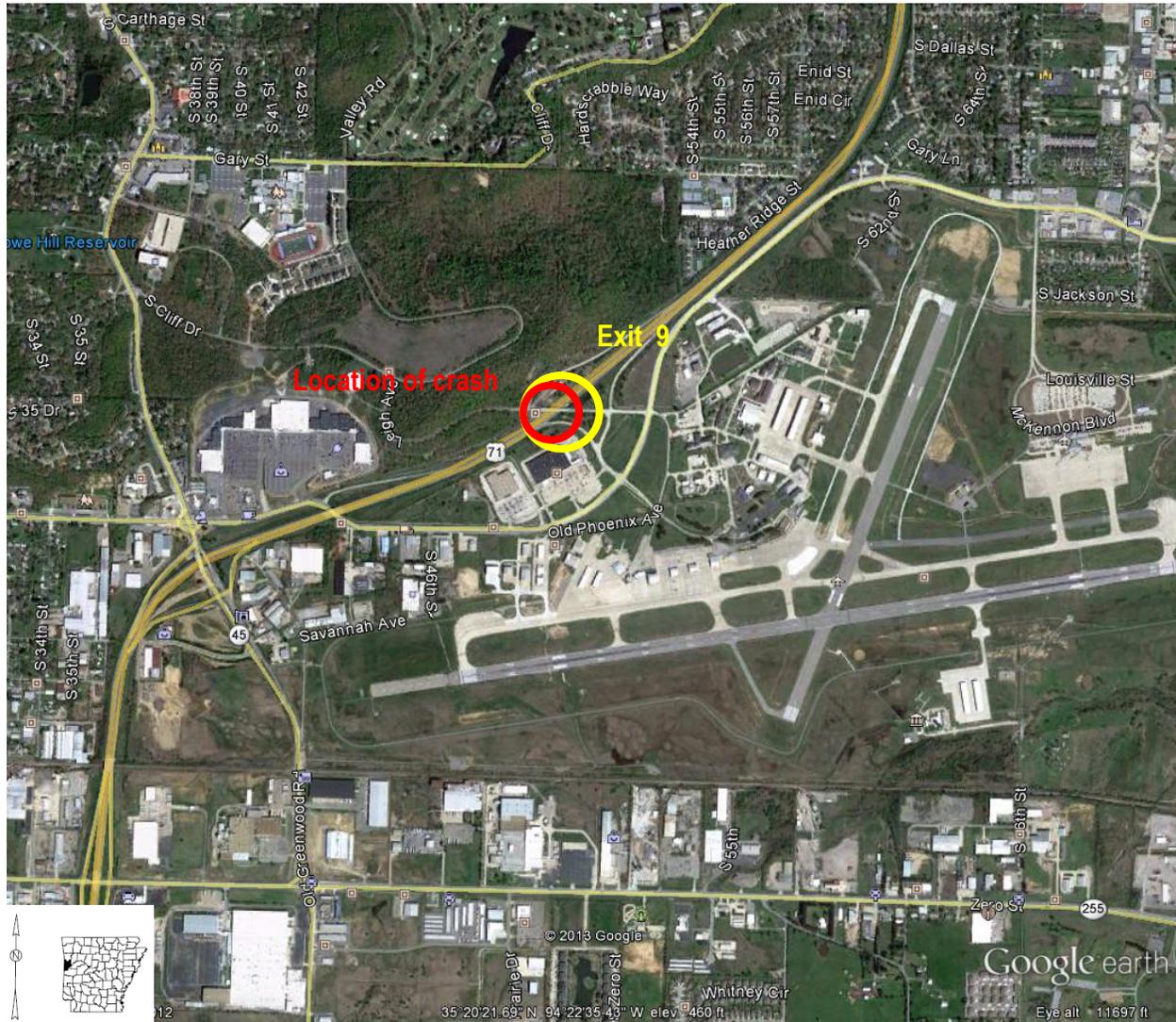
Maintenance Review Results

The interchange at Exit 14 was examined and all pavement markings and signs were in place and were in conformance with MUTCD standards. However, some signs are the incorrect size and need to be replaced to be in conformance with AHTD standards. These signs will be replaced with the proper size signs by statewide forces.





Interstate 540, Section 4, Exit 9 in Sebastian County



Maintenance Review

The driver accessed I-540 north and traveled south in the northbound lanes of traffic from possibly Exit 9. The driver was involved in a fatal head on crash in Sebastian County at Log Mile 5.18.

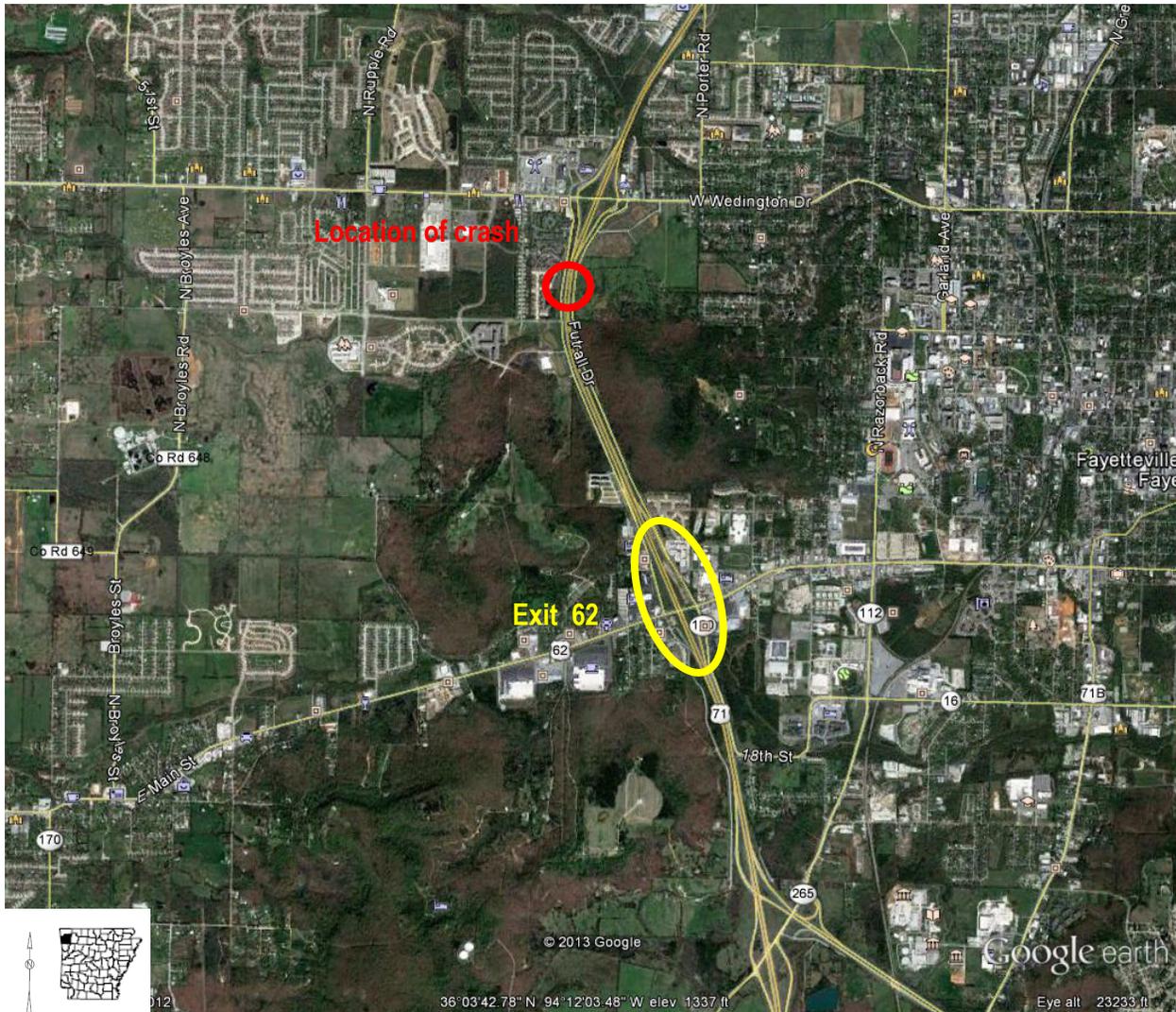
Maintenance Review Results

The interchange at Exit 9 was examined and all pavement markings were present and in conformance with MUTCD standards. However, one sign assembly consisting of a Stop, Do Not Enter, and Two Way signs are missing and need to be replaced to be in conformance with AHTD standards. These signs will be replaced by statewide forces.





Interstate 540, Section 4, Exit 62 in Washington County



Maintenance Review

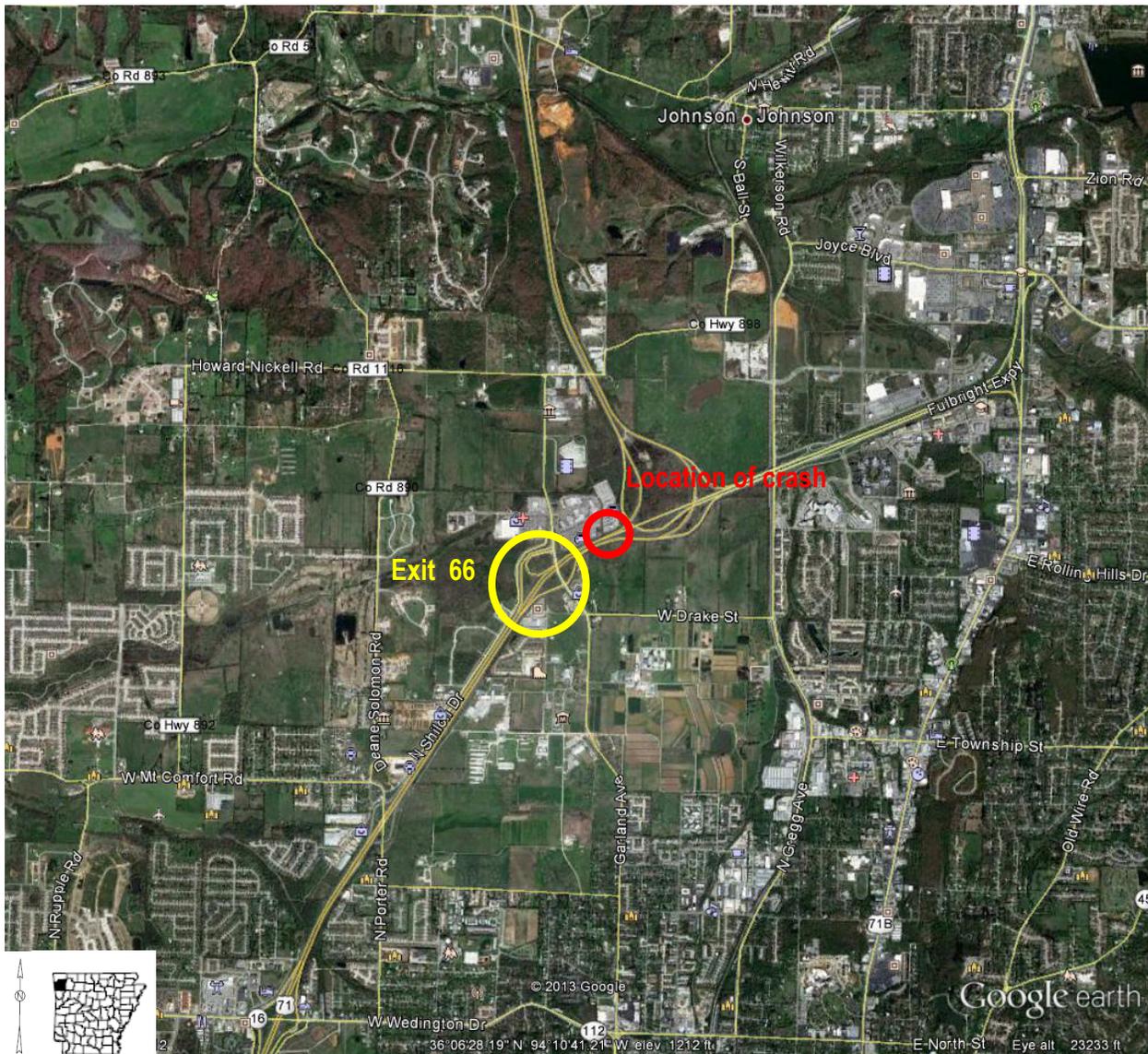
The driver accessed I-540 south and traveled north in the southbound lanes of traffic from possibly Exit 62. The driver was involved in a fatal head on crash in Washington County at Log Mile 63.39.

Maintenance Review Results

The interchange at Exit 62 was examined and all pavement markings were present and in conformance with MUTCD standards. However, some additional signs are needed and some signs need to be replaced to be in compliance with AHTD standards. These signs will be added or replaced by statewide forces.



Interstate 540, Section 4, Exit 66 in Washington County



Maintenance Review

The driver accessed I-540 south and traveled north in the southbound lanes of traffic from possibly Exit 66. The driver was involved in a sideswipe opposite direction crash in Washington County at Log Mile 66.30.

Maintenance Review Results

The interchange at Exit 66 was examined and all pavement markings and signs were present and in conformance with MUTCD standards. However, it is noted that some additional signs are needed and some signs need to be replaced to be in conformance with AHTD standards. These signs will be added or replaced by statewide forces.



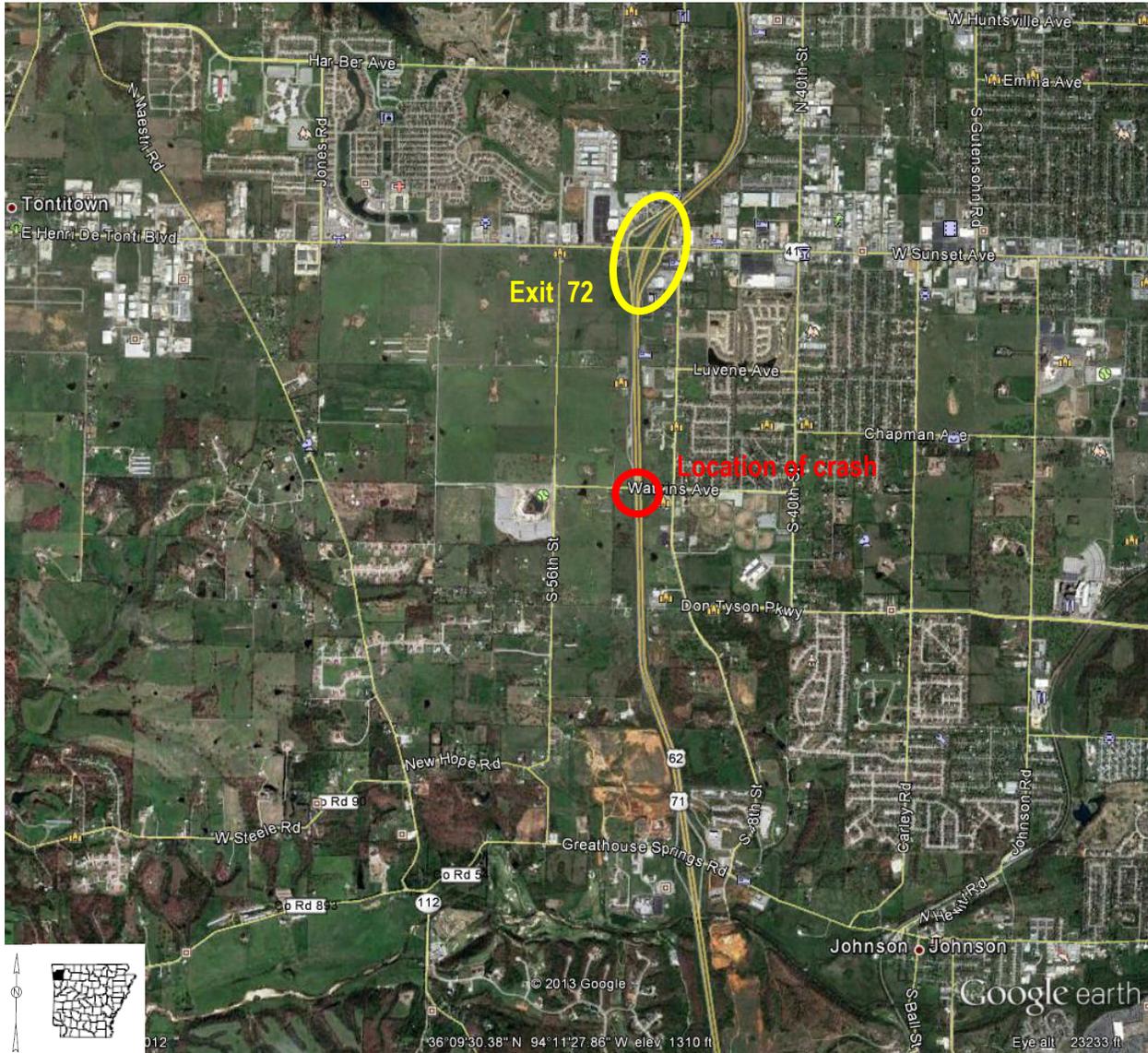
HWY. 110







Interstate 540, Section 4, Exit 72 in Washington County



Maintenance Review

The driver accessed I-540 north and traveled south in the northbound lanes of traffic from possibly Exit 72. The driver was involved in a fatal head on crash in Washington County at Log Mile 70.56.

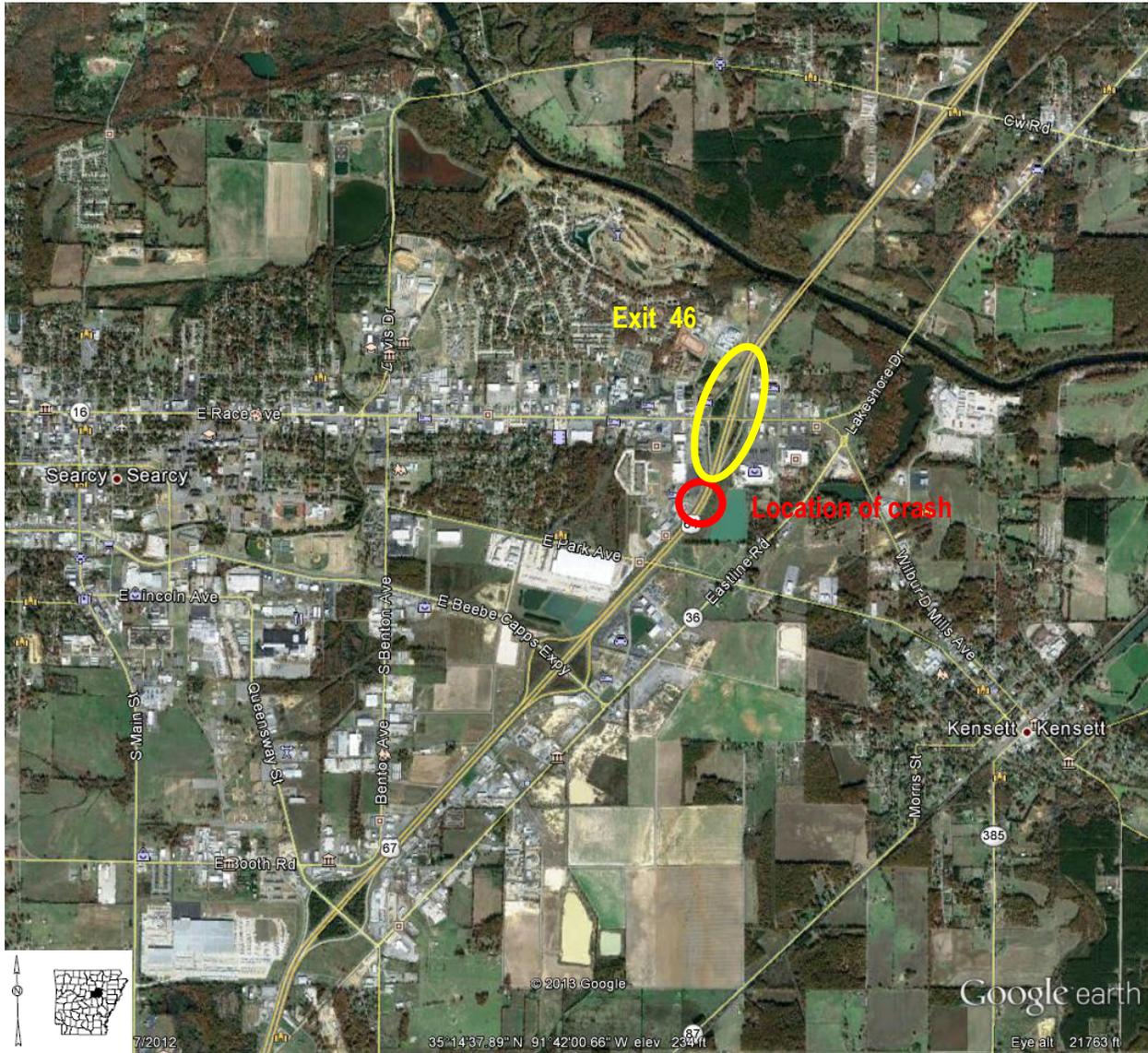
Maintenance Review Results

The interchange at Exit 72 was examined and all pavement markings and signs were in place and were in conformance with the MUTCD and AHTD standards.





Highway 67, Section 12, Exit 46 in White County



Maintenance Review

The driver accessed Hwy 67 north and traveled south in the northbound lanes of traffic from possibly Exit 46. The driver was involved in a sideswipe opposite direction crash in White County at Log Mile 20.30.

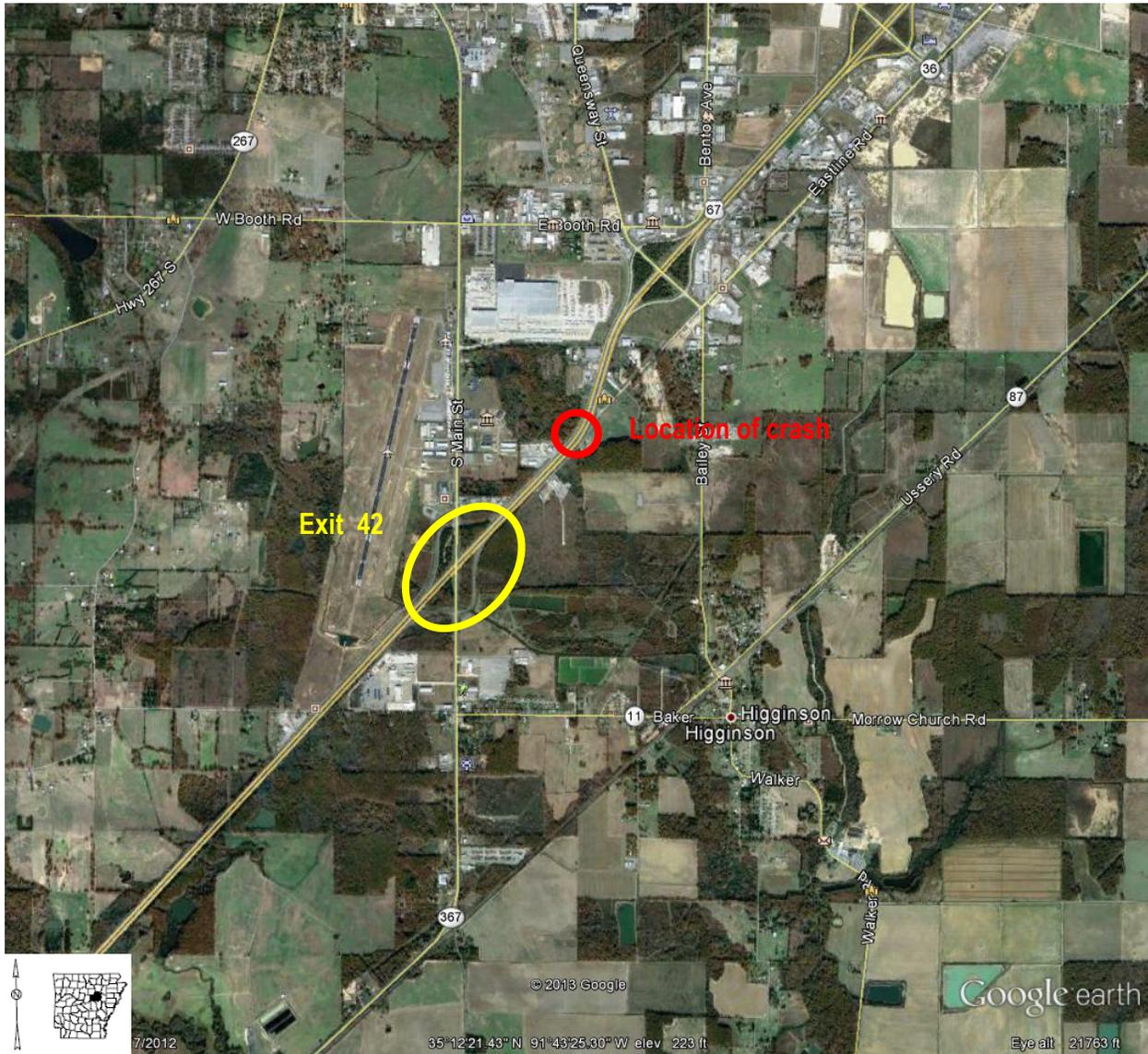
Maintenance Review Results

The interchange at Exit 46 was examined and all pavement markings and signs were in place and were in conformance with MUTCD standards. Some signs are the incorrect size to be in conformance with AHTD standards, and will be replaced by statewide forces.





Highway 67, Section 12, Exit 42 in White County



Maintenance Review

The driver accessed Hwy 67 south and traveled north in the southbound lanes of traffic from possibly Exit 42. The driver was involved in a sideswipe opposite direction crash in White County at Log Mile 17.33.

Maintenance Review Results

The interchange at Exit 42 was examined and all pavement markings and signs were in place and were in conformance with MUTCD standards. Some signs are the incorrect size to be in conformance with AHTD standards, and will be replaced by statewide forces.



