

Hamilton Avenue (CR 606) and Kuser Road (CR 619)/Ward Avenue and
Hamilton Avenue and Liberty Street

Township of Hamilton

Crash Analysis



June 2017

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1. Introduction

Michael Baker International (Michael Baker) obtained motor vehicle crash data from the New Jersey Department of Transportation (NJDOT) Bureau of Safety Programs. Data for the most recent available three-year period (2013-2015) for the intersections of Hamilton Avenue (CR 606) with Kuser Road (CR 619)/Ward Avenue, and Hamilton Avenue with Liberty Street was obtained. Analysis was conducted to identify locations within the project limits with safety concerns and develop an improvement plan to address those concerns.

A total of 48 crashes were reported from milepost (MP) 2.10 to MP 2.24 on CR 606, MP 1.65 to MP 1.75 on CR 619, MP 2.16 on Liberty Street, and MP 0.13 on Ward Avenue from 2013 to 2015. Results of the crash analysis are presented in this report with figures and tables showing factors of the crashes including crash locations, crash types, contributing circumstances and vehicle actions. A crash diagram was prepared to provide an aerial view of the locations of the 48 crashes.

2. Crash Data and Diagram

Figure 1 shows a crash diagram with the locations of crashes and crash types. Of the 48 reported crashes, 40 occurred on CR 606, six occurred on CR 619, one occurred on Liberty Street and one occurred on Ward Avenue near Archer Court. Police reports of the crashes were reviewed in order to confirm the direction of travel for each vehicle.

Appendix A lists the 48 crashes which occurred from 2013 to 2015 within the project limit, detailing crash type, date, time, contributing circumstances, and vehicle actions. Additional details include roadway conditions and environmental circumstances.

3. Crash Types

Six types of crashes reported were within the project location. As shown in Table 1 and Figure 2, there were 28 (58%) *Same Direction-Rear End* crashes and eight (17%) *Right Angle* crashes. *Same Direction-Rear End* and *Right Angle* were the most common crash types. Out of the six *Fixed Object* crashes, four were reported on CR 619/Ward Avenue. The two *Opposite Direction-Head On* crashes occurred on CR 606; one by Haslach Avenue and one near Coolidge Avenue. The three *Same Direction-Side Swipe* crashes occurred at the intersection of CR 606 and CR 619/Ward Avenue. The single *Left Turn/U Turn* crash occurred on CR 606 at Liberty Street.



LEGEND

- ←← SAME DIRECTION-REAR END
- ←←← SAME DIRECTION-SIDE SWIPE
- ↶ LEFT TURN/U-TURN
- ↷ OPPOSITE DIRECTION - SIDE SWIPE
- ↷↷ OPPOSITE DIRECTION - HEAD ON/ANGULAR

- E← ENCROACHMENT
- B← PEDALCYCLIST
- ← FIXED OBJECT
- BACKING
- ⊥ RIGHT ANGLE

- A← ANIMAL
- ← NON-FIXED OBJECT
- P← PEDESTRIAN
- ▣← STRUCK PARKED VEHICLE
- O← OTHER



(X) NUMBER OF CRASHES

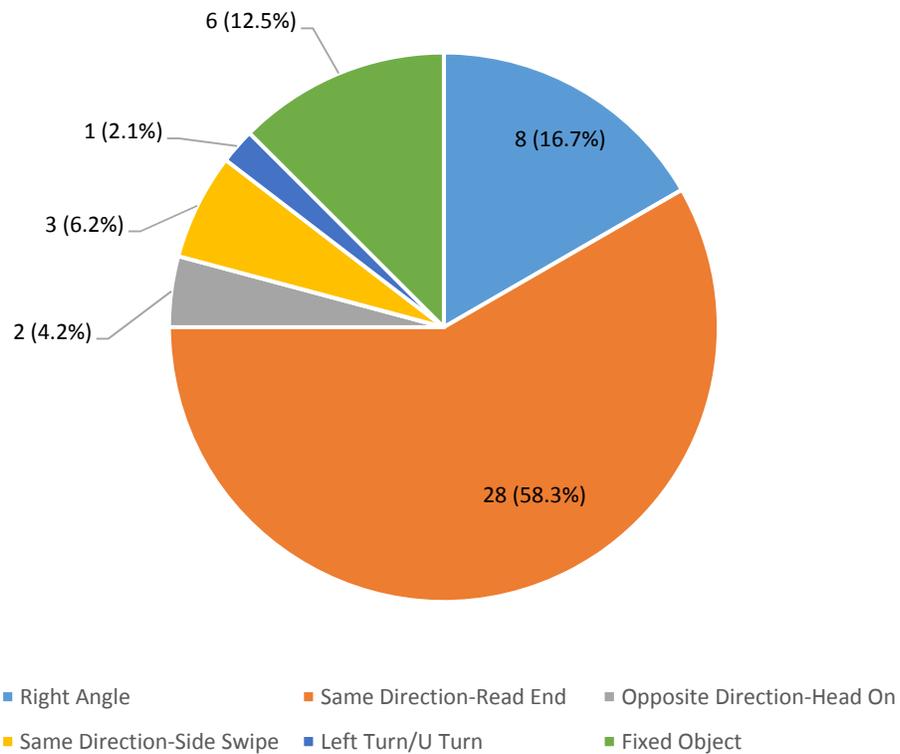
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Crash Locations (2013-2015)	
Hamilton Avenue (CR 606) and Kuser Road (CR 619)/Ward Avenue and Hamilton Avenue and Liberty Street Hamilton Township, Mercer County	
Figure 1	
	
June 2017	

Table 1

CRASH TYPE	Number	Percentage
Right Angle	8	16.7%
Same Direction-Read End	28	58.3%
Opposite Direction-Head On	2	4.2%
Same Direction-Side Swipe	3	6.2%
Left Turn/U Turn	1	2.1%
Fixed Object	6	12.5%
Total	48	100.0%

Figure 2 - Crash Type



4. Contributing Circumstances and Vehicle Actions

This section of the crash analysis breaks down the contributing circumstances and vehicular actions involved in the 48 reported crashes by crash type. Two tables are presented for each crash type; one showing contributing circumstances and one that shows vehicle actions. Contributing circumstances describe the decisions and behaviors of the drivers and vehicle actions describe the movement of the vehicles immediately before or during the crash. By understanding the causes of the six crash types, this analysis will assist in the development of crash countermeasures.

Table 2

Right Angle	Vehicle 1 Contributing Circumstances	Percentage	Vehicle 2 Contributing Circumstances	Percentage
Control Device Defective or Missing	1	12.5%	0	0.0%
Disobeyed Traffic Control Device	2	25.0%	0	0.0%
Driver Inattention	2	25.0%	0	0.0%
Failed to Yield to Right-Of-Way	2	25.0%	0	0.0%
Improper Turn	1	12.5%	0	0.0%
None	0	0.0%	8	100.0%
Total	8	100.0%	8	100.0%

Table 2.1

Right Angle	Vehicle 1 Action	Percentage	Vehicle 2 Action	Percentage
Right Turn on Red	3	37.5%	0	0.0%
Going Straight Ahead	4	50.0%	7	87.5%
Making Left Turn	1	12.5%	0	0.0%
Stopped in Traffic	0	0.0%	1	12.5%
Passing	0	0.0%	0	0.0%
Total	8	100.0%	8	100.0%

Table 3

Same Direction-Rear End	Vehicle 1 Contributing Circumstances	Percentage	Vehicle 2 Contributing Circumstances	Percentage
Driver Inattention	21	72.4%	1	3.4%
Failed to Yield to Right-Of-Way	1	3.4%	0	0.0%
Following Too Closely	1	3.4%	0	0.0%
Improper Turning	1	3.4%	0	0.0%
Other Driver Action	1	3.4%	1	3.4%
Unknown	2	7.0%	1	3.4%
None	2	7.0%	26	89.8%
Total	29	100.0%	29	100.0%

Table 3.1

Same Direction-Rear End	Vehicle 1 Action	Percentage	Vehicle 2 Action	Percentage
Right Turn on Red	0	0.0%	2	6.9%
Going Straight Ahead	12	41.5%	2	6.9%
Stopped in Traffic	3	10.3%	20	69.1%
Slowing or Stopping	9	31.1%	3	10.3%
Driverless/Moving	1	3.4%	0	0.0%
Starting in Traffic	2	6.9%	1	3.4%
Making Left Turn	1	3.4%	0	0.0%
Unknown	1	3.4%	1	3.4%
Total	29	100.0%	29	100.0%

Table 4

Opposite Direction-Head On	Vehicle 1 Contributing Circumstances	Percentage	Vehicle 2 Contributing Circumstances	Percentage
Unsafe Speed	1	50.0%	0	0.0%
Improper Turning	1	50.0%	0	0.0%
None	0	0.0%	2	100.0%
Total	2	100.0%	2	100.0%

Table 4.1

Opposite Direction-Head On	Vehicle 1 Action	Percentage	Vehicle 2 Action	Percentage
Going Straight Ahead	0	0.0%	1	50.0%
Making Left Turn	2	100.0%	0	0.0%
Stopped in Traffic	0	0.0%	1	50.0%
Total	2	100.0%	2	100.0%

Table 5

Same Direction-Side Swipe	Vehicle 1 Contributing Circumstances	Percentage	Vehicle 2 Contributing Circumstances	Percentage
Driver Inattention	2	66.7%	0	0.0%
Improper Passing	1	33.3%	0	0.0%
None	0	0.0%	3	100.0%
Total	3	100.0%	3	100.0%

Table 5.1

Same Direction-Side Swipe	Vehicle 1 Action	Percentage	Vehicle 2 Action	Percentage
Going Straight Ahead	0	0.0%	2	66.7%
Merging	2	66.7%	0	0.0%
Passing	1	33.3%	0	0.0%
Stopped in Traffic	0	0.0%	1	33.3%
Total	3	100.0%	3	100.0%

Table 6

Left Turn/U Turn	Vehicle 1 Contributing Circumstances	Percentage	Vehicle 2 Contributing Circumstances	Percentage
Disobeyed Traffic Control Device	1	100.0%	1	100.0%
Total	1	100.0%	1	100.0%

Table 6.1

Left Turn/U Turn	Vehicle 1 Action	Percentage	Vehicle 2 Action	Percentage
Making Left Turn	1	100.0%	0	0.0%
Going Straight Ahead	0	0.0%	1	100.0%
Total	1	100.0%	1	100.0%

Table 7

Fixed Object	Vehicle 1 Contributing Circumstances	Percentage	Vehicle 2 Contributing Circumstances	Percentage
Driver Inattention	3	49.9%	0	0.0%
Road Surface Condition	1	16.7%	0	0.0%
Failure to Keep Right	1	16.7%	0	0.0%
Unknown	0	0.0%	1	16.7%
None	1	16.7%	5	83.3%
Total	6	100.0%	6	100.0%

Table 7.1

Fixed Object	Vehicle 1 Action	Percentage	Vehicle 2 Action	Percentage
Going Straight Ahead	3	49.9%	0	0.0%
Making Left Turn	1	16.7%	0	0.0%
Negotiating Curve	1	16.7%	0	0.0%
Parked	0	0.0%	1	16.7%
None	1	16.7%	5	83.3%
Total	6	100.0%	6	100.0%

5. Data Observations

As shown in Figure 1, 10 of the 29 rear end crashes occur on eastbound Hamilton Avenue approaching Liberty Street and 6 of the 29 rear end crashes occur on eastbound Hamilton Avenue between Liberty Street and Kuser Road /Ward Avenue. An additional 5 rear end crashes occur on westbound Hamilton Avenue approaching Kuser Road /Ward Avenue. Some observations include:

- When Hamilton Avenue has a red phase, vehicles on Liberty Street are allowed to turn right onto Hamilton Avenue. The vehicles will queue back onto Liberty Street. When Hamilton Avenue received a green phase, vehicles on Hamilton Avenue must wait for the queued traffic blocking the intersection to clear out.
- Sun glare in the PM peak hours obscures the visibility of the traffic signal.
- During field observations, neither Hamilton Avenue nor Liberty Street traffic queued back to Johnson Avenue due to the signal at Hamilton Avenue and Kuser Road /Ward Avenue

Of the 8 right angle crashes, 7 were attributed to driver error, such as disobeying traffic control device, failure to yield right of way, and driver inattention. Some observations include:

- A single No Turn on Red sign is posted on the Kuser Road approach to Hamilton Avenue
- There are access points in close proximity to the intersection of Hamilton Avenue and Liberty Street and Hamilton Avenue and Kuser Road. This includes the bagel shop/beauty parlor and a private residence.

6. Conclusion

Based on the crash data presented and field observations, the following improvements are proposed:

- Signalize the Liberty Street approach to the Hamilton Avenue intersection and coordinate the signal to allow the eastbound traffic Hamilton Avenue at the Kuser Road/Ward Avenue intersection clear out before releasing the traffic at Hamilton Avenue and Liberty Street.
- Add backplates to the traffic signal heads on Hamilton Avenue
- Change the Hamilton Ave signal heads to be optically programmed to prevent approaching traffic from seeing the signal heads at the adjacent intersection
- Add second No Turn on Red sign for the Kuser Road approach to Hamilton Avenue
- Restrict access to right-in/right-out at access points in close proximity to intersections
- Increase change/clearance times at Hamilton Avenue and Kuser Road/Ward Avenue
- Move bus stop at near-side corner of Hamilton Avenue and Kuser Road/Ward Avenue to far-side corner

With these proposed improvements, it is expected that the safety will be increased for drivers along Hamilton Avenue within the project limits. Additionally, these improvements are also expected to improve operations within the project limits.

APPENDIX A
Crash Summary

DRAFT

CRASH ID	CRASH LOCATION	CRASH TYPE	MILEPOST	VEHICLE 1 DIRECTION	VEHICLE 1 VEH TYPE, VEH ACTN	VEHICLE 2 DIRECTION	VEHICLE 2 VEH TYPE, VEH ACTN	WEATHER	ROAD CONDITIONS	LITE	DATE	DOW	TIME	VEH 1 CONTRIB CIRCUMSTANCES	VEH 2 CONTRIB CIRCUMSTANCES
14-4042	WARD AVENUE	FIXED OBJECT	0.13	-	GOING STRAIGHT AHEAD	-	-	CLEAR	WET	DAY	2014	WED	-	-	-
14266413	CR 619	FIXED OBJECT	1.65	NORTH	PASS-GOING STRT	-	-	CLEAR	DRY	DARK	9/15/2014	MON	23:01	FAIL TO KEEP RT	-
14250533	CR 619	FIXED OBJECT	1.7	EAST	PASS-GOING STRT	SOUTH	PASS-PARKED	CLEAR	DRY	DARK	8/14/2014	THR	1:30	DRI INATTENTION	UNKNOWN
14123810	CR 619	SAME DIR-REAR	1.75	NORTH	PASS-GOING STRT	NORTH	PKUP-STOP-TRAF	CLEAR	DRY	DAY	1/31/2014	FRI	13:57	DRI INATTENTION	NONE-DRIVER/CYC
15186637	CR 619	FIXED OBJECT	1.75	EAST	PASS-NEG CURVE	-	-	CLEAR	DRY	DARK	5/26/2015	TUE	21:09	DRI INATTENTION	-
15307775	CR 619	SAME DIR-REAR	1.75	NORTH	PASS-SLOW-STOP	NORTH	SUV-STOP-TRAF	CLEAR	DRY	DAY	11/12/2015	THR	14:24	DRI INATTENTION	NONE-DRIVER/CYC
15287624	CR 619	RIGHT ANGLE	1.75	NORTH	PASS-LEFT TURN	WEST	PASS-GOING STRT	CLEAR	DRY	DAY	10/17/2015	SAT	13:15	DRI INATTENTION	NONE-DRIVER/CYC
15160530	CR 606	SAME DIR-REAR	2.1	EAST	PASS-GOING STRT	EAST	PASS-STOP-TRAF	OC	WET	DAY	3/27/2015	FRI	11:00	DRI INATTENTION	NONE-DRIVER/CYC
15287816	CR 606	SAME DIR-REAR	2.1	EAST	PASS-GOING STRT	EAST	SUV-SLOW-STOP	CLEAR	DRY	DAY	9/19/2015	SAT	13:41	DRI INATTENTION	NONE-DRIVER/CYC
14173765	CR 606	OPP HEAD-ON	2.11	SOUTH	PASS-LEFT TURN	NORTH	PASS-STOP-TRAF	CLEAR	DRY	DAY	4/18/2014	FRI	16:23	UNSAFE SPEED	NONE-DRIVER/CYC
14297430	CR 606	SAME DIR-REAR	2.11	EAST	SUV-STOP-TRAF	EAST	SUV-STOP-TRAF	CLEAR	DRY	DAY	10/22/2014	WED	15:51	DRI INATTENTION	NONE-DRIVER/CYC
15321056	CR 606	RIGHT ANGLE	2.11	SOUTH	PASS-RT TRN-NRD	WEST	PASS-GOING STRT	RAIN	WET	DARK	12/2/2015	WED	18:47	DISOBEYED TCD	NONE-DRIVER/CYC
15287787	CR 606	FIXED OBJECT	2.12	WEST	PASS-GOING STRT	-	-	CLEAR	DRY	DAY	9/26/2015	SAT	11:59	DRI INATTENTION	-
13242444	CR 606	SAME DIR-REAR	2.14	NORTH	PASS-STOP-TRAF	NORTH	PASS-STOP-TRAF	CLEAR	DRY	DAY	7/15/2013	MON	18:18	NONE-DRIVER/CYC	NONE-DRIVER/CYC
14145603	CR 606	SAME DIR-REAR	2.14	EAST	PASS-DRIVERLESS	EAST	PASS-STOP-TRAF	CLEAR	DRY	DAY	2/18/2014	TUE	16:59	DRI INATTENTION	NONE-DRIVER/CYC
14208589	CR 606	SAME DIR-REAR	2.14	EAST	PASS-GOING STRT	EAST	PASS-GOING STRT	CLEAR	DRY	DAY	5/30/2014	FRI	18:11	DRI INATTENTION	NONE-DRIVER/CYC
13254555	CR 606	SAME DIR-REAR	2.15	EAST	S2AXL-SLOW-STOP	EAST	PASS-STOP-TRAF	CLEAR	DRY	DAY	10/1/2013	TUE	8:54	DRI INATTENTION	NONE-DRIVER/CYC
14123775	CR 606	SAME DIR-REAR	2.15	EAST	SUV-SLOW-STOP	EAST	S3AXL-STOP-TRAF	SN/SN	SN	DAY	1/21/2014	TUE	11:29	DRI INATTENTION	NONE-DRIVER/CYC
14208501	CR 606	FIXED OBJECT	2.15	WEST	PASS-LEFT TURN	-	-	RAIN	WET	DARK	6/13/2014	FRI	1:45	RD SURF CNDTION	-
14221088	CR 606	SAME DIR-REAR	2.15	NORTH	PASS-GOING STRT	NORTH	PASS-STOP-TRAF	CLEAR	DRY	DARK	7/5/2014	SAT	23:50	UNKNOWN	NONE-DRIVER/CYC
15160506	CR 606	SAME DIR-REAR	2.15	EAST	PASS-GOING STRT	EAST	PASS-START TRAF	CLEAR	DRY	DARK	4/3/2015	FRI	20:17	FAIL TO YLD ROW	NONE-DRIVER/CYC
15281766	CR 606	SAME DIR-REAR	2.15	EAST	PKUP-START TRAF	EAST	PASS-SLOW-STOP	CLEAR	DRY	DAY	9/8/2015	TUE	14:38	DRI INATTENTION	NONE-DRIVER/CYC
15307950	CR 606	LEFT/U TURN	2.15	EAST	PASS-LEFT TURN	WEST	SUV-GOING STRT	CLEAR	DRY	DARK	11/23/2015	MON	17:10	DISOBEYED TCD	DISOBEYED TCD
13006711	CR 606	RIGHT ANGLE	2.18	EAST	SUV-RT TRN-NRD	SOUTH	BV9PL-STOP-TRAF	CLEAR	WET	DARK	1/30/2013	WED	19:08	IMPROPER TURN	NONE-DRIVER/CYC
13018345	CR 606	RIGHT ANGLE	2.18	EAST	PASS-GOING STRT	SOUTH	SUV-GOING STRT	CLEAR	DRY	DAY	2/18/2013	MON	12:21	DRI INATTENTION	NONE-DRIVER/CYC
13018955	CR 606	SAME DIR-REAR	2.18	EAST	PASS-LEFT TURN	EAST	PASS-GOING STRT	CLEAR	DRY	DAY	2/21/2013	THR	11:18	NONE-DRIVER/CYC	DRI INATTENTION
13135364	CR 606	SAME DIR-SIDE	2.18	EAST	PASS-MERGING	EAST	PASS-GOING STRT	CLEAR	DRY	DAY	4/2/2013	TUE	18:25	DRI INATTENTION	NONE-DRIVER/CYC
13214233	CR 606	RIGHT ANGLE	2.18	EAST	PASS-GOING STRT	NORTH	SUV-GOING STRT	CLEAR	DRY	DAY	6/26/2013	WED	14:43	CD DEFECT/MSSNG	NONE-DRIVER/CYC
13242443	CR 606	SAME DIR-REAR	2.18	EAST	PASS-GOING STRT	EAST	SUV-STOP-TRAF	CLEAR	WET	DAY	4/12/2013	FRI	17:40	DRI INATTENTION	NONE-DRIVER/CYC
13257459	CR 606	SAME DIR-REAR	2.18	EAST	PASS-GOING STRT	EAST	SUV-STOP-TRAF	CLEAR	DRY	DAY	10/17/2013	THR	17:25	DRI INATTENTION	NONE-DRIVER/CYC
13299776	CR 606	SAME DIR-REAR	2.18	WEST	S2AXL-SLOW-STOP	WEST	SUV-STOP-TRAF	CLEAR	DRY	DAY	11/16/2013	SAT	14:28	DRI INATTENTION	NONE-DRIVER/CYC
14192500	CR 606	RIGHT ANGLE	2.18	NORTH	PASS-LEFT TURN	WEST	PASS-GOING STRT	CLEAR	DRY	DAY	5/14/2014	WED	17:18	FAIL TO YLD ROW	NONE-DRIVER/CYC
14260945	CR 606	RIGHT ANGLE	2.18	NORTH	PASS-RT TRN-NRD	EAST	PASS-GOING STRT	CLEAR	DRY	DAY	5/30/2014	FRI	6:56	FAIL TO YLD ROW	NONE-DRIVER/CYC
14266401	CR 606	SAME DIR-SIDE	2.18	SOUTH	SUV-MERGING	SOUTH	SUV-GOING STRT	CLEAR	DRY	DAY	9/3/2014	WED	14:28	DRI INATTENTION	NONE-DRIVER/CYC
14331773	CR 606	SAME DIR-REAR	2.18	EAST	PASS-START TRAF	EAST	PASS-STOP-TRAF	CLEAR	DRY	DAY	11/29/2014	SAT	15:21	DRI INATTENTION	NONE-DRIVER/CYC
14349195	CR 606	SAME DIR-REAR	2.18	WEST	BV9PL-SLOW-STOP		PASS-STOP-TRAF	CLEAR	WET	DAY	12/1/2014	MON	15:41	DRI INATTENTION	NONE-DRIVER/CYC
15147279	CR 606	SAME DIR-REAR	2.18	EAST	PASS-GOING STRT	EAST	PASS-RT TRN-NRD	CLEAR	WET	DAY	3/11/2015	WED	8:13	DRI INATTENTION	NONE-DRIVER/CYC
15201442	CR 606	SAME DIR-REAR	2.18	EAST	PASS-GOING STRT	EAST	SUV-STOP-TRAF	RAIN	WET	DAY	5/21/2015	THR	13:45	DRI INATTENTION	NONE-DRIVER/CYC
15249965	CR 606	SAME DIR-REAR	2.18	NORTH	PASS-GOING STRT	NORTH	SUV-SLOW-STOP	CLEAR	DRY	DAY	8/15/2015	SAT	11:56	DRI INATTENTION	NONE-DRIVER/CYC
15287775	CR 606	SAME DIR-SIDE	2.18	SOUTH	SUV-PASSING	SOUTH	SUV-STOP-TRAF	CLEAR	DRY	DARK	10/4/2015	SUN	21:00	IMP PASSING	NONE-DRIVER/CYC
15321046	CR 606	RIGHT ANGLE	2.18	EAST	PASS-GOING STRT	NORTH	PKUP-GOING STRT	RAIN	WET	DAY	12/1/2015	TUE	9:34	DISOBEYED TCD	NONE-DRIVER/CYC
14173750	CR 606	SAME DIR-REAR	2.2	WEST	PASS-STOP-TRAF	WEST	PASS-STOP-TRAF	CLEAR	DRY	DAY	3/26/2014	WED	15:58	OTH DR/PED ACT	OTH DR/PED ACT
14313011	CR 606	SAME DIR-REAR	2.2	WEST	PASS-GOING STRT	WEST	PASS-RT TRN-NRD	CLEAR	DRY	DAY	11/10/2014	MON	14:58	DRI INATTENTION	NONE-DRIVER/CYC
214110314-22747	CR 606	OPP HEAD-ON	2.21	WEST	LEFT TURN	EAST	GOING STRT	CLEAR	DRY	DARK	5/31/2014	SAT	2:00	IMPROPER TURN	NONE-DRIVER/CYC
2015110315-6643	CR 606	SAME DIR-REAR	2.22	WEST	SLOW-STOP	WEST	STOP-TRAF	SN/SN	WET	DAY	2/14/2015	SAT	16:09	FOLLOW TO CLOSE	NONE-DRIVER/CYC
2013110313-21257	CR 606	SAME DIR-REAR	2.24	SOUTH	START-TRAF	SOUTH	STOP-TRAF	CLEAR	DRY	DAY	5/29/2013	WED	18:52	DRI INATTENTION	NONE-DRIVER/CYC
201511032015-23859	CR 606	SAME DIR-REAR	2.24	SOUTH	SLOW-STOP	SOUTH	STOP-TRAF	CLEAR	DRY	DAY	6/9/2015	TUE	14:44	DRI INATTENTION	NONE-DRIVER/CYC
2014110314-37100	LIBERTY STREET	SAME DIR-REAR	2.16	EAST	-	-	-	CLEAR	DRY	-	9/4/2014	THR	8:24	-	-