

# Project Screening

## Using Data-Based Analysis



Vincent Cardone  
Principal Engineer II, Traffic  
Monmouth County

# High Risk Rural Roads Program

- ▶ Competitive program administered by MPO
- ▶ Uses funds from the Federal Highway Administration's Highway Safety Improvements Program (HSIP).
- ▶ Only NJTPA member subregions are eligible to submit applications to the NJTPA for these programs. Municipalities located within the subregions may recommend a project to their respective county



# High Risk Rural Roads Program

- ▶ For projects to be advanced in FY 2018 all environmental approvals, local approval, and right-of-way acquisition must be completed and a full set of PS&E documents submitted to the Local Aid office by a set deadline.



# High Risk Rural Roads Program

- ▶ Project sponsors must give consideration to modern roundabouts for all new intersection and intersection upgrade projects.
- ▶ The National Environmental Policy Act (NEPA) regulations must be followed. As such, projects must have minimal or no environmental and cultural resource impacts.
- ▶ Projects must be completed within 24 months of receiving federal authorization.





# High Risk Rural Roads Program

- ▶ The following types of projects are NOT eligible:
  - improvements involving State, U.S. and Interstate highways including any improvements at intersections with such facilities;
  - routine maintenance/ replacement projects (including general resurfacing projects)
  - congestion management/ roadway capacity enhancements (road widening)
  - Aesthetic improvements along the rights-of-way.



# NJTPA High Risk Rural Roads Network Screening List

FY 2017-2018 HIGH RISK RURAL ROADS PROGRAM  
NETWORK SCREENING (USING CRASH DATA FROM 2011-2013)  
ALL COUNTIES

NJTPA RANK	COUNTY RANK	COUNTY	MUNICIPALITY	ROAD NAME	SRI	MILEPOST START	MILEPOST END	LENGTH	TOTAL CRASHES	FATAL INJURY	INCAPACITATING INJURY	MODERATE INJURY	PAIN	PDO	WEIGHTED SCORE/MILE
9	2	Hunterdon	Clinton town	West Main Street	000001732	0.00	0.45	0.45	2	1	0	0	0	1	10.69
11	3	Hunterdon	Tewksbury township	Fairmount Road West	00000512	3.73	4.93	1.20	14	0	2	1	1	10	10.24
13	3	Hunterdon	Delaware township	Stockton-Flemington Road	00000523	3.03	3.95	0.92	10	0	1	1	2	6	9.22
14	3	Hunterdon	Lebanon township	Fairview Avenue	00000513	15.97	20.05	4.08	73	1	3	3	12	54	8.88
19	4	Hunterdon	Tewksbury township	Old Turnpike Road	00000517	1.39	3.29	1.90	36	1	0	3	4	28	7.27
21	4	Hunterdon	Clinton township	PAYNE RD	10061007	0.60	1.33	0.73	2	1	0	0	0	1	6.59
23	5	Hunterdon	Holland township	Milford-Warren Glen Road	00000519	19.46	22.56	3.10	49	0	2	5	2	40	6.44
27	5	Hunterdon	Kingwood township	Kingwood Road	00000519	9.19	10.36	1.17	6	0	1	0	2	3	5.82
41	7	Hunterdon	Union Twp (Hunterdon Co)	Little York Road	10000614	5.11	6.37	1.26	8	1	0	0	1	6	4.61
64	11	Hunterdon	East Amwell township	Rileyville Road	10000607	0.00	2.08	2.08	5	0	1	0	0	4	2.31
3	2	Middlesex	Old Bridge township	Texas Road	00000520	0.00	2.06	2.06	107	0	1	2	26	78	15.58
4	1	Monmouth	Wall township	Belmar Boulevard	130000181	1.41	2.46	1.05	28	0	2	1	3	22	13.61
6	1	Monmouth	Freehold township	Jackson Mill Road	13000023	0.00	1.45	1.45	35	1	0	3	9	22	12.98
15	4	Monmouth	Millstone township	Perrineville Road	13000001	1.57	3.23	1.66	40	0	1	1	8	30	8.72
26	8	Monmouth	Howell township	CASINO RD	13191012	2.62	3.60	0.98	6	0	1	0	1	4	5.93
31	8	Monmouth	Roosevelt borough	South Rochdale Avenue	00000571	29.68	30.57	0.89	4	1	0	0	0	3	5.40
31	8	Monmouth	Howell township	ARNOLD BLVD	13191101	0.00	0.89	0.89	4	0	1	0	0	3	5.40
42	9	Monmouth	Upper Freehold township	Stage Coach Road	00000524	7.91	13.36	5.45	29	1	1	5	7	15	4.58
43	9	Monmouth	Freehold township	Ely Harmony Road	13321049	0.00	4.46	4.46	37	0	1	5	7	24	4.52
51	12	Monmouth	Upper Freehold township	Holmes Mill Road	13000027	1.37	4.67	3.30	13	1	0	3	1	8	3.28
56	12	Monmouth	Upper Freehold township	MEIRS RD	13511013	1.79	3.97	2.18	4	1	0	1	0	2	2.97
60	12	Monmouth	Millstone township	Millstone Road	13321017	0.00	5.57	5.57	39	1	0	4	3	31	2.60
1	1	Morris	Washington Twp (Morris Co)	West Mill Road	00000513	25.67	25.85	0.18	11	0	1	0	0	10	26.72
30	2	Morris	Washington Twp (Morris Co)	Fairmont Road	00000517	7.31	9.30	1.99	22	0	1	3	1	17	5.44
36	2	Morris	Washington Twp (Morris Co)	East Mill Road	00000513	26.87	28.39	1.52	31	0	1	0	3	27	5.14
38	3	Morris	Jefferson township	Ridge Road	14141233	1.51	2.49	0.98	2	0	1	0	0	1	4.91
40	3	Morris	Mendham township	Roxcticus Road	14191045	2.18	3.52	1.34	4	1	0	1	0	2	4.84
18	1	Ocean	Ocean Twp (Ocean Co)	Warren Grove-Waretown Road	00000532	32.21	33.04	0.83	5	0	1	1	0	3	7.81
20	1	Ocean	Manchester township	Whiting-New Egypt Road	00000539	25.36	28.38	3.02	43	0	1	3	11	28	6.89
24	2	Ocean	Stafford township	North Green Street	00000539	10.58	11.68	1.10	6	0	1	0	2	3	6.19
25	2	Ocean	Plumsted township	Pinehurst Road	00000539	32.23	33.71	1.48	5	1	0	2	1	1	6.18
29	4	Ocean	Little Egg Harbor township	Thomas Avenue	15000602	0.00	1.75	1.75	4	1	1	0	0	2	5.50
33	5	Ocean	Jackson township	West Veterans Highway	00000528	16.41	18.18	1.77	13	0	1	1	3	8	5.36
39	6	Ocean	Little Egg Harbor township	STAGE RD	15161159	0.00	0.99	0.99	3	0	1	0	0	2	4.86
44	7	Ocean	Little Egg Harbor township	North Green Street	00000539	0.73	3.69	2.96	53	1	0	2	5	45	4.44
46	7	Ocean	Lacey township	Lacey Road	15000614	2.71	10.04	7.33	46	0	1	8	8	29	3.57
47	8	Ocean	Lacey township	Cedar Bridge-Whiting Road	00000539	15.91	20.85	4.94	33	1	0	4	6	22	3.54
55	9	Ocean	Berkeley township	Dover Road	15000618	1.90	3.80	1.90	9	0	1	0	1	7	3.06
61	9	Ocean	Lacey township	Dover Road	15000618	0.00	1.90	1.90	1	0	1	0	0	0	2.53
68	9	Ocean	Plumsted township	Long Swamp Road	15230004	0.00	3.85	3.85	2	1	0	0	0	1	1.25
16	1	Somerset	Tewksbury township	Lamington Road	00000523	24.36	24.94	0.58	6	1	0	0	0	5	8.25
58	4	Somerset	Hillsborough township	BEEKMAN LN	18101024	1.22	3.24	2.02	5	0	1	0	1	3	2.88
59	4	Somerset	Bedminster township	Burnt Mills Road	18000620	0.00	3.01	3.01	23	0	1	1	2	19	2.82

# Monmouth County List


NJTPA RANK	COUNTY RANK	COUNTY	MUNICIPALITY	ROAD NAME	SRI	MILEPOST START	MILEPOST END	LENGTH
4	1	Monmouth	Wall township	Belmar Boulevard	130000181__	1.41	2.46	1.05
6	1	Monmouth	Freehold township	Jackson Mill Road	13000023__	0.00	1.45	1.45
15	4	Monmouth	Millstone township	Perrineville Road	13000001__	1.57	3.23	1.66
26	8	Monmouth	Howell township	CASINO RD	13191012__	2.62	3.60	0.98
31	8	Monmouth	Roosevelt borough	South Rochdale Avenue	00000571__	29.68	30.57	0.89
31	8	Monmouth	Howell township	ARNOLD BLVD	13191101__	0.00	0.89	0.89
42	9	Monmouth	Upper Freehold township	Stage Coach Road	00000524__	7.91	13.36	5.45
43	9	Monmouth	Freehold township	Ely Harmony Road	13321049__	0.00	4.46	4.46
51	12	Monmouth	Upper Freehold township	Holmes Mill Road	13000027__	1.37	4.67	3.30
56	12	Monmouth	Upper Freehold township	MEIRS RD	13511013__	1.79	3.97	2.18
60	12	Monmouth	Millstone township	Millstone Road	13321017__	0.00	5.57	5.57

ROAD NAME	SRI	TOTAL CRASHES	FATAL INJURY	INCAPACITATING INJURY	MODERATE INJURY	PAIN	PDO	Weighted Score/mile
Belmar Boulevard	130000181__	28	0	2	1	3	22	13.61
Jackson Mill Road	13000023__	35	1	0	3	9	22	12.98
Perrineville Road	13000001__	40	0	1	1	8	30	8.72
CASINO RD	13191012__	6	0	1	0	1	4	5.93
South Rochdale Avenue	00000571__	4	1	0	0	0	3	5.40
ARNOLD BLVD	13191101__	4	0	1	0	0	3	5.40
Stage Coach Road	00000524__	29	1	1	5	7	15	4.58
Ely Harmony Road	13321049__	37	0	1	5	7	24	4.52
Holmes Mill Road	13000027__	13	1	0	3	1	8	3.28
MEIRS RD	13511013__	4	1	0	1	0	2	2.97
Millstone Road	13321017__	39	1	0	4	3	31	2.60



# Monmouth County List

Lists are ranked assuming the weight of a fatal crash is the same as an incapacitating injury crash and using the value of a Complaint of Pain injury as the base value (K=A, no Property Damage only (PDO)).

 		HSM (FHWA-HRT-05-051) <a href="#">Link</a> Published 2005		Weighting Factors		
		2001 dollars	2012 dollars (KABCO)	KABCO Weight	K=A Weight	K=A No PDO Weight
K	Fatal	\$ 4,008,900	\$ 5,197,200	89.30	4.81	2.73
ABC	ALL INJURY	\$ 82,600	\$ 107,100			
A	Incapacitating	\$ 216,000	\$ 280,000	4.81	4.81	2.73
B	Moderate	\$ 79,000	\$ 102,400	1.76	1.76	1.00
C	Complaint of Pain	\$ 44,900	\$ 58,200	1.00	1.00	0.57
O	PDO	\$ 7,400	\$ 9,600	0.16	0.16	0.00

ROAD NAME	SRI	TOTAL CRASHES	FATAL INJURY	INCAPACITATING INJURY	MODERATE INJURY	PAIN	PDO	Weighted Score/mile
Belmar Boulevard	130000181_	28	0	2	1	3	22	13.61
Jackson Mill Road	13000023_	35	1	0	3	9	22	12.98
Perrineville Road	13000001_	40	0	1	1	8	30	8.72
CASINO RD	13191012_	6	0	1	0	1	4	5.93
South Rochdale Avenue	00000571_	4	1	0	0	0	3	5.40
ARNOLD BLVD	13191101_	4	0	1	0	0	3	5.40
Stage Coach Road	00000524_	29	1	1	5	7	15	4.58
Ely Harmony Road	13321049_	37	0	1	5	7	24	4.52
Holmes Mill Road	13000027_	13	1	0	3	1	8	3.28
MEIRS RD	13511013_	4	1	0	1	0	2	2.97
Millstone Road	13321017_	39	1	0	4	3	31	2.60







Date last inventoried: July 2011



# Plan4Safety Filter

Filter Builder - You're editing filter: CR18HRRR2017 -

## Preview Your Filter

The filter you're building will find crash records where...

```
[  
  CRASH.COUNTY = MONMOUTH  
  and  
  CRASH.CRASH_YEAR in [2011,2012,2013,2014,2015]  
  and  
  [  
    CRASH.MILEPOST <= 2.46  
    and  
    CRASH.MILEPOST >= 1.41  
  ]  
  and  
  CRASH.SRI = 130000181  
]
```

[Select All](#) [Unselect All](#) [Alt. Shading On](#) [Preview Off](#) [Refresh](#)

<input type="checkbox"/>	Table: CRASH	Column: COUNTY	Operator: =	Value: MONMOUTH
AND				
<input type="checkbox"/>	Table: CRASH	Column: CRASH_YEAR	Operator: IN	Value: 2013 2014 2015 2016
AND				
<input type="checkbox"/>	Table: CRASH	Column: MILEPOST	Operator: <=	Value: 2.46
AND				
<input type="checkbox"/>	Table: CRASH	Column: MILEPOST	Operator: >=	Value: 1.41
AND				
<input type="checkbox"/>	Table: CRASH	Column: SRI	Operator: =	Value: 130000181

Network screening  
List covered 2011 –  
2013  
Query expanded to  
capture the most  
recent data

New Criteria

Insert Criteria

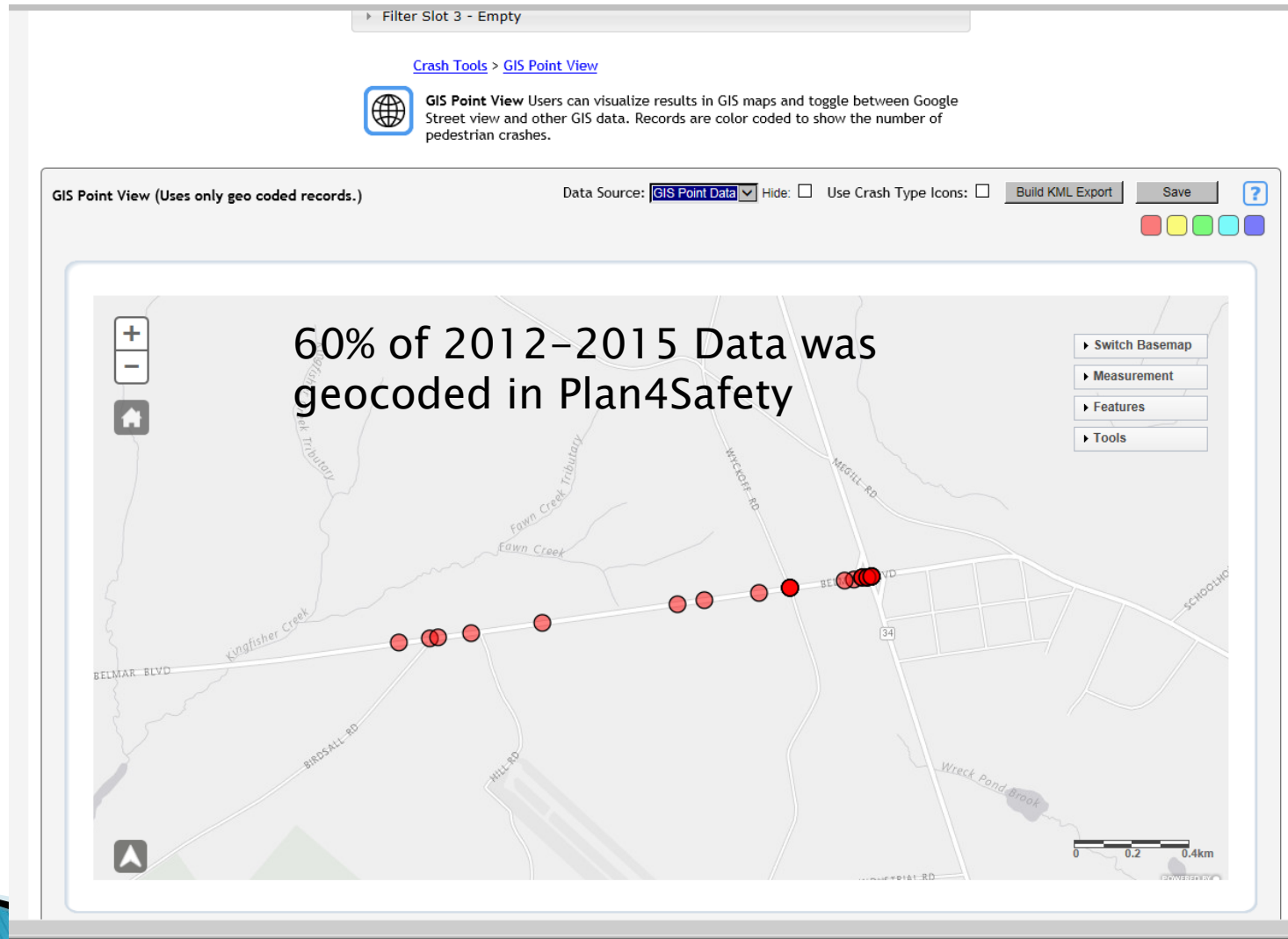
Delete Checked

Group Checked

Ungroup Checked



# Plan4Safety GIS Point View



# Use crash tools to create a road histogram (P4S)

Comprehensive Crash Analysis Program


Home Filter Tools Filtered Data **Crash Tools** Fix It Settings Logout

CR18HRRR2017 - Active Filter (100.00 % Geo Coded)

Filter Slot 2 - Empty

Filter Slot 3 - Empty


[Crash Tools](#) > [Roadway Histogram Tool](#)

 The **Roadway Histogram Tool** allows you to view the a roadway histogram based on an SRI road segment with crashes defined by your filter.

**Roadway Histogram Tool (Uses only geo coded records.)**

**\*\* No data found for this filter!! \*\***

**No Data Found**  
Could not find data for the given active filter and form criteria.

SQL XLS CSV TAB PNG DOC PDF  Rows Per Page: 25 [Filters On](#)

SRI: 00000030 From: 2011 To: 2012 Segment Length: 0.1 Start Milepost: 2 End Milepost: 20 Crash Count >: 0 **Save**

**Result Set: 0 Rows**

**Empty Grid** Drag columns here

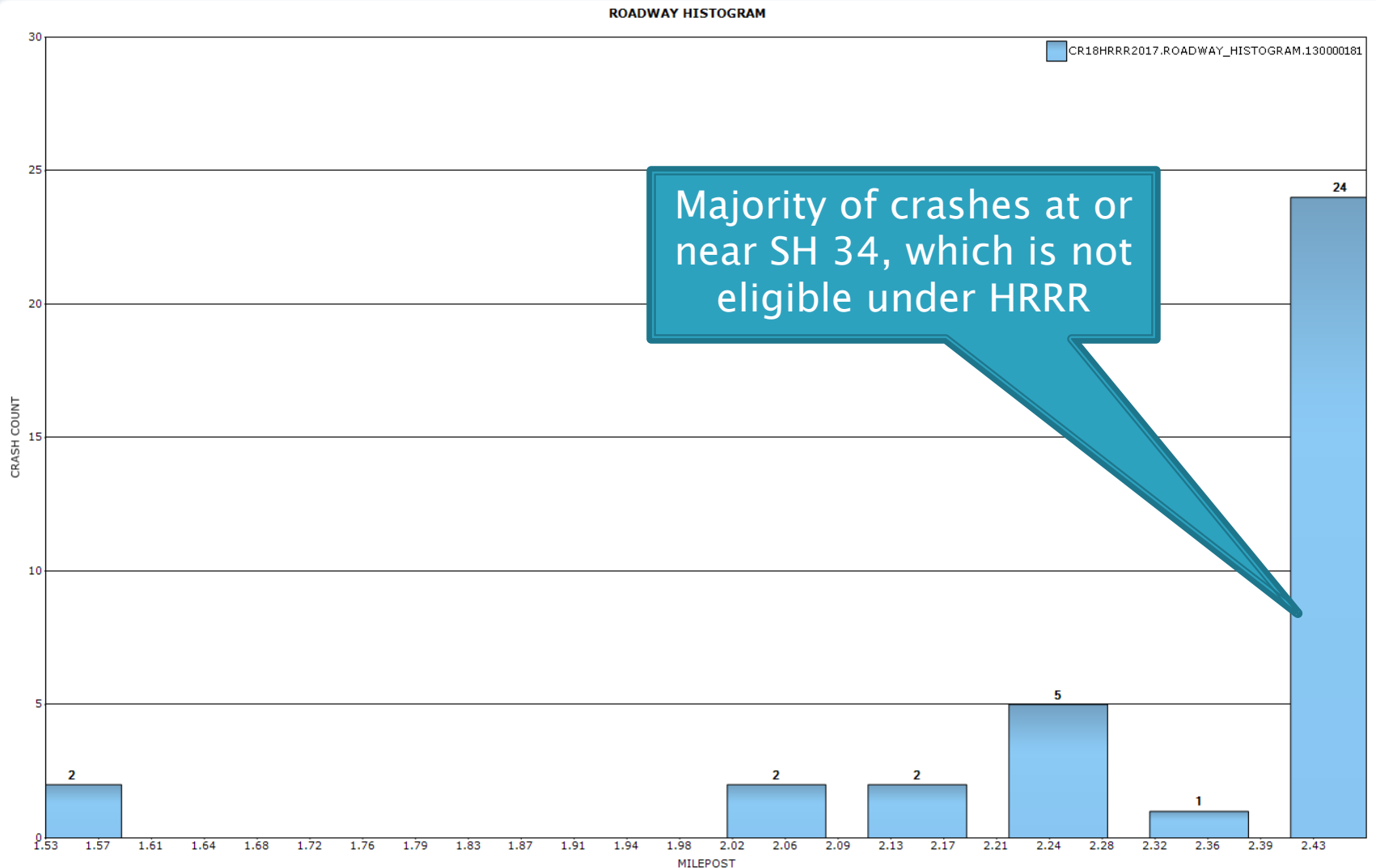
Empty Grid: 1 Items ( Showing 1 to 1 )

Empty

Total: 0 Mean: 0 Median: 0



# Road Histogram reveals crash locations (P4S)

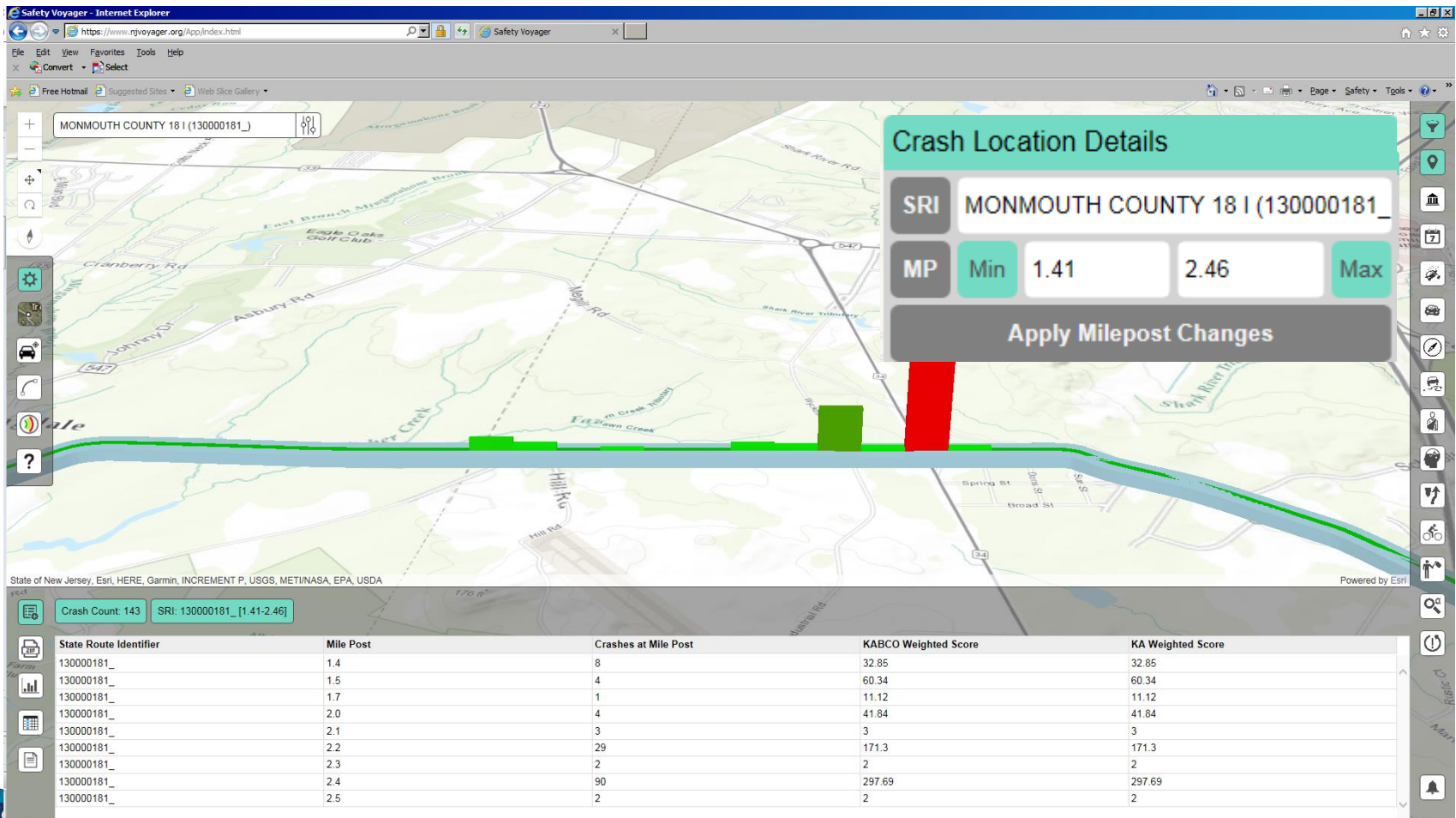


# Safety Voyager

- ▶ Process using Safety Voyager is similar, but results are obtained faster

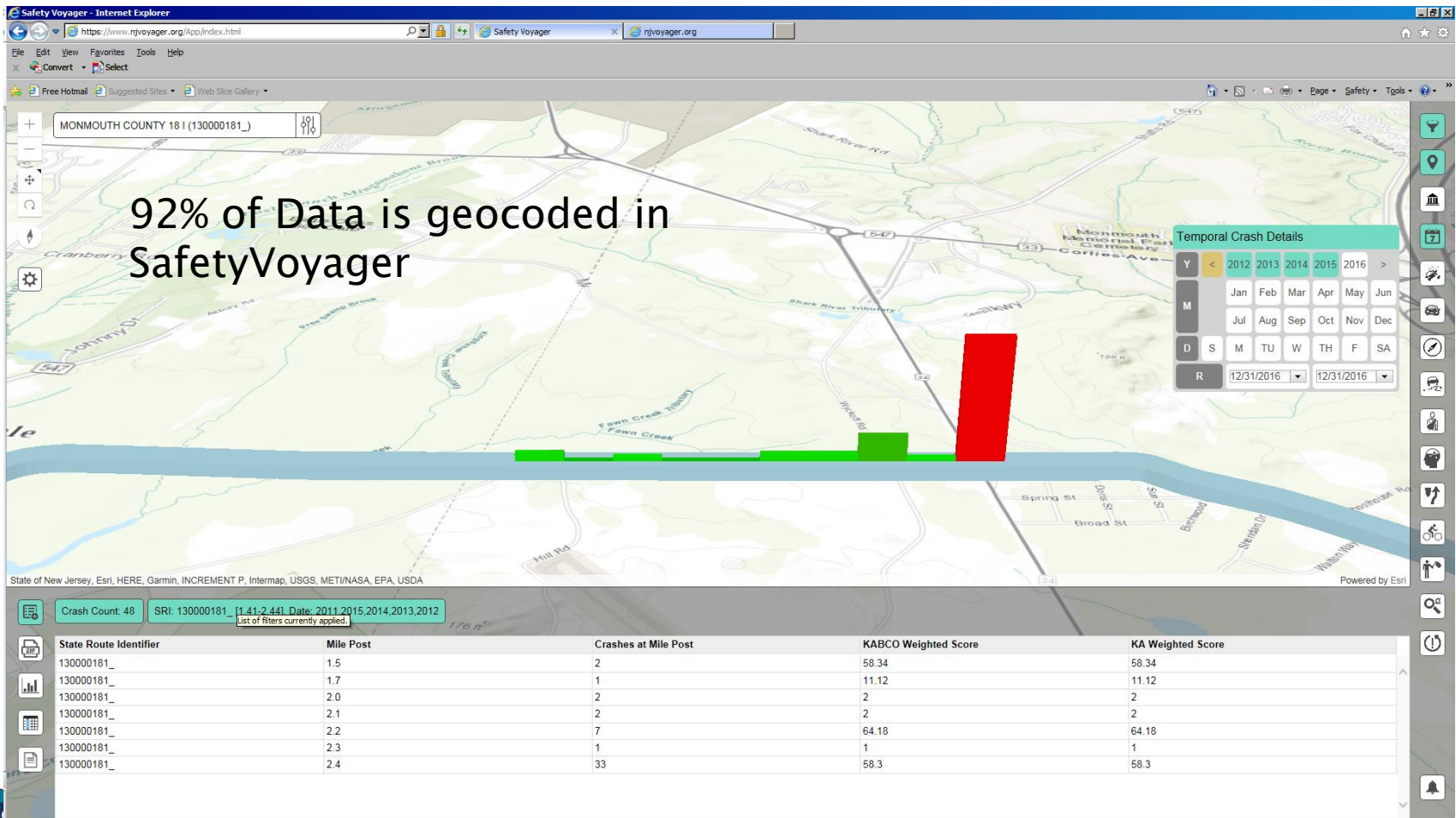


# Crash SRI and Milepost





# Filters are easy to find



# Review remainder of screening list

- ▶ Iterative process
- ▶ Need to diagnose the problem before coming up with a solution



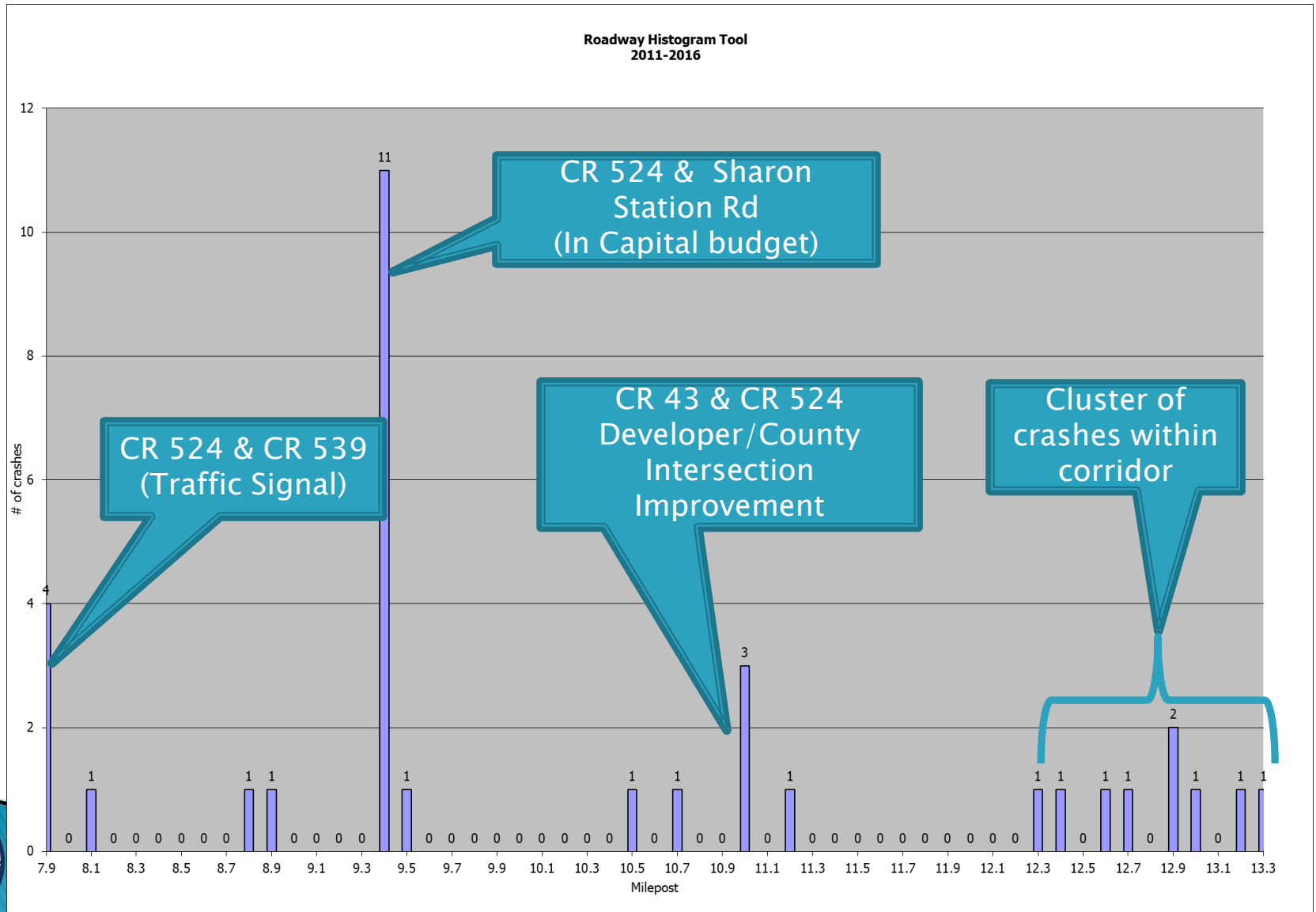
# Review remainder of screening list

4	1	Monmouth	Wall township	Belmar Boulevard	130000181_	1.41	2.46	1.05
6	1	Monmouth	Freehold township	Jackson Mill Road	13000023_	0.00	1.45	1.45
15	4	Monmouth	Millstone township	Perrineville Road	13000001_	1.57	3.23	1.66
26	8	Monmouth	Howell township	CASINO RD	13191012_	2.62	3.60	0.98
31	8	Monmouth	Roosevelt borough	South Rochdale Avenue	00000571_	29.68	30.57	0.89
31	8	Monmouth	Howell township	ARNOLD BLVD	13191101_	0.00	0.89	0.89
42	9	Monmouth	Upper Freehold township	Stage Coach Road	00000524_	7.91	13.36	5.45
43	9	Monmouth	Freehold township	Ely Harmony Road	13321049_	0.00	4.46	4.46
51	12	Monmouth	Upper Freehold township	Holmes Mill Road	13000027_	1.37	4.67	3.30
56	12	Monmouth	Upper Freehold township	MEIRS RD	13511013_	1.79	3.97	2.18
60	12	Monmouth	Millstone township	Millstone Road	13321017_	0.00	5.57	5.57

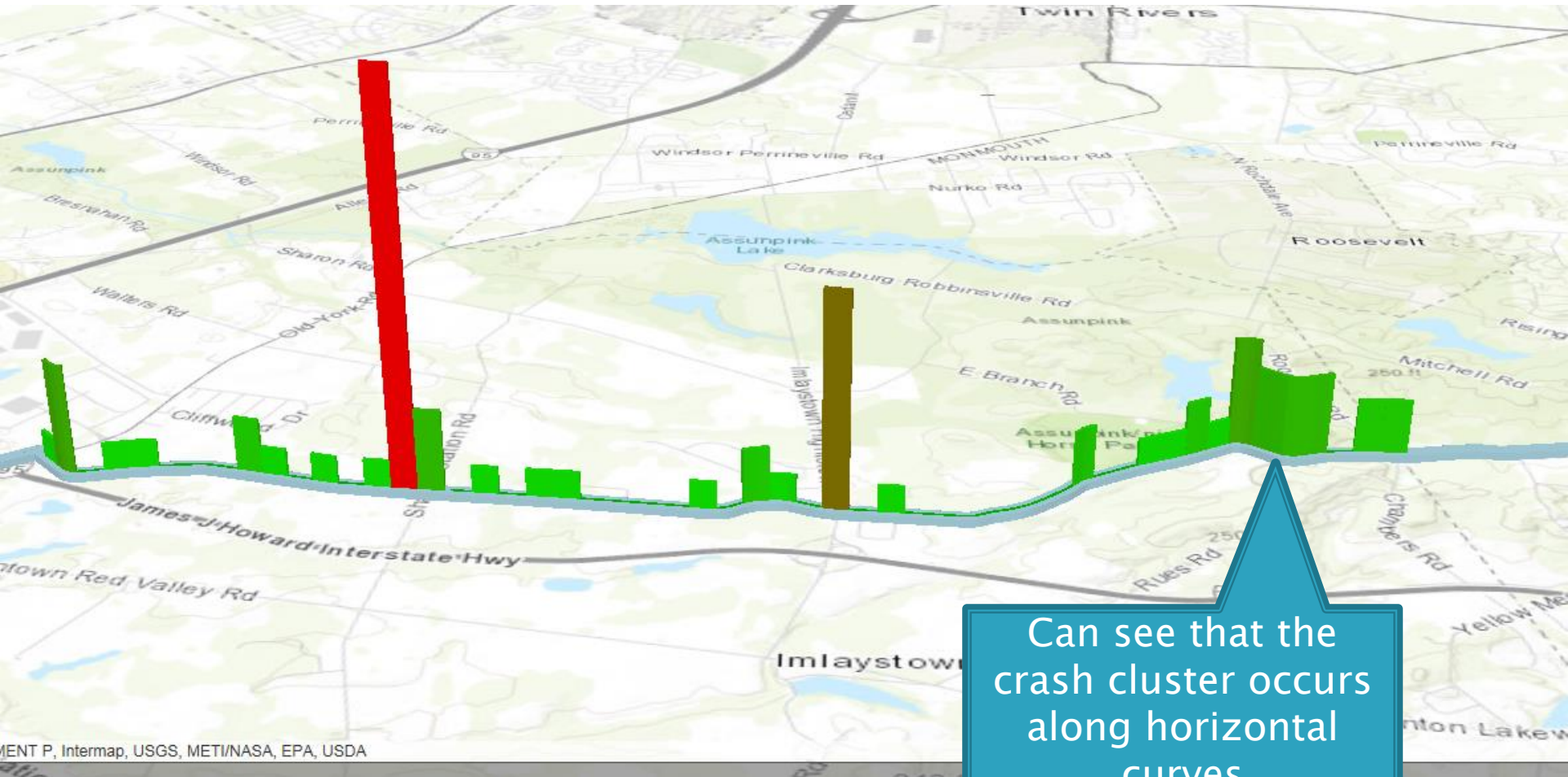
- ▶ Jackson Mills Rd corridor included several Developer–lead projects that were yet to be constructed
- ▶ Perrineville Rd–reviewed intersection of CR 1 & Millstone Rd for possible roundabout–Green Acres implications and ROW impacts would not qualify under HRRR
- ▶ Casino Rd, South Rochdale Ave, & Arnold Blvd had 3 to 4 crashes per corridor–Cost/Benefit would be low
- ▶ CR 524 (Stage Coach Rd)–Several “hot spots”
  - CR 524 & CR 539–Traffic Signal installed by Developer
  - CR 524 & Sharon Station Rd–Discussions with Upper Freehold for large–scale project outside funding limits of HRRR
  - Several fixed object crashes in the corridor, especially along easterly portion (connects to segment previously approved by HRRR)



# CR 524 Histogram (P4S)



# CR 524 Histogram-SafetyVoyager



MENT P, Intermap, USGS, METI/NASA, EPA, USDA





# Detailed Crash Data



The image shows the Plan4Safety web application interface. At the top is a banner with the text "Plan4Safety" and "Comprehensive Crash Analysis Program" over a background of police lights. Below the banner is a navigation bar with buttons: Home, Filter Tools, Filtered Data, Crash Tools, Fix It, Settings, and Logout. The "Crash Tools" button is highlighted, and a dropdown menu is open showing options: Filter Statistics (Filter Statistic Required), Crash Tables (Active Filter Required), and Single Crash Report (Active Filter Required). To the left of the dropdown, there are filter slots: "Temp 17102411", "CR18HRRR2017", and "Filter Slot 3 - Empty". Below the navigation bar, there are links for "Crash Tools" and "P4S Dashbaord". At the bottom, there is an information icon and a text box describing the Plan4Safety System (P4S) as a crash and analysis database system.

**Plan4Safety**  
Comprehensive Crash Analysis Program

Home Filter Tools Filtered Data Crash Tools Fix It Settings Logout

Temp 17102411 Viewing Tools > Filter Statistics (Filter Statistic Required)  
CR18HRRR2017 Comparison Tools > **Crash Tables (Active Filter Required)**  
Filter Slot 3 - Empty Single Crash Report (Active Filter Required)

[Crash Tools](#) > [P4S Dashbaord](#)

 The Plan4Safety System (P4S) is a crash and analysis database system capable of providing users with a quick way to rank, analyze, and visualize crashes.



# Detailed Crash Data

## ► Plan4Safety

[Filtered Data](#) > [Basic Table Summary](#)



The **Basic Table Summary** page allows you to view data in the main crash tables defined by your filter.

### Basic Table Summary

**\*\* Notice, you have a maximum row return of 50,000 rows for viewing data. Use the Bulk Export Tool to download larger data sets. \*\***

[Small On](#) [Medium On](#) [Large](#) [Extra Large On](#) [Filters On](#) Rows Per Page:  [Single Crash Report](#) [Bulk Export Filter](#)

Filter:  Table:

Table Dr: [Click here to download an Excel version \(XLS\) of this report.](#)

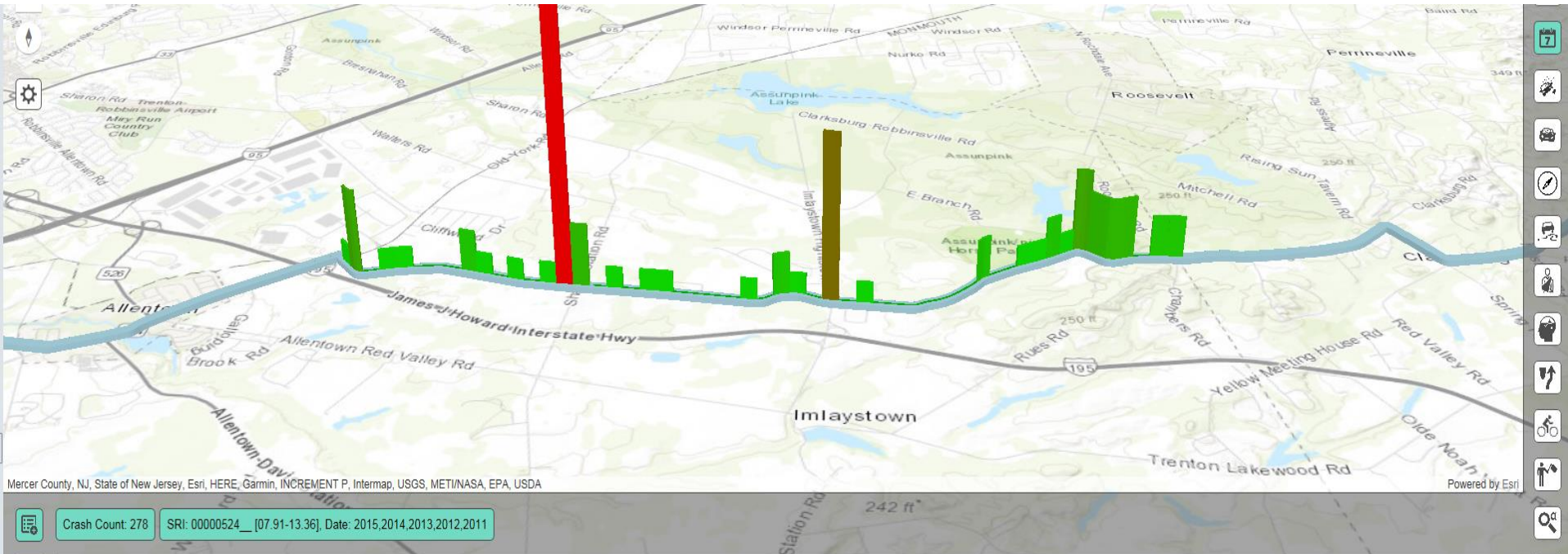
Table: 84 Items ( Showing 1 to 25 )

	ID	DOT_WEB_ID	CASE_NUMBER	CRASH_YEAR	COUNTY	MUNICIPALITY	CRASH_DATE	CRASH_DAY_OF_WEEK	CRASH_MONTH	CRASH_TIME
►	3747837	20111112I-2011-007864	I-2011-007864	2011	MERCER	Washington Twp (Mercer Co)	2011-05-04	Wednesday	May	16:27:00
	4037262	20121112I-2012-019209	I-2012-019209	2012	MERCER	Washington Twp (Mercer Co)	2012-10-26	Friday	October	13:45:00
	4320565	20131112I-2013-023242	I-2013-023242	2013	MERCER	Washington Twp (Mercer Co)	2013-11-05	Tuesday	November	14:43:00
	4369597	20131351C060-2013-00129A	C060-2013-00129A	2013	MONMOUTH	Upper Freehold township	2013-01-31	Thursday	January	07:21:00
	8489422	20141351C060-2014-00129A	C060-2014-01628A	2014	MONMOUTH	Upper Freehold township	2014-11-01	Saturday	November	09:47:00



# Detailed Crash Data

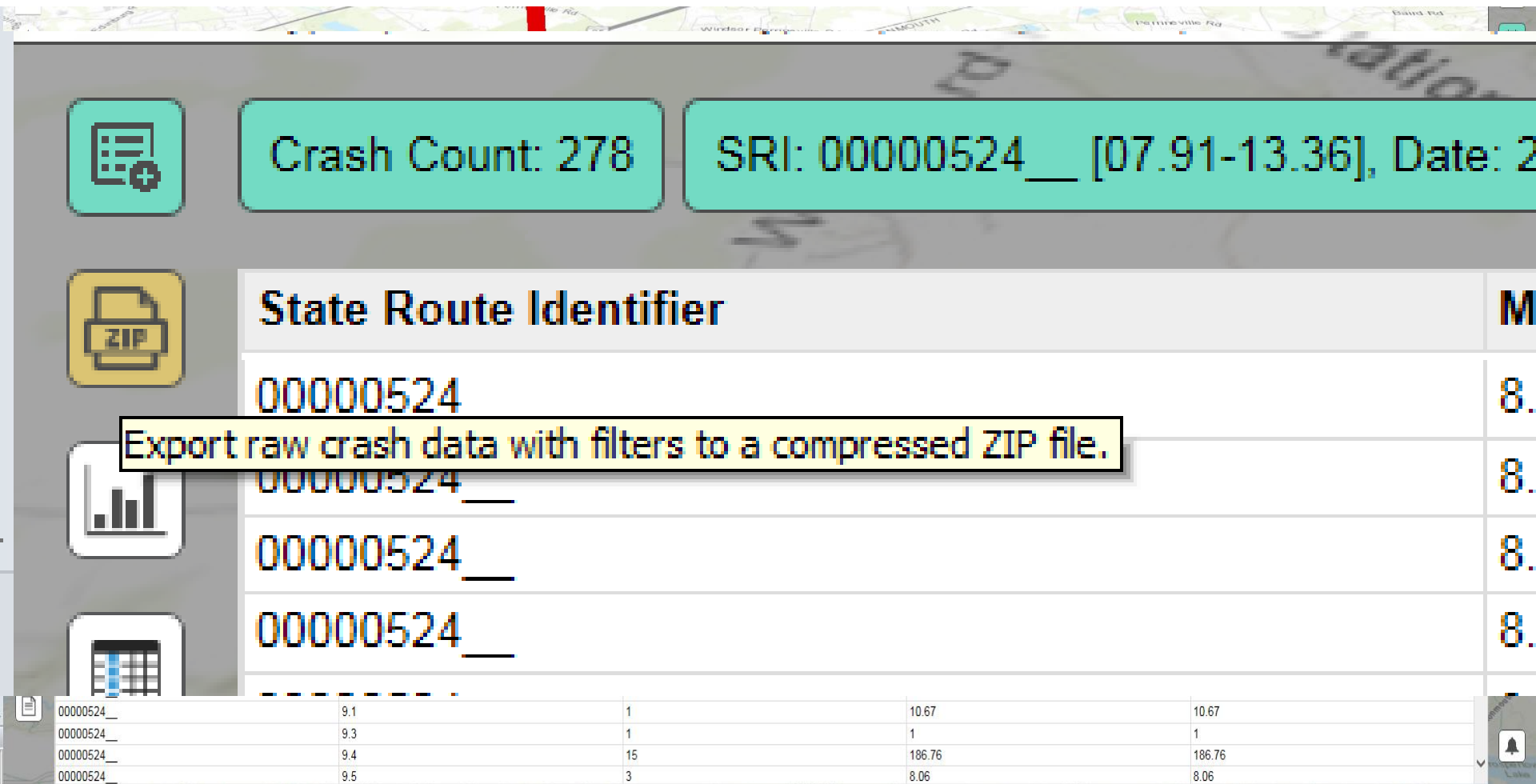
## ► Safety Voyager



State Route Identifier	Mile Post	Crashes at Mile Post	KABCO Weighted Score	KA Weighted Score
00000524	8.0	1	1	1
00000524	8.1	4	9.06	9.06
00000524	8.3	1	1	1
00000524	8.4	1	1	1
00000524	8.8	2	7.06	7.06
00000524	8.9	1	1	1
00000524	9.1	1	10.67	10.67
00000524	9.3	1	1	1
00000524	9.4	15	186.76	186.76
00000524	9.5	3	8.06	8.06

# Detailed Crash Data

## ► Safety Voyager



# Detailed Crash Data

## ► Safety Voyager

Crash Identifier												
Crash Identifier	County	Municipality	Year	Case Number	Day of the Week	Crash Type	Route Suffix	Road Characteristic	Road Surface Type	Road Condition	Light Condition	Environment
13-02-2013-MV-13-19	MONMOUTH	ALLENTOWN BORO	2013	MV-13-19	Wednesday	Fixed Object	NOT RECORDED	Straight and Level	Blacktop	Dry	Daylight	Clear
13-02-2013-MV-13-18	MONMOUTH	ALLENTOWN BORO	2013	MV-13-18	Tuesday	Same Direction - Sideswipe	NOT RECORDED	Straight and Level	Blacktop	Dry	Daylight	Clear
13-02-2005-MV05-67	MONMOUTH	ALLENTOWN BORO	2005	MV05-67	Thursday	Right Angle	NOT RECORDED	Curve and Level	Blacktop	Dry	Dark (street lights on)	Clear
13-02-2004-04-48	MONMOUTH	ALLENTOWN BORO	2004	MV04-13	Apr-48 Tuesday	Struck Parked Vehicle	NOT RECORDED	Straight and Level	Blacktop	Dry	Daylight	Clear
13-02-2004-MV04-13	MONMOUTH	ALLENTOWN BORO	2004		Saturday	Right Angle	NOT RECORDED	Straight and Level	Blacktop	Dry	Daylight	Clear
13-02-2015-MV15-34	MONMOUTH	ALLENTOWN BORO	2015	MV15-34	Saturday	Same Direction - Rear End	NOT RECORDED	Straight and Level	Blacktop	Dry	Daylight	Clear
13-02-2014-MV-14-46	MONMOUTH	ALLENTOWN BORO	2014	MV-14-46	Tuesday	Same Direction - Rear End	NOT RECORDED	Straight and Level	Blacktop	Dry	Daylight	Clear
13-02-2015-2015-41	MONMOUTH	ALLENTOWN BORO	2015	2015-41	Friday	Struck Parked Vehicle	NOT RECORDED	Straight and Level	Blacktop	Dry	Daylight	Clear
13-02-2015-15-43	MONMOUTH	ALLENTOWN BORO	2015	15-43	Sunday	Fixed Object	NOT RECORDED	Straight and Level	Blacktop	Dry	Dark (street lights on)	Clear
13-02-2012-MV-12-20	MONMOUTH	ALLENTOWN BORO	2012	MV-12-20	Thursday	Struck Parked Vehicle	NOT RECORDED	Straight and Level	Blacktop	Dry	Daylight	Clear
13-02-2010-MV10-24	MONMOUTH	ALLENTOWN BORO	2010	MV10-24	Friday	Right Angle	NOT RECORDED	Straight and Grade	Blacktop	Dry	Daylight	Clear
13-02-2010-MV-10-39	MONMOUTH	ALLENTOWN BORO	2010	MV-10-39	Thursday	Right Angle	NOT RECORDED	Straight and Level	Blacktop	Wet	Daylight	Clear
13-02-2003-MV03-30	MONMOUTH	ALLENTOWN BORO	2003	MV03-30	Wednesday	Same Direction - Rear End	NOT RECORDED	Straight and Level	Blacktop	Dry	Daylight	Clear
13-02-2003-C0302003-269A	MONMOUTH	ALLENTOWN BORO	2003	C0302003-269A	Sunday	Fixed Object	NOT RECORDED	Straight and Level	Concrete	Dry	Dark (no street lights)	Clear
13-02-2016-16AT0036816-18	MONMOUTH	ALLENTOWN BORO	2016	16AT0036816-18	Sunday	Fixed Object	NOT RECORDED	Straight and Level	Blacktop	Dry	Daylight	Clear
13-02-2006-MV06-14	MONMOUTH	ALLENTOWN BORO	2006	MV06-14	Thursday	Same Direction - Rear End	NOT RECORDED	Straight and Grade	Blacktop	Dry	Daylight	Clear
13-02-2015-MV15-13	MONMOUTH	ALLENTOWN BORO	2015	MV15-13	Tuesday	Same Direction - Rear End	NOT RECORDED	Straight and Level	Blacktop	Snowy	Daylight	Snow
13-02-2006-MV06-30	MONMOUTH	ALLENTOWN BORO	2006	MV06-30	Saturday	Same Direction - Rear End	NOT RECORDED	Straight and Level	Blacktop	Dry	Dark (no street lights)	Clear
13-02-2003-MV03-26	MONMOUTH	ALLENTOWN BORO	2003	MV03-26	Sunday	Right Angle	NOT RECORDED	Straight and Level	Blacktop	Dry	Daylight	Clear
13-02-2009-09-11	MONMOUTH	ALLENTOWN BORO	2009	MV09-16	11-Sep Thursday	Fixed Object	NOT RECORDED	Straight and Level	Blacktop	Dry	Daylight	Clear
13-02-2005-05-04	MONMOUTH	ALLENTOWN BORO	2005		4-May Wednesday	Left Turn/U Turn	NOT RECORDED	Straight and Level	Blacktop	Dry	Daylight	Clear
13-02-2003-03-38	MONMOUTH	ALLENTOWN BORO	2003	MV03-07	Mar-38 Monday	Right Angle	NOT RECORDED	Straight and Level	Blacktop	Dry	Daylight	Clear
13-02-2003-03-22	MONMOUTH	ALLENTOWN BORO	2003		22-Mar Friday	Same Direction - Sideswipe	NOT RECORDED	Straight and Level	Blacktop	Dry	Daylight	Clear
13-02-2003-03-54	MONMOUTH	ALLENTOWN BORO	2003	MV03-07	Mar-54 Wednesday	Same Direction - Sideswipe	NOT RECORDED	Straight and Level	Blacktop	Wet	Daylight	Rain
13-02-2003-MV03-07	MONMOUTH	ALLENTOWN BORO	2003		Thursday	Struck Parked Vehicle	NOT RECORDED	Straight and Level	Blacktop	Dry	Dark (street lights on)	Clear
13-02-2004-04-28	MONMOUTH	ALLENTOWN BORO	2004	MV04-23	28-Apr Saturday	Struck Parked Vehicle	NOT RECORDED	Straight and Level	Blacktop	Dry	Daylight	Clear
13-02-2004-MV04-23	MONMOUTH	ALLENTOWN BORO	2004		Saturday	Same Direction - Sideswipe	NOT RECORDED	Straight and Level	Blacktop	Dry	Daylight	Clear
13-02-2005-05-64	MONMOUTH	ALLENTOWN BORO	2005	MV05-21	May-64 Tuesday	Backing	NOT RECORDED	Straight and Level	Blacktop	Dry	Daylight	Clear
13-02-2005-MV05-21	MONMOUTH	ALLENTOWN BORO	2005		Wednesday	Non-fixed Object	NOT RECORDED	Curve and Level	Blacktop	Dry	Daylight	Clear
13-02-2005-MV05-22	MONMOUTH	ALLENTOWN BORO	2005	MV05-22	Friday	Struck Parked Vehicle	NOT RECORDED	Straight and Level	Blacktop	Dry	Daylight	Clear
13-02-2005-MV05-2C	MONMOUTH	ALLENTOWN BORO	2005	MV05-2C	Wednesday	Right Angle	NOT RECORDED	Straight and Grade	Blacktop	Dry	Dark (street lights on)	Clear
13-02-2005-MV05-36	MONMOUTH	ALLENTOWN BORO	2005	MV05-36	Sunday	Pedestrian	NOT RECORDED	Curve and Level	Blacktop	Dry	Daylight	Clear
13-02-2005-MV05-52	MONMOUTH	ALLENTOWN BORO	2005	MV05-52	Friday	Same Direction - Rear End	NOT RECORDED	Curve and Level	Blacktop	Dry	Daylight	Clear
13-02-2005-MV05-66	MONMOUTH	ALLENTOWN BORO	2005	MV05-66	Saturday	Same Direction - Rear End	NOT RECORDED	Straight and Level	Blacktop	Dry	Dark (street lights on)	Clear
13-02-2008-MV08-38	MONMOUTH	ALLENTOWN BORO	2008	MV08-38	Wednesday	Right Angle	NOT RECORDED	Straight and Grade	Blacktop	Dry	Daylight	Clear
13-02-2010-MV10-06	MONMOUTH	ALLENTOWN BORO	2010	MV10-06	Tuesday	Opposite Direction (Sideswipe)	NOT RECORDED	Straight and Grade	Blacktop	Dry	Daylight	Overcast
13-02-2010-MV10-08	MONMOUTH	ALLENTOWN BORO	2010	MV10-08	Monday	Same Direction - Rear End	NOT RECORDED	Straight and Level	Blacktop	Dry	Dark (no street lights)	Clear
13-02-2010-MV10-09	MONMOUTH	ALLENTOWN BORO	2010	MV10-09	Tuesday	Right Angle	NOT RECORDED	Straight and Level	Blacktop	Dry	Dark (street lights on)	Clear
13-02-2010-MV10-26	MONMOUTH	ALLENTOWN BORO	2010	MV10-26	Friday	Backing	NOT RECORDED	Straight and Level	Concrete	Dry	Daylight	Clear
13-02-2009-MV09-16	MONMOUTH	ALLENTOWN BORO	2009	MV09-16	Tuesday	Struck Parked Vehicle	NOT RECORDED	Straight and Level	Blacktop	Dry	Daylight	Overcast



**DATE:** 20-Apr-23 **DTI:** VC

**ANALYSED PERIOD:** Jan 2011 to Sep 2013

AM	1	2	3	4	5	6	7	8	9	10	11
PM	1	1	2	1	2	1	2	1	1		

Crash Year	No. of Crashes
2011	4
2012	1
2013	1
2014	7
2015	3
2016	1

Light condition	No. of Crashes
Daylight	11
Dark (No street lighting)	3
Dark (No street lighting) - City limits	1
Dark (Street lighting)	1

Surface	No. of Crashes
Dry	9
Wet	4
Snow	7
Ice	2

Severity	No. of Crashes
Fatal	0
Major	4
Minor	11
Property damage only	0
Uninjured	0
Fatal Injury	0

Type of Crash	No. of Crashes	% of Total
Backing	0	0%
Fixed object	12	70%
Left turn/through	0	0%
Opp. direction	0	0%
Head-on/collision	0	0%
Permanently	0	0%
Intersection	0	0%
Right Angle	0	0%
Rear end	1	6%
Side swipe	0	0%
Animal	3	18%

**LEGEND**

- FIXED OBJECT, PDO
- FIXED OBJECT, PAIN
- FIXED OBJECT/MODERATE INJURY
- SAME DIRECTION - REAR END, PDO
- ANIMAL, PDO

**PROJECT LIMIT MP 12.65**

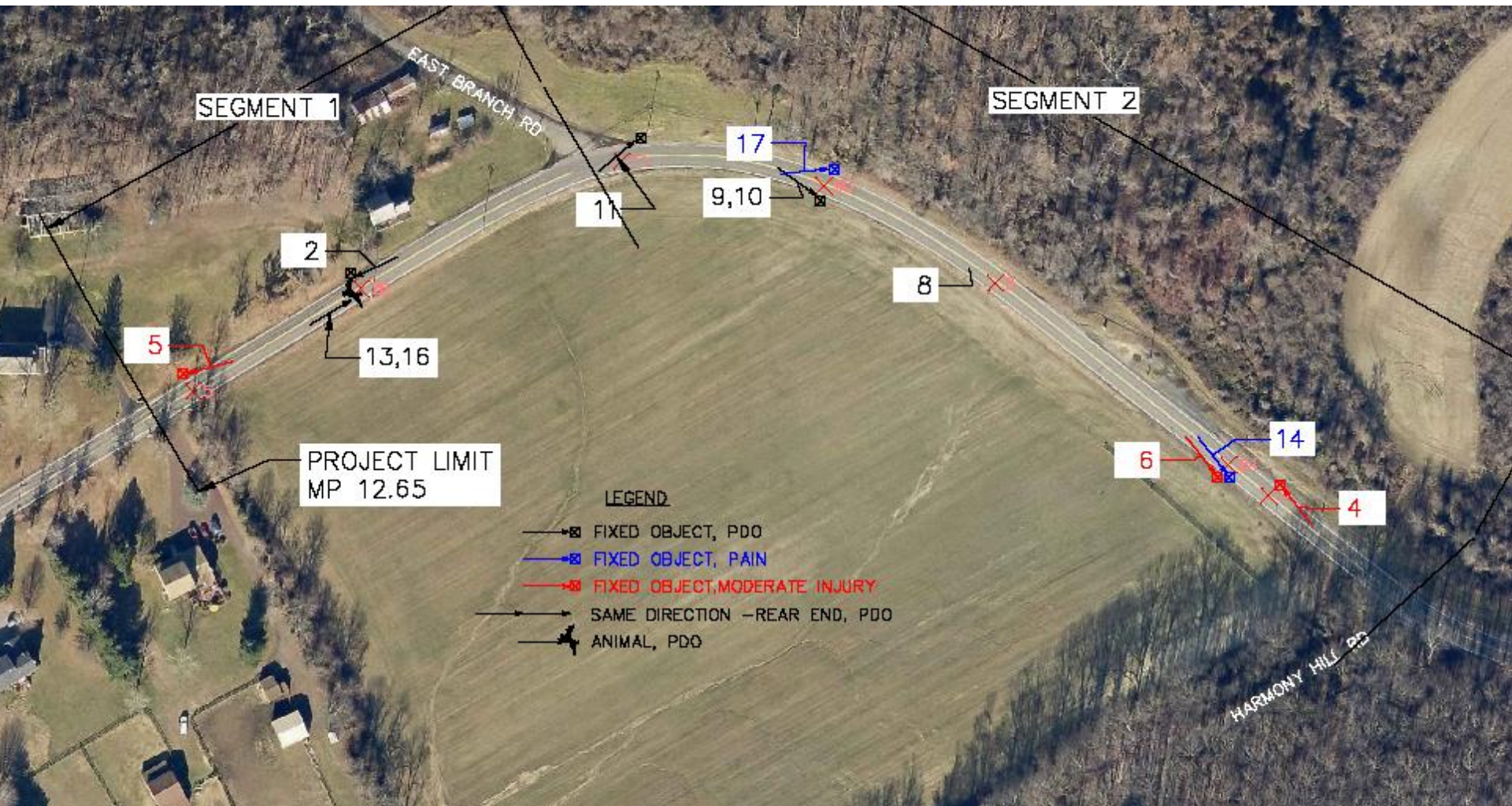
**PROJECT LIMIT MP 13.25**

[illegible]

no.	revisions	date
<p align="center"><b>COUNTY OF MONMOUTH</b>  DEPARTMENT OF PUBLIC WORKS AND ENGINEERING  DIVISION OF ENGINEERING &amp; TRAFFIC SAFETY  JOSEPH M. ETTORE, COUNTY ENGINEER</p>		
<p align="center"><b>CORRIDOR IMPROVEMENTS ON  CR 524 (NEW CANTON-STONE TAVERN RD)  MP 12.65 TO 13.25  UPPER FREEHOLD TOWNSHIP</b></p>		
<b>MONMOUTH COUNTY</b>		<b>NEW JERSEY</b>
<p align="center"><b>CRASH DIAGRAM</b></p>		
<b>NOT TO SCALE</b>	<b>drawn by</b> WJC	<b>checked by</b> DAJ <b>date</b> 07-27-2016
<p align="center"><b>JOSEPH M. ETTORE, P.E.</b></p>		<p align="center">date</p> <p align="center">1 of</p>
<p align="center">PROFESSIONAL ENGINEER</p>		<p align="center">N.J. LIC. NO. 24602C3294</p>



# Crash Diagram/Crash table





# Crash Diagram/Crash Table

#	CRASH DATE	CRASH TIME	ROUTE	MILEPOST	INTERSECT	CRASH TYPE	SURFACE CONDITION	LIGHT CONDITION	ENVIRONMENTAL CONDITION	DISTANCE	UNIT OF M	DIRECTION	CROSS STREET NAME	X	Y	EPDO	Direction of travel	Crash description
1	1/26/2011	17:19	524	13.04	Not At Intersect	Same Direction - Rear End	Icy	Dark (No Street Lights)	Sleet/Hail/Freezing Rain	1584	Foot	West	CHAMBERS RD / ROOSEVELT RD	498181.47	493515.81	PDO	Westbound	Same Direction - Rear End
2	2/27/2011	20:30	524	12.7	At Intersect	Fixed Object	Dry	Dark (No Street Lights)	Clear		At	South	EAST BRANCH RD	496584.63	493889.55	PDO	Westbound	ran off road right, struck utility pole
3	4/26/2011	12:51	524	13.24	Not At Intersect	Fixed Object	Dry	Daylight	Clear	528	Foot	West	CHAMBERS RD / ROOSEVELT RD	499221.59	493693.02	Pain	Eastbound	ran off road left, struck utility pole & mailbox
4	8/7/2011	18:44	524	12.91	Not At Intersect	Fixed Object	Wet	Daylight	Rain	2640	Foot	East	ROUTE 539	497556.03	493668.03	Moderate Injury	Westbound	ran off road right, struck embankment
5	9/23/2012	0:36	524	12.66	Not At Intersect	Fixed Object	Dry	Dark (Street Lights On)	Clear	200	Foot	West	EAST BRANCH RD	496405.07	493779.66	Moderate Injury	Westbound	ran off road right, struck tree
6	12/24/2013	1:28	524	12.9	Not At Intersect	Fixed Object	Dry	Dark (No Street Lights)	Clear		NULL	NULL		497514.24	493701	Moderate Injury	Westbound	ran off road left, struck tree
7	2/22/2014	7:41	524	13.04	Not At Intersect	Fixed Object	Icy	Daylight	Clear	1584	Foot	East	CHAMBERS RD / ROOSEVELT RD	498181.47	493515.81	Moderate Injury	Eastbound	ran off road right, struck utility pole
8	7/8/2014	21:28	524	12.84	Not At Intersect	Other	Wet	Dark (No Street Lights)	Rain	2640	Foot	West	CHAMBERS RD / ROOSEVELT RD	497264.01	493895.48	PDO	Eastbound	"thrown/falling object"
9	9/27/2014	8:48	524	12.8	Not At Intersect	Fixed Object	Dry	Daylight	Clear		NULL	NULL		497080.2	493999.32	PDO	Eastbound	ran off road right, struck traffic sign
10	10/11/2014	17:03	524	12.8	Not At Intersect	Fixed Object	Wet	Daylight	Clear		NULL	NULL		497080.2	493999.32	PDO	Eastbound	ran off road right, struck tree
11	10/13/2014	9:05	524	12.76	Not At Intersect	Other	Dry	Daylight	Overcast	300	Foot	East	EAST BRANCH RD	496864.46	494025.66	PDO	Westbound	ran off road right, crossed centerline, ran off road left, struck post
12	10/24/2014	7:33	524	13.2	Not At Intersect	Animal	Dry	Daylight	Clear		NULL	NULL		499008.49	493683.44	PDO	Eastbound	deer strike
13	11/12/2014	14:11	524	12.7	Not At Intersect	Animal	Dry	Daylight	Clear		NULL	NULL		496584.63	493889.55	PDO	Westbound	deer strike
14	3/1/2015	14:11	524	12.9	Not At Intersect	Fixed Object	Snowy	Daylight	Snow		NULL	NULL		497514.24	493701	Pain	Eastbound	ran off road right, struck tree
15	3/1/2015	13:34	524	13.09	Not At Intersect	Fixed Object	Snowy	Daylight	Snow	1056	Foot	East	HARMONY HILL RD	498433.68	493600.71	Pain	Westbound	ran off road left, struck mailbox
16	12/16/2015	6:10	524	12.7	At Intersect	Animal	Dry	Dark (Street Lights Off)	Clear		At	NULL	EAST BRANCH RD	496584.63	493889.55	PDO	Westbound	deer strike
17	3/14/2016	16:06	524	12.8	Not At Intersect	Fixed Object	Wet	Daylight	Rain		NULL	NULL		497080.2	493999.32	Pain	Eastbound	ran off road left, struck post

# Crash Diagram/Crash Table

<b>DATE:</b>	26-Jul-15	<b>BY:</b>	VC
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<b>ANALYSIS PERIOD:</b>	Jan 2011 to Dec 2013
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	12	1	2	3	4	5	6	7	8	9	10	11
AM	1	1					1	2	1	1		
PM	1	1	2		1	2	1		1	1		

Crash Year	No. of Crashes
2011	4
2012	1
2013	1
2014	7
2015	3
2016	1

Light condition	No. of Crashes
Daylight	11
Dark (No Street Lights)	3
Dark (Street Lights On/ spot)	1
Dark (Street Lights Off)	1

Surface	No. of Crashes
Dry	9
Wet	4
Snowy	2
Icy	2

Type of Crash	No. of Crashes	% of Total
Backing	0	0%
Fixed object	13	76%
Left turn/U turn	0	0%
Opp. direction	0	0%
Headon/Angular	0	0%
Petalcyclist	0	0%
Pedestrian	0	0%
Right Angle	0	0%
Rear end	1	6%
Side swipe	0	0%
Animal	3	18%

Severity	No. of Crashes
PDO	9
Pain	4
Moderate Injury	4
Incapacitating Injury	0
Fatal Injury	0



# Countermeasures selected based on crash type

- High friction surface treatment (FHWA proven Safety Countermeasure)
- Centerline rumble strips (FHWA proven Safety Countermeasure)
- Safety Edge pavement edge treatment (FHWA proven Safety Countermeasure)
- 8" edge line marking
- Raised pavement markers on center line
- Additional signage for advanced guidance on roadway
- Sign upgrades based on advisory speed limits determined by ball banking
- Improve sign visibility by installation of retroreflective post covers
- Chevrons and/or other traffic control devices to provide further guidance through curves
- Brush clearing to improve line of sight
- Installation of breakaway roadside fixtures within clear zone



# Crash Modification Factors



<http://www.cmfclearinghouse.org/>

## CMF / CRF Details

CMF ID: 7900

**Improve pavement friction (HFS-High Friction Surfacing)**

**Description:** The safety benefit of High Friction Surfacing Treatment (HFS)

**Prior Condition:** Individual curve with perceived friction-related crash problem

**Category:** Roadway

**Study:** [Evaluation of Pavement Safety Performance, Merritt et al., 2015](#)

**Star Quality Rating:**

★★★★☆ [\[View score details\]](#)

### Crash Modification Factor (CMF)

**Value:** 0.759

**Adjusted Standard Error:**

**Unadjusted Standard Error:** 0.067

### Crash Reduction Factor (CRF)

**Value:** 24.1 (This value indicates a **decrease** in crashes)



# Crash Modification factors

Treatment	Crash modification factor			
	Total		Fatal/Injury	
	CMF #	CMF	CMF #	CMF
High Friction Surface Treatment	7900	0.759	N/A	1
Safety Edge	4303	0.923	4323	0.835
Centerline Rumble Strip	3364	0.83	3368	0.63
Combined CMF		0.581		0.526
Predicted Crash Rate-Existing Conditions		2.343		0.846
<b>Predicted Crash Rate-Post-construction</b>		<b>1.362</b>		<b>0.445</b>

Cost/Benefit Analysis can be performed by comparing KABCO costs with and without modification factors vs estimated project cost (over the service life of the improvement)



# KABCO Costs

			Estimated Cost			
			2001*	2016/17		
	Fatal	(K)	\$4,008,900	\$5,447,373.00		
	Fatal and/or Injury	(K/A/B/C)	\$158,200	\$214,965.30		
	Injury	(A/B/C)	\$82,600	\$112,238.52		
"Incapacitating"----- >	Disability Injury	(A)	\$216,000	\$293,505.09		
"Moderate"----- >	Evident Injury	(B)	\$79,000	\$107,346.77		
"Complaint of Pain"--- >	Possible Injury	(C)	\$44,900	\$61,011.01		
	Property Damage Only	(O)	\$7,400	\$10,055.27		

\* Societal Crash Costs by Severity, FHWA-HRT-05-051, October 2005





# KABCO Costs

<https://www.fhwa.dot.gov/publications/research/safety/05051/05051.pdf>

## Crash Cost Estimates by Maximum Police-Reported Injury Severity Within Selected Crash Geometries

PUBLICATION NO. FHWA-HRT-05-051

OCTOBER 2005

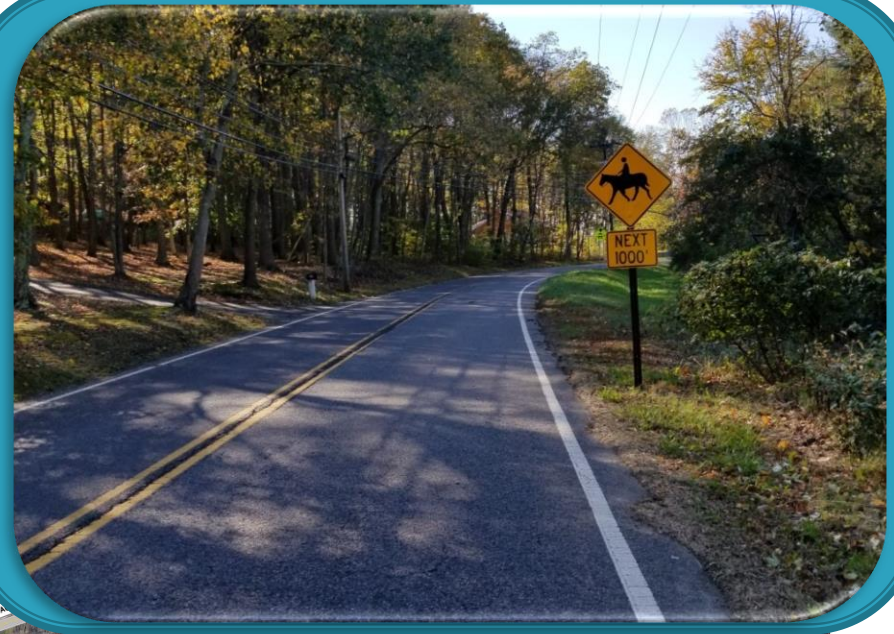


U.S. Department of Transportation  
Federal Highway Administration

Research, Development, and Technology  
Turner-Fairbank Highway Research Center  
6300 Georgetown Pike  
McLean, VA 22101-2296



# Concept Plan

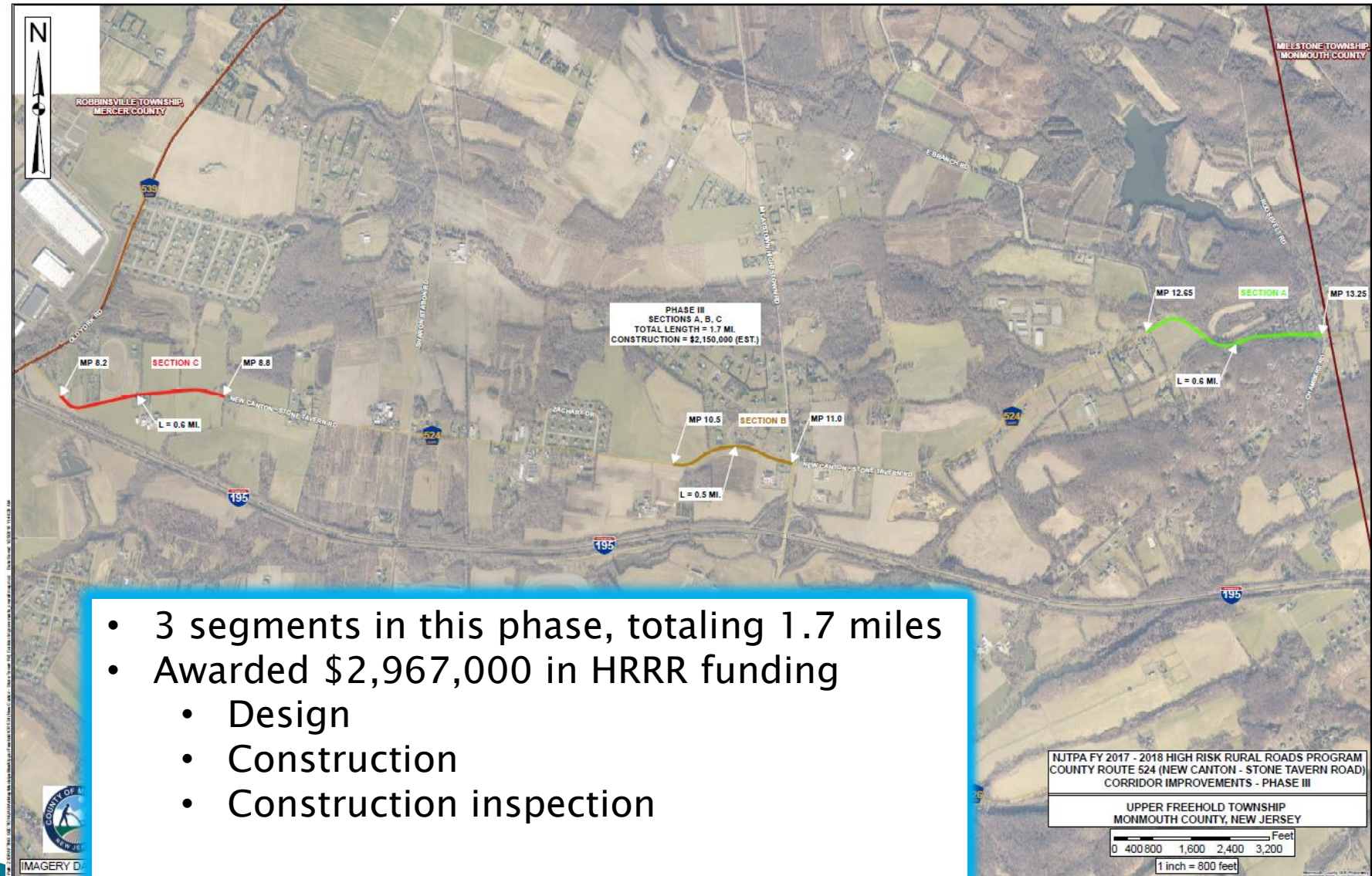


no.	revisions	date
<b>COUNTY OF MONMOUTH</b> DEPARTMENT OF PUBLIC WORKS AND ENGINEERING DIVISION OF ENGINEERING & TRAFFIC SAFETY JOSEPH M. ETTORE, COUNTY ENGINEER		
CORRIDOR IMPROVEMENTS ON CR 524 (STAGE COACH ROAD) MP 12.65 TO 13.25 UPPER FREEHOLD TOWNSHIP		
MONMOUTH COUNTY		NEW JERSEY
<b>CONCEPTUAL IMPROVEMENT PLAN</b> NOT TO SCALE drawn by SK checked by J.M. date 08-31-2016		
date JOSEPH M. ETTORE, P.E. PROFESSIONAL ENGINEER		1 of 1
N.J. LIC. NO. 24GE032394		





# Concept Plan



- 3 segments in this phase, totaling 1.7 miles
- Awarded \$2,967,000 in HRRR funding
  - Design
  - Construction
  - Construction inspection

# Summary

- ▶ Follow the guidelines for the funding solicitations
- ▶ Develop a process for selecting potential projects
  - Start with “high level” data (i.e. network screening lists)
  - Narrow down to a specific corridor or location
  - Identify crash patterns & develop a problem statement
  - Identify potential countermeasures
  - Evaluate the potential effect of countermeasures (i.e. use CMF)
- ▶ Effective understanding and presentation of data will help the people that make the decisions.



# Thank You

[vince.cardone@co.monmouth.nj.us](mailto:vince.cardone@co.monmouth.nj.us)



Vincent Cardone  
Principal Engineer II, Traffic  
Monmouth County