

# **Crash Data Analysis Manual Version 1.0**

**November 2017**

**VDOT Traffic Engineering Division**

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## Disclosure Statement

This document is intended to serve as a reference manual for individuals using crash data made available by the Virginia Department of Transportation (VDOT). The information contained herein may differ from information made available by the Virginia Department of Motor Vehicles (DMV). The DMV is the Commonwealth's official repository of crash data.

The contents of this manual may be periodically updated to reflect changes in the crash data fields contained in Virginia's FR-300 crash reports, a change in file structures provided by VDOT, or crash definitions. When changes are necessary, VDOT will post the updated manual on its website with the latest revision dates listed in the Document Control Panel prior to the Table of Contents.

# 1 Introduction

## 1.1 BACKGROUND AND PURPOSE

The manner by which VDOT acquires, stores, maintains, and processes crash data has changed over the last several years. Crash records are transmitted from the police to the Department of Motor Vehicles (DMV) who in turn transmits the electronic information to VDOT. VDOT conducts a quality control on a percentage of the crash records and updates the crash records database within its Roadway Network System (RNS), which is available to all VDOT users for obtaining and querying crash data. Data from RNS is then uploaded to the Tableau Crash Analysis Tool, an online tool developed by the Traffic Engineering Division, Highway Safety Section that is available to users inside VDOT as well as outside users such as jurisdictions or consultants. The DMV is the official repository of the Commonwealth's crash data and the actual crash reports (FR-300).

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*The purpose of this manual is to help ensure, irrespective of the user, that a consistent approach is undertaken to interpreting and using the crash data supplied by VDOT.*

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As a result of these changes, there was a need to document VDOT's crash data provided to its users. The purpose of this manual is to help ensure, irrespective of the user, that a consistent approach is undertaken to interpreting and using the crash data supplied by VDOT. In **Chapter 2**, The manual provides a list of the data elements in the FR-300 crash reports. Furthermore, in **Chapter 3**, the manual includes standardized definitions of crashes related to the Commonwealth's Strategic Highway Safety Plan Emphasis Areas including what determines an intersection related crash and a roadway departure crash. Finally, in **Chapter 4**, the manual gives examples of how to use available crash tools to query crash data needed for common crash analyses.

While this manual provides documentation and guidance on the use of VDOT supplied crash data, it should not serve as a replacement for regular contact with VDOT's Traffic Engineering Division Safety Team. Continue to work with the Safety Team if any questions arise regarding the format of the crash data, interpretation of crash data, any unique analyses that may be required, or general anomalies with the information. Engineers should document the queries and methods used to complete crash analyses and make note of when their methods or assumptions vary from those presented in this manual.



## 2.1 GENERAL DATA ELEMENTS

Page one of the FR300 report includes general information regarding the crash, vehicles, drivers, and passengers.

**Document Number:** A unique identifier assigned to each crash by VDOT that is generated randomly by the Roadway Network System (RNS).

**Local Case Number:** The investigating agency's case or report number

**Crash Date:** The date at which the crash occurred in the format of month, day, and year

**Day of Week:** The day of the week on which the crash occurred.

CODE	Day of the Week
0	Not Provided
1	Monday
2	Tuesday
3	Wednesday
4	Thursday
5	Friday
6	Saturday
7	Sunday

**GPS Lat/GPS Long:** The geographic locations in terms of latitude and longitude.

**Military Time:** The time (24-hour format) at which the crash occurred.

**County of Crash:** The County in which the crash occurred.

CODE	COUNTY
000	Arlington
001	Accomack
002	Albemarle
003	Alleghany
004	Amelia
005	Amherst
006	Appomattox
007	Augusta
008	Bath
009	Bedford
010	Bland
011	Botetourt
012	Brunswick
013	Buchanan
014	Buckingham
015	Campbell
016	Caroline
017	Carroll
018	Charles City
019	Charlotte
020	Chesterfield
021	Clarke
022	Craig
023	Culpeper
024	Cumberland
025	Dickenson
026	Dinwiddie
027	Elizabeth City
028	Essex
029	Fairfax
030	Fauquier
031	Floyd
032	Fluvanna

CODE	COUNTY
033	Franklin
034	Frederick
035	Giles
036	Gloucester
037	Goochland
038	Grayson
039	Greene
040	Greensville
041	Halifax
042	Hanover
043	Henrico
044	Henry
045	Highland
046	Isle of Wight
047	James City
048	King George
049	King & Queen
050	King William
051	Lancaster
052	Lee
053	Loudoun
054	Louisa
055	Lunenburg
056	Madison
057	Mathews
058	Mecklenburg
059	Middlesex
060	Montgomery
061	Nansemond
062	Nelson
063	New Kent
064	Norfolk
065	Northampton

CODE	COUNTY
066	Northumberland
067	Nottoway
068	Orange
069	Page
070	Patrick
071	Pittsylvania
072	Powhatan
073	Prince Edward
074	Prince George
075	Princess Anne
076	Prince William
077	Pulaski
078	Rappahannock
079	Richmond
080	Roanoke
081	Rockbridge
082	Rockingham
083	Russell
084	Scott
085	Shenandoah
086	Smyth
087	Southampton
088	Spotsylvania
089	Stafford
090	Surry
091	Sussex
092	Tazewell
093	Warren
095	Washington
096	Westmoreland
097	Wise
098	Wythe
099	York

**City of/Town of:** The city/town in which the crash occurred.

CODE	CITY OR TOWN
100	Alexandria
101	Big Stone Gap
102	Bristol
103	Buena Vista
104	Charlottesville
105	Clifton Forge
106	Colonial Heights
107	Covington
108	Danville
109	Emporia
110	Falls Church
111	Fredericksburg
112	Front Royal
113	Galax
114	Hampton
115	Harrisonburg
116	Hopewell
117	Lexington
118	Lynchburg
119	Marion
120	Martinsville
121	Newport News
122	Norfolk
123	Petersburg
124	Portsmouth
125	Pulaski
126	Radford
127	Richmond
128	Roanoke
129	Salem
130	South Boston
131	Chesapeake
132	Staunton
133	Suffolk
134	Virginia Beach
136	Waynesboro
137	Williamsburg
138	Winchester
139	Wytheville
140	Abingdon
141	Bedford
142	Blackstone
143	Bluefield
144	Farmville
145	Franklin
146	Norton
147	Poquoson
148	Richlands
149	Vinton
150	Blacksburg
151	Fairfax
152	Manassas Park
153	Vienna
154	Christiansburg
155	Manassas
156	Warrenton

CODE	CITY OR TOWN
157	Rocky Mount
158	Tazewell
159	Luray
160	Accomac
161	Alberta
162	Altavista
163	Amherst
164	Appalachia
165	Appomattox
166	Ashland
167	Belle Haven
168	Berryville
169	Bloxom
170	Boones Mill
171	Bowling Green
172	Boyce
173	Boydton
174	Boykins
175	Branchville
176	Bridgewater
177	Broadway
178	Brodnax
179	Brookneal
180	Buchanan
181	Burkeville
182	Cape Charles
183	Capron
184	Cedar Bluff
185	Charlotte C.H.
186	Chase City
187	Chatham
188	Cheriton
189	Chilhowie
190	Chincoteague
191	Claremont
192	Clarksville
193	Cleveland
194	Clifton
195	Clinchport
196	Clintwood
197	Clover
198	Coeburn
199	Colonial Beach
200	Columbia
201	Courtland
202	Craigsville
203	Crewe
204	Culpeper
205	Damascus
206	Dayton
207	Dendron
208	Dillwyn
209	Drakes Branch
210	Dublin
211	Duffield
212	Dumfries

CODE	CITY OR TOWN
213	Dungannon
214	Eastville
215	Edinburg
216	Elkton
217	Exmore
218	Fincastle
219	Floyd
220	Fries
221	Gate City
222	Glade Spring
223	Glasgow
224	Glen Lyn
225	Gordonsville
226	Goshen
227	Gretna
228	Grottoes
229	Grundy
230	Halifax
231	Hallwood
232	Hamilton
233	Haymarket
234	Haysi
235	Herndon
236	Hillsboro
237	Hillsville
239	Honaker
240	Independence
241	Iron Gate
242	Irrington
243	Ivor
244	Jarratt
245	Jonesville
246	Keller
247	Kenbridge
248	Keysville
249	Kilmarnock
250	LaCrosse
251	Lawrenceville
252	Lebanon
253	Leesburg
254	Louisa
255	Lovettsville
256	Madison
257	McKenney
258	Melfa
259	Middleburg
260	Middletown
261	Mineral
262	Monterey
263	Montross
264	Mount Crawford
265	Mount Jackson
266	Narrows
267	Nassawadox
268	New Castle
269	New Market

CODE	CITY OR TOWN
270	Newsoms
271	Nickelsville
272	Occoquan
273	Onancock
274	Onley
275	Orange
276	Painter
277	Pamplin City
278	Parksley
279	Pearisburg
280	Pembroke
281	Pennington Gap
282	Phenix
283	Pocahontas
284	Port Royal
285	Pound
286	Purcellville
287	Quantico
288	Remington
289	Rich Creek
290	Ridgeway

CODE	CITY OR TOWN
291	Round Hill
292	Rural Retreat
293	St. Charles
294	Saint Paul
295	Saltville
296	Saxis
297	Scottsburg
298	Scottsville
299	Shenandoah
300	Smithfield
301	South Hill
302	Stanardsville
303	Stanley
304	Stephens City
305	Stony Creek
306	Strasburg
307	Stuart
308	Surry
309	Tangier
310	Tappahannock
311	The Plains

CODE	CITY OR TOWN
312	Timberville
313	Toms Brook
314	Troutdale
315	Troutville
316	Urbanna
317	Victoria
318	Virgilina
319	Wachapreague
320	Wakefield
321	Warsaw
322	Washington
323	Waverly
324	Weber City
325	West Point
327	White Stone
328	Windsor
329	Wise
330	Woodstock
331	Hurt
339	Clinchco
340	Castlewood

**Landmark at Scene:** The address nearest the crash scene.

**Location of Crash (route/street):** Exact location on the roadway, using GPS/GIS or linear referencing technology to document where the crash occurred.

**Railroad Crossing ID No (If within 150 ft.):** If the crash occurred within 150 feet of an at-grade railroad crossing, the unique identifier for the nearby railroad crossings assigned by a state highway agency.

**At Intersection with or not:** Location of the crash within the boundary of an intersection.

**Mile Marker Number:** The mile marker (mile post) on a highway where crash occurred, the number increased south to North / West to East.

**Number of Vehicles:** The number of vehicles involved in the crash.

**Drivers Name, Address, Birth Date, and Gender:** The full name, address, birthdate, and gender of the drivers who involved in the crash.

**Driver License Number:** A unique number assigned by the authorizing agent issuing a driver license to the individual.

**Safety Equipment Used:** The safety equipment used by the driver and vehicle occupants at the time of the crash.

CODE	SAFETY EQUIPMENT USED
0	Not Provided
1	Lap Belt Only
2	Shoulder Belt Only
3	Lap and Shoulder Belt
5	Helmet
6	Other
8	No Restraint Used
9	Not Applicable

**Airbag:** Indicates which airbags deployed as a result of the crash.

CODE	AIRBAG
0	Not Provided
1	Deployed – Front
2	Not Deployed
3	Unavailable/Not Applicable
4	Keyed Off
5	Unknown
6	Deployed – Side
7	Deployed – Other (Knee, Air Belt, etc.)
8	Deployed – Combination

**Ejected:** Whether or not a vehicle driver or occupant was ejected from the vehicle as a result of crash.

CODE	EJECTED
0	Not Provided
1	Not Ejected
2	Partially Ejected
3	Totally Ejected

**Summons Issued:** Whether or not a summons was issued as a result of the crash.

CODE	SUMMONS ISSUED
0	Not Provided
1	Yes
2	No
3	Pending

**Crash Severity:** Crash Severity is coded using the KABCO scale, as per the Model Minimum Uniform Crash Criteria (MMUCC) based on the most severe injury to any person involved in the crash. For example, if two drivers are involved in a crash and the driver of one vehicle suffered from a Suspected Serious Injury (A) and the driver from the other vehicle suffered from a Possible Injury (C), the crash severity would be recorded as “A.”

### KABCO Scale Definitions

<b>K</b>	<b>Fatal Injury</b>	A fatal injury is any injury that results in death within 30 days after the motor vehicle crash in which the injury occurred. If the person did not die at the scene but died within 30 days of the motor vehicle crash in which the injury occurred, the injury classification will be changed to the attribute “Fatal Injury.”
<b>A</b>	<b>Suspected Serious Injury</b>	A suspected serious injury is any injury other than fatal which results in one or more of the following: <ul style="list-style-type: none"> <li>a. Severe laceration resulting in exposure of underlying tissues/muscle/organs or resulting in significant loss of blood</li> <li>b. Broken or distorted extremity (arm or leg)</li> <li>c. Crush injuries</li> <li>d. Suspected skull, chest or abdominal injury other than bruises or minor lacerations</li> <li>e. Significant burns (second and third degree burns over 10% or more of the body)</li> <li>f. Unconsciousness when taken from the crash scene</li> <li>g. Paralysis</li> </ul>
<b>B</b>	<b>Suspected Minor Injury</b>	A minor injury is any injury that is evident at the scene of the crash, other than fatal or serious injuries. Examples include lump on the head, abrasions, bruises, and minor lacerations (cuts on the skin surface with minimal bleeding and no exposure of deeper tissue/muscle).
<b>C</b>	<b>Possible Injury</b>	A possible injury is any injury reported or claimed which is not a fatal, suspected serious, or suspected minor injury. Examples include momentary loss of consciousness, claim of injury, limping, or complaint of pain or nausea. Possible injuries are those which are reported by the person or are indicated by his/her behavior, but no wounds or injuries are readily evident.
<b>O</b>	<b>Property Damage Only (No Apparent Injury)</b>	No apparent injury is a situation where there is no reason to believe that the person received any bodily harm from the motor vehicle crash. There is no physical evidence of injury and the person does not report any change in normal function, but the crash resulted in damage of at least \$1,500 to the motor vehicle or other property. The threshold for a property-damage-only crash changed from \$1,000 to \$1,500 in July 2008.

The FR-300 report uses Injury Type codes. The translation from Crash Severity to Injury Type is shown below.

### Translation of Crash Severity (KABCO) to Injury Types

CODE	CRASH SEVERITY	INJURY TYPE (FR-300)
1 or 5	Fatal Injury (K)	Dead
2	Suspected Serious Injury (A)	Serious Injury
3	Suspected Minor Injury (B)	Minor/Possible Injury
4	Possible Injury (C)	No apparent Injury
6	Property Damage Only (O)	No Injury

**Injury Type:** The level of injury sustained by the driver in the crash.

CODE	INJURY TYPE (FR-300)
1 or 5	Dead
2	Serious Injury
3	Minor/Possible Injury
4	No apparent Injury
6	No Injury

**Vehicle Owners Name, Address, Birth Date:** The full name and full address of the vehicle owners whose vehicle is resulted on crash.

**Vehicle Year:** The year that the vehicle was manufactured.

**Vehicle Make:** The vehicle make (Honda, Ford, etc.).

**Vehicle Model:** The vehicle model (Accord, Focus, etc.).

**Vehicle Identification Number (VIN):** A unique combination of alphanumeric characters assigned to a specific motor vehicle and formulated by the manufacturer.

**Approximate Repair Cost:** The estimated repair cost of the damaged vehicle as determined by the police officer at the scene.

**Name of Insurance Company:** The company that provides liability insurance for the crash vehicle.

**Maximum Safe Speed:** The safe speed of the vehicle struck while stopped at a traffic control device and it is an opinion based on road, traffic, weather and light conditions.

**Speed before Crash:** The speed of the vehicle before the crash. This is determined by the officer at the scene based on physical evidence and witnesses.

**Speed Limit:** The authorized speed limit or posted speed limit for the motor vehicle at the time and location of the crash.

**Passenger Info:** Information for occupants of motor vehicle other than the driver. Additional passenger information can be entered on page 6 of the FR300 report.

**Name of Injured:** The full name of injured/killed passengers.

**Position In/On Vehicle:** The seating position of each injured/killed passengers.

## 2.2 DRIVER DATA ELEMENTS

Page two of the FR300 report includes additional information regarding drivers involved in the crash.

**Driver Action (P1):** The action of the driver that resulted in the crash.

CODE	DRIVER ACTION
0	Not Provided
1	No Improper Action
2	Exceeded Speed Limit
3	Exceeded Safe Speed But Not Speed Limit
4	Overtaking On Hill
5	Overtaking On Curve
6	Overtaking at Intersection
7	Improper Passing of School Bus
8	Cutting In
9	Other Improper Passing
10	Wrong Side Of Road – Not Overtaking
11	Did Not Have Right-of-Way
12	Following Too Close
13	Fail to Signal or Improper Signal
14	Improper Turn – Wide Right Turn
15	Improper Turn – Cut Corner on Left Turn
16	Improper Turn From Wrong Lane
17	Other Improper Turn
18	Improper Backing
19	Improper Start From Parked Position
99	Not Applicable

**Condition of Driver contributing to the Crash (P2):** The condition of the driver that may have contributed to the crash as determined by the officer at the scene.

CODE	DRIVER CONDITION
0	Not Provided
99	Not Applicable
1	No Defects
2	Eyesight Defective
3	Hearing Defective
4	Other Body Defects
5	Illness
6	Fatigued
7	Apparently Asleep
8	Other
9	Unknown

**Driver Vision Obscured (P3):** The object, geometry, or weather which obscured the driver’s vision at the time of the crash.

CODE	DRIVER VISION
0	Not Provided
99	Not Applicable
1	Not Obscured
2	Rain, Snow, etc. on Windshield
3	Windshield Otherwise Obscured
4	Vision Obscured by Load on Vehicle
5	Trees, Crops, etc.
6	Building
7	Embankment
8	Sign or Signboard
9	Hillcrest
10	Parked Vehicle(s)
11	Moving Vehicle(s)
12	Sun or Headlight Glare
13	Other
14	Blind Spot
15	Smoke/Dust
16	Stopped Vehicle(s)

**Type of Driver Distractions (P4):** The distraction to the driver at the time of the crash.

CODE	DRIVER DISTRACTION
0	Not Provided
99	Not Applicable
1	Looking at Roadside Incident
2	Driver Fatigue
3	Looking at Scenery
4	Passenger(s)
5	Radio/CD, etc.
6	Cell Phone
7	Eyes Not on Road
8	Daydreaming
9	Eating/Drinking
10	Adjusting Vehicle Controls
11	Other
12	Navigation Device
13	Texting
14	No Driver Distraction

**Drinking (P5):** The driver's alcohol consumption prior to the crash.

CODE	DRIVER DRINKING
0	Not Provided
99	Not Applicable
1	Had Not Been Drinking
2	Drinking – Obviously Drunk
3	Drinking – Ability Impaired
4	Drinking – Ability Not Impaired
5	Drinking – Not Known Whether Impaired
6	Unknown

**Method of Alcohol Determination (by police) (P6):** The method used by the police to determine if the driver had been drinking alcohol prior to the crash.

CODE	DRIVER ALCOHOL TEST
0	Not Provided
99	Not Applicable
1	Blood
2	Breath
3	Refused
4	No Test

**Drug Use (P7):** The driver's drug use prior to the crash.

CODE	DRIVER DRUG USE
0	Not Provided
99	Not Applicable
1	Yes
2	No
3	Unknown

## 2.3 VEHICLE DATA ELEMENTS

Page two of the FR300 report also includes additional information regarding vehicles involved in the crash.

**Vehicle Maneuver (V1):** The movements of the motor vehicle prior to the crash.

CODE	VEHICLE MANEUVER
0	Not Provided
1	Going Straight Ahead
2	Making Right Turn
3	Making Left Turn
4	Making U-Turn
5	Slowing or Stopping
6	Merging Into Traffic Lane
7	Starting From Parked Position
8	Stopped in Traffic Lane
9	Ran Off Road – Right
10	Ran Off Road – Left
11	Parked
12	Backing
13	Passing
14	Changing Lanes
15	Other
16	Entering Street From Parking Lot

**Skidding Tire/Mark (V2):** The tire marks left on the road as a result of the crash.

CODE	SKID TIRE/MARK
0	Not Provided
99	Not Applicable
1	Before Application of Brakes
2	After Application of Brakes
3	Before and After Application of Brakes
4	No Visible Skid Mark/Tire Mark

**Vehicle Body Type (V3):** The type of motor vehicle involved in the crash distinguished by characteristics such as number of doors, seats, windows etc.

CODE	VEHICLE BODY TYPE
0	Not Provided
1	Passenger car
2	Truck – Pick-up/Passenger Truck
3	Van
4	Truck – Single Unit Truck (2-Axles)
7	Motor Home, Recreational Vehicle
8	Special Vehicle – Oversized (Veh/Earthmover/Road Equip.)
9	Bicycle
10	Moped
11	Motorcycle
12	Emergency Vehicle (Regardless of Veh Type)
13	Bus – School Bus
14	Bus – City Transit Bus/Privately Owned Church Bus
15	Bus – Commercial Bus
16	Other (Scooter, Go-cart, Hearse, Bookmobile, Golf Cart, etc.)
18	Special Vehicle – Farm Machinery
19	Special Vehicle – ATV
21	Special Vehicle – Low Speed Vehicle
22	Truck – Sport Utility Vehicle (SUV)
23	Truck – Single Unit Truck (3 Axles or More)
25	Truck – Truck Tractor (Bobtail-No Trailer)

**Vehicle Damage (V4):** The severity of the vehicle damage caused by the crash.

CODE	VEHICLE DAMAGE TYPE
0	Not Provided
1	Unknown
2	No Damage
3	Overturned
4	Motor
5	Undercarriage
6	Totaled
7	Fire
8	Other

**Vehicle Condition (V5):** The condition of the vehicle that may have contributed to the crash.

CODE	VEHICLE CONDITION TYPE
0	Not Provided
99	Not Applicable
1	No Defects
2	Lights Defective
3	Brakes Defective
4	Steering Defective
5	Puncture/Blowout
6	Worn or Slick Tires
7	Motor Trouble
8	Chains In Use
9	Other
10	Vehicle Altered
11	Mirrors Defective
12	Power Train Defective
13	Suspension Defective
14	Windows/Windshield Defective
15	Wipers Defective
16	Wheels Defective
17	Exhaust System

**Special Function Motor Vehicle (V6):** The type of use of the vehicle.

CODE	SPECIAL FUNCTION MOTOR VEHICLE
0	Not Provided
99	Not Applicable
1	No Special Function
2	Taxi
3	School Bus (Public or Private)
4	Transit Bus
5	Intercity Bus
6	Charter Bus
7	Other Bus
8	Military
9	Police
10	Ambulance
11	Fire Truck
12	Tow Truck
13	Maintenance
14	Unknown

**EMV in Service (V7):** Whether or not the vehicle was on an emergency response. This is only applicable when the vehicle is an Emergency Motor Vehicle (EMV) legally authorized by a government authority to respond to emergencies (with or without the use of emergency warning equipment).

CODE	EMERGENCY MOTOR VEHICLE
99	Not Applicable
1	Yes
2	No

**Truck Cover (V8):** Whether or not the vehicle had a truck cover. This field is only required when the vehicle is a truck that is required to be covered.

CODE	TRUCK PAYLOAD COVERED
99	Not Applicable
1	Yes
2	No

## 2.4 CRASH DATA ELEMENTS

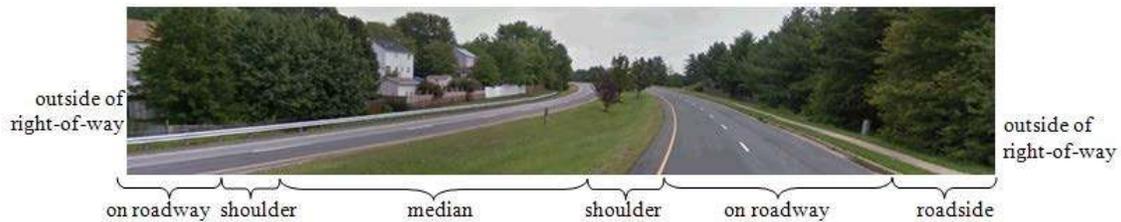
Pages three and four of the FR300 report include additional information regarding the crash.

**Location of First Harmful Event in Relation to Roadway (C1):** The location of the first injury or damage-producing event that characterizes the crash type.

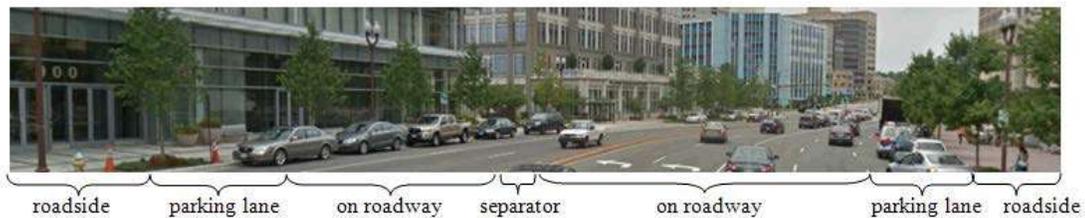
CODE	LOCATION OF FIRST HARMFUL EVENT
0	Not Provided
1	On Roadway
2	Shoulder
3	Median
4	Roadside
5	Gore
6	Separator
7	In Parking Lane or Zone
8	Off Roadway, Location Unknown
9	Outside Right-of-Way

The figures below show example locations that demonstrate various types of roadways and environments. They are not all inclusive.

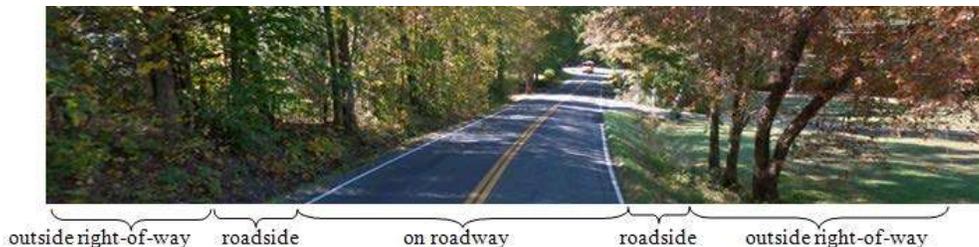
### Divided Highway



### Urban Undivided Roadway



### Rural Undivided Roadway



**Weather Condition (C2):** The weather condition at the time of crash.

CODE	WEATHER CONDITION TYPE
0	Not Provided
1	No Adverse Condition (Clear/Cloudy)
3	Fog
4	Mist
5	Rain
6	Snow
7	Sleet/Hail
8	Smoke/Dust
9	Other
10	Blowing Sand, Soil, Dirt, or Snow
11	Severe Crosswinds

**Light Condition (C3):** The light condition at the time of crash.

CODE	LIGHT CONDITION
0	Not Provided
1	Dawn
2	Daylight
3	Dusk
4	Darkness - Road Lighted
5	Darkness - Road Not Lighted
6	Darkness - Unknown Road Lighting
7	Unknown

**Traffic Control Device (C4):** This field indicates if the traffic control device selected in **Traffic Control Type (C5)** was functional at the time of the crash.

CODE	TRAFFIC CONTROL DEVICE STATUS
0	Not Provided
1	Yes - Working
2	Yes - Working and Obscured
3	Yes - Not Working
4	Yes - Not Working and Obscured
5	Yes - Missing
6	No Traffic Control Device Present
99	Not Applicable

**Traffic Control Type (C5):** The traffic control type at the scene of the crash.

CODE	TRAFFIC CONTROL TYPE
0	Not Provided
1	No Traffic Control
2	Officer or Flagger
3	Traffic Signal
4	Stop Sign
5	Slow or Warning Sign
6	Traffic Lanes Marked
7	No Passing Lines
8	Yield Sign
9	One Way Road or Street
10	Railroad Crossing With Markings and Signs
11	Railroad Crossing With Signals
12	Railroad Crossing With Gate and Signals
13	Other
14	Pedestrian Crosswalk
15	Reduced Speed - School Zone
16	Reduced Speed - Work Zone
17	Highway Safety Corridor
99	Not Applicable

**Roadway Alignment (C6):** The geometric layout and characteristics of the roadway at the location of first harmful event.

CODE	ROADWAY ALIGNMENT
0	Not Provided
1	Straight - Level
2	Curve – Level
3	Grade – Straight
4	Grade – Curve
5	Hillcrest – Straight
6	Hillcrest – Curve
7	Dip – Straight
8	Dip – Curve
9	Other
10	On/Off Ramp

**Roadway Surface Condition (C7):** The roadway surface condition of the travel lanes at the time and location of first harmful event in the crash.

CODE	ROADWAY SURFACE CONDITION
0	Not Provided
99	Not Applicable
1	Dry
2	Wet
3	Snowy
4	Icy
5	Muddy
6	Oil/Other Fluids
7	Other
8	Natural Debris
9	Water (Standing, Moving)
10	Slush
11	Sand, Dirt, Gravel

**Roadway Surface Type (C8):** The roadway surface type at the location of first harmful event in the crash.

CODE	ROADWAY SURFACE TYPE
0	Not Provided
1	Concrete
2	Blacktop, Asphalt, Bituminous
3	Brick or Block
4	Slag, Gravel, Stone
5	Dirt
6	Other

**Roadway Description (C9):** The roadway facility at the location of first harmful event in the crash.

CODE	ROADWAY
0	Not Provided
1	Two-Way, Not Divided
2	Two-Way, Divided, Unprotected Median
3	Two-Way, Divided, Positive Median Barrier
4	One-Way, Not Divided
5	Unknown

**Roadway Defects (C10):** Roadway defects at the scene of the crash which may have contributed to the crash.

CODE	ROADWAY DEFECT TYPE
0	Not Provided
99	Not Applicable
1	No Defects
2	Holes, Ruts, Bumps
3	Soft or Low Shoulder
4	Under Repair
5	Loose Material
6	Restricted Width
7	Slick Pavement
8	Roadway Obstructed

**Relation to Roadway (C11):** The location of the first harmful event in relation to the roadway.

CODE	ROADWAY RELATION
0	Not Provided
1	Main-Line Roadway
2	Acceleration/Deceleration Lanes
3	Gore Area (b/w Ramp and Highway Edge lines)
4	Collector/Distributor Road
5	On Entrance/Exit Ramp
6	Intersection at end of Ramp
7	Other location not listed above within an interchange area (median, shoulder , roadside)
8	Non-Intersection
9	Within Intersection
10	Intersection Related – Within 150 Feet
11	Intersection Related – Outside 150 Feet
12	Crossover Related
13	Driveway, Alley-Access – Related
14	Railway Grade Crossing
15	Other Crossing (Crossing for Bikes, School, etc.)

**Intersection Type (C12):** The configuration of the intersection at which the crash occurred.

CODE	INTERSECTION TYPE
0	Not Provided
99	Not Applicable
1	Not at Intersection
2	Two Approaches
3	Three Approaches
4	Four Approaches
5	Five-Point, or More
6	Roundabout

**Work Zone (C13):** Whether or not the first harmful event of the crash occurred within the boundaries of a work zone.

**Note:** A work zone is considered any area of a highway with construction, maintenance, or utility work activities—typically marked by signs, channelizing devices, barriers, pavement markings, and/or work vehicles. The work zone extends from the first warning sign or Advance Warning Area until the Termination Area. Workers may or may not be present.

CODE	WORK ZONE RELATED
0	Not Provided
1	Yes
2	No

**Work Zone Workers Present (C14):** Whether or not workers and/or law enforcement were present at the time of the crash. If the crash did not occur within a work zone this field will be null.

CODE	WORK ZONE WORKERS PRESENT
1	With Law Enforcement
0	Not Provided
99	Not Applicable
2	With No Law Enforcement
3	No Workers Present

**Work Zone Location (C15):** The location of the crash within the work zone.

CODE	WORK ZONE LOCATION
0	Not Provided
99	Not Applicable
1	Advance Warning Area
2	Transition Area
3	Activity Area
4	Termination Area

**Work Zone Type (C16):** The type of work zone in which the crash occurred. If the crash did not occur within a work zone this field will be null.

CODE	WORK ZONE TYPE
0	Not Provided
99	Not Applicable
1	Lane Closure
2	Lane Shift/Crossover
3	Work on Shoulder or Median
4	Intermittent or Moving Work
5	Other

**School Zone (C17):** Whether or not the crash occurred in a school zone and if school activity was occurring at the time of the crash.

CODE	SCHOOL ZONE
0	Not Provided
99	Not Applicable
1	Yes
2	Yes – With School Activity
3	No

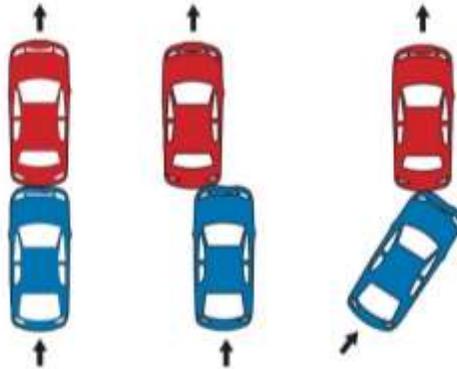
**Note:** A school zone should be considered from the warning sign (with or without flashing lights) to the end school zone sign. Where there are no signs, the school zone should be from the preceding intersection to the school to the following intersection, or where cross walks may be applied to the pavement. School Activity includes all school events even after normal school hours.

**Type of Collision (C18):** The type of collision that resulted in injury or property damage. Examples of each are given on the following pages.

CODE	COLLISION TYPE
1	Rear End
2	Angle
3	Head on
4	Sideswipe – Same direction of travel
5	Sideswipe – Opposite direction of travel
6	Fixed object in road (from ditch to ditch)
7	Train
8	Non-Collision, overturned, jackknifed or ran off road (no object)
9	Fixed object off road (from outside of ditch)
10	Deer
11	Other Animal
12	Pedestrian
13	Bicyclist
14	Motorcyclist
15	Backed Into
16	Miscellaneous or other
17	Not Stated

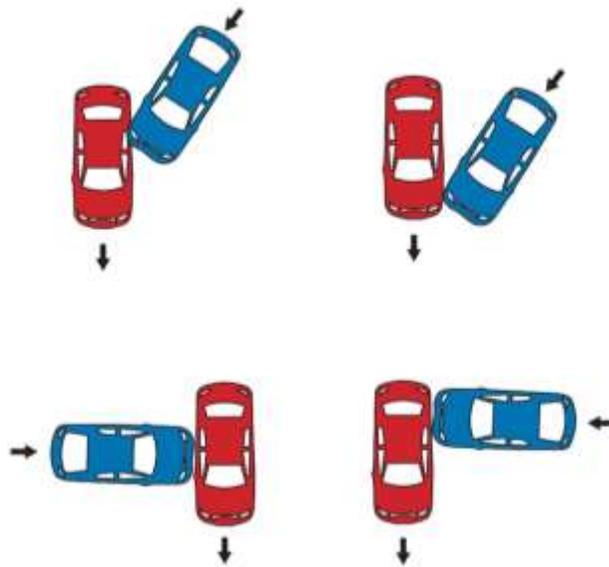
**1. Rear-end:**

A crash in which the front-end of one vehicle collides with the rear end of another vehicle.



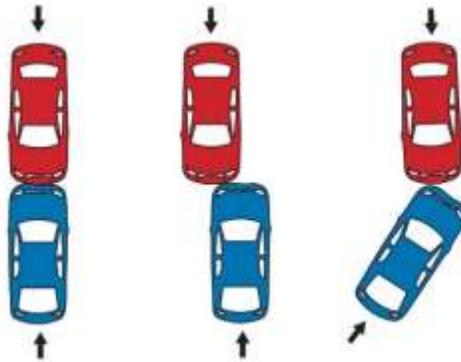
**2. Angle:**

A crash in which the front-end of one vehicle collides with the side of another vehicle. An angle collision occurs when vehicles collide while traveling on crossing paths.



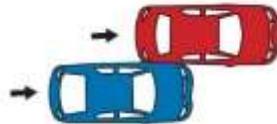
### 3. Head-on:

A crash in which the front-end of one vehicle collides with the front-end of another vehicle.



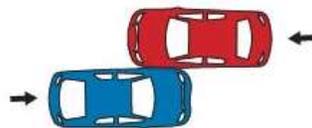
### 4. Sideswipe – Same direction:

A crash in which the side of a vehicle collides with the side of another vehicle traveling in the same direction.



### 5. Sideswipe – Opposite direction:

A crash in which the side of a vehicle collides with the side of another vehicle traveling in the opposite direction.



### 6. Fixed object in road:

A crash in which a vehicle collides with a fixed object in the roadway. “In the Roadway” is defined as from ditch to ditch.

### 7. Train:

A crash in which a motor vehicle collides with a locomotive, rail car, light rail train, or other type of train.

**8. Non-Collision:**

A crash event not involving a collision. Includes overturn/rollover, fire/explosion, immersion, jackknife, cargo/equipment loss or shift, equipment failure, separation of units, ran off road, cross median, cross centerline, downhill runaway, fell/jumped from motor vehicle, thrown or falling objects.

**9. Fixed object off road:**

A crash in which a vehicle collides with a fixed object outside of the roadway. "Outside of the roadway" is defined as outside of the ditch line.

**10. Deer:**

A crash in which a vehicle collides with a deer.

**11. Other animal:**

A crash in which a vehicle collides with an animal other than a deer.

**12. Pedestrian:**

A crash in which a vehicle collides with a pedestrian.

**13. Bicyclist:**

Bicyclist has been disabled and can no longer be selected in Collision Type. In order to determine if a crash involved a bicycle, "Bicycle" should be selected as a *Vehicle Body Type*.

**14. Motorcyclist:**

Motorcyclist has been disabled and can no longer be selected in Collision Type. In order to determine if a crash involved a motorcycle, "Motorcycle" should be selected as a *Vehicle Body Type*.

**15. Backed Into:**

A crash in which a vehicle in reverse collides with another vehicle or object.

**16. Other:**

A crash in which the type of collision is not included in those listed above. If crash is coded as other, an explanation should be provided in the crash description.

**Crash Diagram:** A Schematic representation of the crashes that occurred at a site

**Impact Area:** The area of initial impact on the vehicle during the crash.

CODE	IMPACT AREA
0	Not Provided
1	Right side – front corner
2	Right side – front
3	Right side – middle
4	Right side – rear
5	Right side – rear corner
6	Rear
7	Left side – rear corner
8	Left side – rear
9	Left side – middle
10	Left side – front
11	Left side - front corner
12	Front
13	Top (roof)

**Veh Dir of Travel-N/S/E/W:** The direction the vehicle was traveling prior to the crash (N/S/E/W).

CODE	DIRECTION
1	North
2	South
3	East
4	West

**Damage to Property Other Than Vehicles:** The approximate repair cost, type of object, property owner, and location of property other than vehicles that was damaged as a result of the crash.

**Crash Description:** A description of the crash recorded by the officer at the scene in the FR-300 Report.

**First Crash Events:** The first event in the crash that caused injury or damage.

**Second Crash Events:** The second event in the crash that caused injury or damage.

**Third Crash Events:** The third event in the crash that caused injury or damage.

**Fourth Crash Events:** The fourth event in the crash that caused injury or damage.

**Most Harmful Event:** The event in the crash that resulted in the most severe injury or greatest property damage.

CODE	CRASH EVENT
0	Not Provided
1	Bank Or Ledge
2	Trees
3	Utility Pole
4	Fence Or Post
5	Guard Rail
6	Parked Vehicle
7	Tunnel, Bridge, Underpass, Culvert, etc.
8	Sign, Traffic Signal
9	Impact Cushioning Device
10	Other
11	Jersey Wall
12	Building/Structure
13	Curb
14	Ditch
15	Other Fixed Object
16	Other Traffic Barrier
17	Traffic Sign Support
18	Mailbox
19	Pedestrian
20	Motor Vehicle In Transport
21	Train

CODE	CRASH EVENT
22	Bicycle
23	Animal
24	Work Zone Maintenance Equipment
25	Other Movable Object
26	Unknown Movable Object
27	Other
28	Ran Off Road
29	Jackknife
30	Overturn (Rollover)
31	Downhill Runaway
32	Cargo Loss or Shift
33	Explosion or Fire
34	Separation of Units
35	Cross Median
36	Cross Centerline
37	Equipment Failure (Tire, etc)
38	Immersion
39	Fell/Jumped From Vehicle
40	Thrown or Falling Object
41	Non-Collision Unknown
42	Other Non-Collision

## 2.5 COMMERCIAL MOTOR VEHICLE ELEMENTS

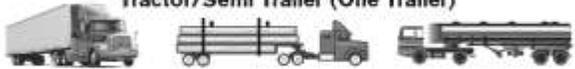
Page five of the FR300 report includes information regarding commercial motor vehicles involved in the accident, if applicable.

**Vehicle Configuration (V10):** The combination of vehicular units comprising the commercial motor vehicle. If the vehicle is not a commercial vehicle, this field will be coded as “0.”

CODE	VEHICLE CONFIGURATION
0	Not Provided
99	Not Applicable
1	Passenger Car (Only if Vehicle Has Hazardous Materials Placard)
2	Light Truck (Only if Vehicle Has Hazardous Materials Placard)
3	Bus (Seats 9–15 People, Including Driver)
4	Bus (Seats for 16 People or More, Including Driver)
5	Single Unit Truck (2 Axles, 6 Tires)
6	Single Unit Truck (3 or More Axles)
7	Truck Trailer(s) [Single-Unit Truck Pulling Trailer(s)]
8	Truck Tractor (Bobtail)
9	Tractor/Semi-trailer (One Trailer)
10	Tractor/Doubles (Two Trailers)
11	Other Truck Greater Than 10,000 lbs. (Not Listed Above)

### Illustration of Vehicle Configurations

Vehicle Configuration

<p><b>Bus (9-15 Seats, Including Driver)</b></p> 	<p><b>Truck/Trailer (Single-Unit Truck Pulling a Trailer)</b></p> 
<p><b>Bus (16 or More Seats, Including Driver)</b></p> 	<p><b>Truck Tractor (Bobtail)</b></p> 
<p><b>Single-Unit (2 Axles, 6 Tires)</b></p> 	<p><b>Tractor/Semi Trailer (One Trailer)</b></p> 
<p><b>Single-Unit (3 or More Axles)</b></p> 	<p><b>Truck Tractor/Double (Two Trailers)</b></p> 
	<p><b>Truck Tractor/Triple (Three Trailers)</b></p> 

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**Cargo Body Type (V11):** The primary cargo carrying capability of the commercial motor vehicle. If the vehicle is not a commercial vehicle, this field will be coded as “0.”

CODE	CARGO BODY TYPE
0	Not Provided
99	Not Applicable
1	Bus (Seats 9-15 People, Including Driver)
2	Bus (Seats For 16 People or More, Including Driver)
3	Van/Enclosed Box
4	Cargo Tank
5	Flatbed
6	Dump
7	Concrete Mixer
8	Auto Transporter
9	Garbage/Refuse
10	Grain/Chips/Gravel
11	Pole-Trailer
12	Vehicle Towing Another Motor Vehicle
13	Intermodel Container Chassis
14	Logging
15	Other Cargo Body (Not Listed Above)
16	Not Applicable/No Cargo Body

**License Class (P8):** The type of commercial motor vehicle license issued to the driver. This field is not used for VDOT crash analysis.

**Commercial Endorsement (P9):** The commercial endorsement issued to the driver of a commercial vehicle. This field is not used for VDOT crash analysis.

**GVWR/GCWR (V12):** The total weight of the commercial motor vehicle. If the vehicle is not a commercial vehicle, this field will be coded as “0.”

CODE	COMMERCIAL GROSS WEIGHT
0	Not Provided
99	Not Applicable
1	10,000 lbs. or Less
2	10,001-26,000 lbs.
3	Greater Than 26,000 lbs.

**Commercial/Non-Commercial (V13):** The commercial status of the carrier. If the vehicle is not a commercial vehicle, this field will be coded as "0."

CODE	COMMERCIAL CARRIER TYPE
0	Not Provided
99	Not Applicable
1	Interstate Carrier
2	Intrastate Carrier
3	Not In Commerce-Government (Trucks and Buses)
4	Not In Commerce-Other Truck (Over 10,000 lbs.)

**Hazardous Material Placard:** Whether or not a hazardous material placard was present on the vehicle at the time of the crash. If the vehicle is not a commercial vehicle, this field will be null.

**Carrier Identification (Carrier Name, Address & ID Number):** The full name, address and ID of the commercial motor carrier and who is responsible for the carrier load

## 2.6 PEDESTRIAN DATA ELEMENTS

Page six of the FR300 report includes information regarding pedestrians involved in the crash, if applicable. Note: A pedestrian is considered a person who is not an occupant of a motor vehicle in transport or a pedal cyclist. Pedestrians includes people adjacent to the motor vehicle regardless of their actions. Pedestrian can also include a person riding a Segway.

**EMS Transport:** Whether or not the pedestrian was transported by emergency medical services.

**Pedestrian Action (P10):** The action of the pedestrian at the time of the crash.

CODE	PEDESTRIAN ACTION
0	Not Provided
99	Not Applicable
1	Crossing At Intersection With Signal
2	Crossing At Intersection Against Signal
3	Crossing At Intersection No Signal
4	Crossing At Intersection Diagonally
5	Crossing Not At Intersection - Rural
6	Crossing Not At Intersection - Urban
7	Coming From Behind Parked Cars
8	Getting Off Or On School Bus
9	Playing In Roadway
10	Getting Off Or On Another Vehicle
11	Hitching On Vehicle
12	Walking In Roadway With Traffic – Sidewalks Available
13	Walking In Roadway With Traffic – Sidewalks Not Available
14	Walking In Roadway Against Traffic – Sidewalks Available
15	Walking In Roadway Against Traffic – Sidewalks Not Available
16	Working In Roadway
17	Standing In Roadway
18	Lying In Roadway
19	Not In Roadway
20	Other

**Pedestrian Drinking (P11):** The pedestrian's alcohol consumption prior to the crash.

CODE	PEDESTRIAN DRINKING
0	Not Provided
99	Not Applicable
1	Had Not Been Drinking
2	Drinking – Obviously Drunk
3	Drinking – Ability Impaired
4	Drinking – Ability Not Impaired
5	Drinking – Not Known Whether Impaired

**Condition of Pedestrian Contributing to the Crash (P12):** The condition of the pedestrian involved in the crash.

CODE	PEDESTRIAN CONDITON
0	Not Provided
99	Not Applicable
1	No Defects
2	Eyesight Defective
3	Hearing Defective
4	Other Body Defects
5	Illness
6	Fatigued
7	Apparently Asleep
8	Other

**Method of Alcohol Determination by police (P13):** The method used by the police to determine if the pedestrian had been drinking alcohol prior to the crash.

CODE	PEDESTRIAN ALCOHOL TEST
0	Not Provided
99	Not Applicable
1	Blood
2	Breath
3	Refused
4	No Test

**Drug Use (P14):** Whether or not the pedestrian had been using drugs prior to the crash.

CODE	PED DRUG USE
0	Not Provided
99	Not Applicable
1	Yes
2	No
3	Unknown

**Pedestrian Wear Reflective Clothing (P15):** Whether or not the pedestrian was wearing reflective clothing at the time of the crash.

CODE	PED REFLECTIVE
0	Not Provided
99	Not Applicable
1	Yes
2	No

## 3 Emphasis Area Definitions

The Strategic Highway Safety Plan (SHSP) is a statewide document that provides a comprehensive approach aimed at reducing deaths and serious injuries on all of Virginia’s public roads. Virginia has identified emphasis areas which represent the key factors contributing to crashes, which, if addressed, have the greatest potential to reduce fatalities and serious injuries. The sections below are intended to assist engineers in identifying crashes included in these emphasis areas.

The Tableau Crash Analysis Tool includes search options to identify each of these emphasis areas. The processes used to identify each of the emphasis areas are also given below.

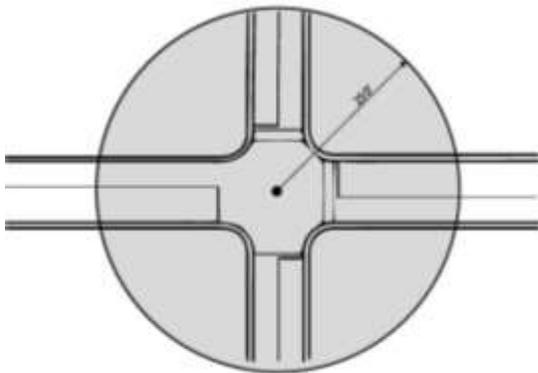
### 3.1 INTERSECTION CRASH

#### Definition:

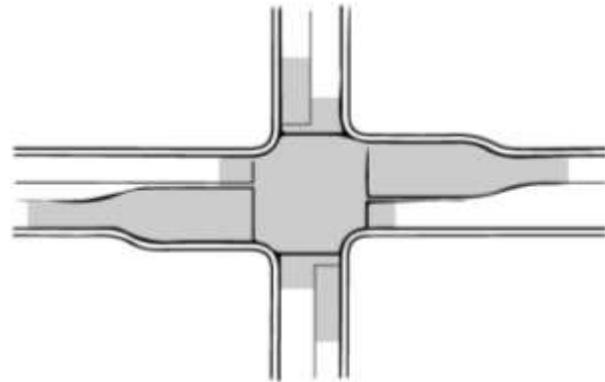
A crash in which the first harmful event occurs within 250 feet of the center of an intersection.

The distance of 250 feet should be used for network level screenings. For project level analyses, the engineer should determine the most appropriate intersection influence area. For example, if 250 feet does not encompass the full intersection functional area, including turn-lanes and tapers, a larger intersection area should be analyzed. The intersection analysis area used and the decision process for choosing this area should be documented with the engineering analysis.

#### Intersection Area – Network Level Screening:



#### Intersection Area – Project Level Screening:



## 3.2 ROAD DEPARTURE CRASH

### Definition:

A crash which occurs after a vehicle crosses an edge line or a center line, or otherwise leaves the traveled way (FHWA).

Please note, as of 2014, the FHWA includes intersection crashes that meet the above definition as roadway departure crashes. However, VDOT has chosen to continue to exclude intersection crashes in the selection of roadway departure crashes, as the countermeasures for addressing roadway departure crashes differs significantly if those crashes occur within or near an intersection.

### Using the Tableau Tool to identify Road Departure Crashes:

The **RD\_TYPE** field in the Tableau Tool can be used to identify if a crash is **RD-RIGHT**, **RD-LEFT**, **RD-UNKNOWN**, or **NOT-RD**. The follow process can also be used to identify a road departure crash based on the information provided in the FR-300 report. Please see **Chapter 2** for the FR-300 code tables.

**Step 1:** Identify single- and multi-vehicle crashes based on the number of vehicles reported in the FR-300 or in the **VEHICLENUMBER** attribute. If it is a single-vehicle crash, proceed to Step 2. If it is a multi-vehicle crash, skip to Step 6.

#### Single Vehicle

**Step 2:** Select only crashes where the *Vehicle Maneuver* is coded either **9** or **10**.

**Step 3:** Select crashes that were not identified in Step 2, but where the *First Crash Event* is coded as **1-18, 28, 35, 36, or 38**.

**Step 4:** Select crashes that were not selected in Step 2 or Step 3, but where the *Collision Type* is coded as **3, 5, or 9**.

**Step 5:** From the crashes selected in Step 3 and Step 4, select only crashes where the *Vehicle Maneuver* is coded as neither **2** nor **3**.

#### Multiple Vehicles

**Step 6:** Select only crashes where *Collision Type* is coded as either **3, 5, or 9**.

**Step 7:** Select crashes where the *Collision Type* is not coded as **4**.

**Step 8:** From the crashes selected in Step 7, select only crashes where the *First Crash Event* is coded as **1-18, 28, 35, 36, or 38**.

**Step 9:** From the crashes selected in Step 6 and Step 8, select only crashes where the *Vehicle Maneuver* is coded as neither **2** nor **3**.

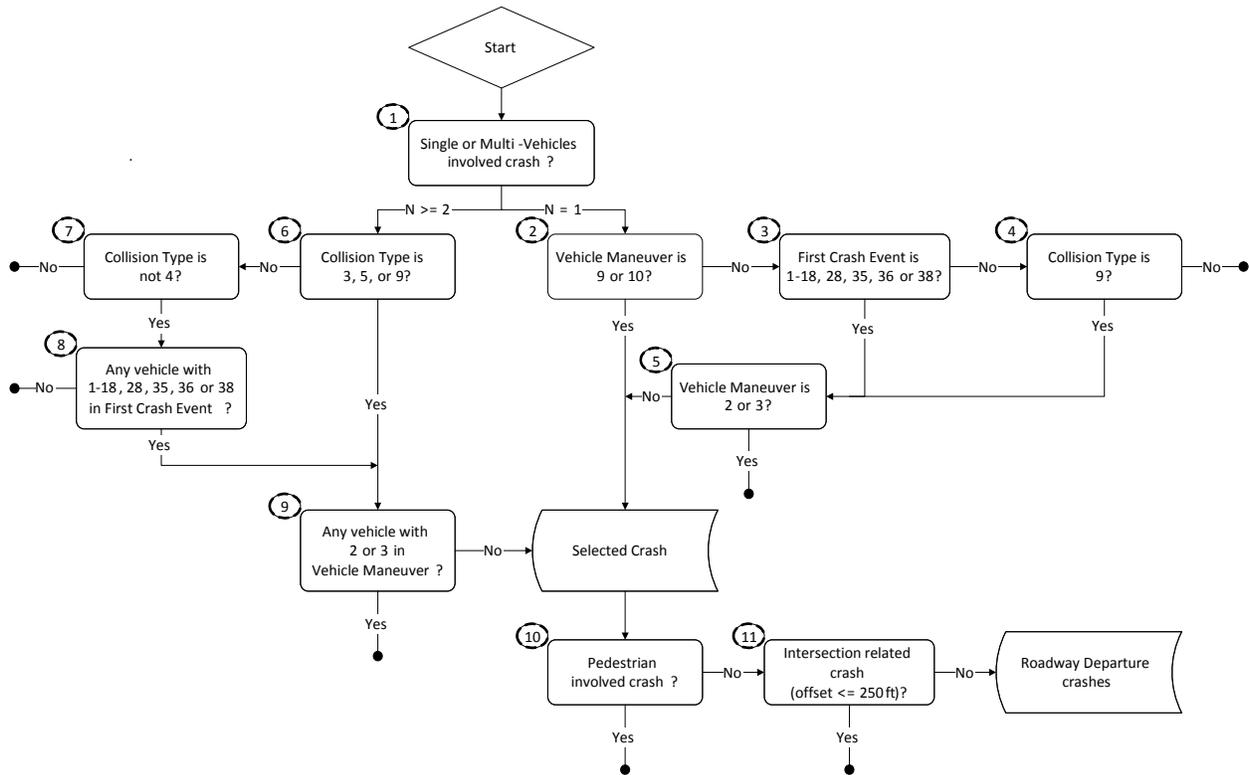
#### All Vehicles

**Step 10:** From the crashes selected in Step 5, and Step 9, select only crashes that do not involve any pedestrians.

**Step 11:** From the crashes selected in Step 10, select only crashes that are not intersection crashes, as defined in **Section 3.1**.

The flowchart below illustrates the process of identifying Roadway Departure Crashes.

## Road Departure Crash Flow Chart



### 3.3 SPEEDING CRASH

#### Definition:

A crash in which any vehicle involved is driving too fast for conditions or exceeding the posted speed limit.

#### Using the Tableau Tool to identify Speeding Crashes:

The **SPEED\_NOTSPEED** field in the Tableau Tool can be used to identify if a crash is a speeding crash. Using FR300 data, a crash is considered a speeding crash if for any vehicle involved in the crash:

1. The *Speed Limit* is less than the *Speed Before Crash* OR
2. The *Maximum Safe Speed* is less than the *Speed Before Crash*

### 3.4 ALCOHOL-RELATED CRASH

#### Definition:

A crash in which any driver, bicyclist, or pedestrian involved had been drinking alcohol prior to the incident.

#### Using the Tableau Tool to identify Alcohol-Related Crashes:

The **ALCOHOL\_NOTALCOHOL** field in the Tableau Tool can be used to identify if a crash is an alcohol related crash. Using FR300 data, crash is considered alcohol-related if the *Drinking* field under Driver Information or Pedestrian Drinking field equal one of the following:

- “Drinking – Obviously Drunk” (2)
- “Drinking – Ability Impaired” (3)
- “Drinking – Ability not Impaired” (4)
- “Drinking – Not known Whether Impaired” (5)

### 3.5 BICYCLE CRASH

#### Definition:

A crash in which any vehicle involved is a bicycle.

#### Using the Tableau Tool to identify Bicycle Crashes:

The **BIKE\_NONBIKE** field in the Tableau Tool can be used to identify if a crash is a bicycle crash. Using FR300 data, a crash is considered a bicycle crash if for any vehicle involved in the crash *Vehicle Body Type* is coded as “Bicycle” (9).

### 3.6 PEDESTRIAN CRASH

#### Definition:

A crash involving a pedestrian.

#### Using the Tableau Tool to identify Pedestrian Crashes:

The **PED\_NONPED** field in the Tableau Tool can be used to identify if a crash is a pedestrian crash. Using FR300 data, a crash is considered a pedestrian crash if either the *Pedestrian Injury Count* or the *Pedestrian Fatality Count* are greater than zero (0).

### 3.7 UNRESTRAINED CRASH

**Definition:**

A crash in which any vehicle occupant involved in the crash was not using the appropriate safety protection such as a safety belt for vehicle occupants or a helmet for bicyclists and motorcyclists.

**Using the Tableau Tool to identify Unrestrained Crashes:**

The **BELTED\_UNBELTED** field in the Tableau Tool can be used to identify if a crash is an unrestrained crash. Using FR300 data, a crash is considered an unrestrained crash when the *Safety Equipment Used* field is coded as “No Restraint Used” (8) for any driver or passenger involved in the crash.

### 3.8 YOUNG DRIVER CRASH

**Definition:**

A crash involving any driver who is at least 15 years of age and not yet 21 years of age at the time of the crash.

**Using the Tableau Tool to identify Young Driver Crashes:**

The **YOUNG\_NOTYOUNG** field in the Tableau Tool can be used to identify if a crash is a young driver crash. Using FR300 data, young driver crashes can be identified if for any driver involved in the crash, the difference between the *Crash Date* and the *Birth Date* is between 15 and 21 years.

### 3.9 SENIOR DRIVER CRASH

**Definition:**

A crash involving any driver who is over 65 years of age.

**Using the Tableau Tool to identify Senior Driver Crashes:**

The **SENIOR\_NOTSENIOR** field in the Tableau Tool can be used to identify if a crash is a senior driver crash. Using FR300 data, senior driver crashes can be identified if for any driver involved in the crash, the difference between the *Crash Date* and the *Birth Date* is greater than 65 years.

## 4 Crash Data Tools and Analysis Examples

### 4.1 CRASH TOOLS

There are two primary means for the majority of users of crash data to obtain VDOT crash data, the Roadway Network System (RNS) and the Tableau Crash Analysis Tool (the Tableau Tool). RNS is only available to VDOT users, whereas the Tableau Tool is available all users including VDOT users as well as outside users, such as localities or consultants. VDOT recommends that internal users utilize both tools.

RNS is a database that tracks and manages Virginia’s road inventory and associated assets and attributes in a tabular, linear, and geospatial context. The RNS currently includes a variety of data including speed zone information, functional classification, railroad crossing locations, and crash data. Data from RNS is incorporated into the Tableau Crash Analysis Tool, an online tool developed by the Traffic Engineering Division, Highway Safety Section.

The Tableau Crash Analysis Tool includes several additional search and query options not available in RNS. A difference to note between the RNS and the Tableau Tool is that when performing road segment/corridor crash retrieval, RNS now retrieves both mainline and intersecting route crashes within 250 feet of the mainline intersection. The Tableau Tool only retrieves mainline crashes. The Tableau Crash Analysis Tool is available here:

**2006-2010:** [https://public.tableau.com/profile/tien.simmons#!/vizhome/Crashtools2006\\_10/Main](https://public.tableau.com/profile/tien.simmons#!/vizhome/Crashtools2006_10/Main)

**2011-Present:** [https://public.tableau.com/profile/publish/Crashtools8\\_2/Main#!/publish-confirm](https://public.tableau.com/profile/publish/Crashtools8_2/Main#!/publish-confirm)

A link to the Tableau User Guide and Data Dictionary is available on the “Main” tab for both the 2006–2010 and the 2011–Present tools. For additional information regarding the Tableau Tool, contact the Traffic Engineering Division, Highway Safety Section. The DMV is the official repository of the Commonwealth’s crash data and the actual crash reports (FR-300). For additional information regarding RNS or crash data and analysis, contact the State Safety Engineer.

**Sections 4.3 and 4.4** include examples of common crash analyses completed using the Tableau Crash Analysis Tool.

### 4.2 EXPECTATIONS OF REPRODUCIBILITY

When conducting crash analyses, engineers should document the queries and methods used to ensure the process is repeatable and the results are reproducible by others. The engineer should make note of any deviations from the crash definitions contained in this manual. The engineer performing the crash analyses should provide an appendix or other documentation to include but not be limited to:

- Date the crash data was obtained.
- The tool used to obtain the crash data.
- Search criteria used in queries. This may include the metadata, SQL code, screenshots of Tableau or RNS, or equivalent.
- Documentation of any deviations for the crash definitions contained in this manual.
- Adjustments made to data based on engineer’s judgement. An example may be the recoding of a collision type based on the crash description provided by the officer at the scene.
- Maintain complete data set used in .csv or another database format in project file.

## 4.3 IDENTIFYING INTERSECTION NODES

Identifying intersection nodes allows users to efficiently query crashes by intersection in order to complete intersection crash analyses. RNS has unique identifiers for each intersection node, which can be used to filter crashes at an intersection in RNS or Tableau. One means of finding this node identifier is to filter crashes in the Tableau Tool by jurisdiction and route and then use the “Map\_Info” to locate the study intersection and identify the node info.

An example is provided on the following pages for identifying the intersection node for the intersection of Washington Street (Route 337) and N. Main Street (Route 32) in Suffolk, VA using the Tableau Crash Analysis Tool. A similar process can be used in RNS for VDOT users.

### 4.3.1 Example: Identifying Intersection Node

1. First on the “Main” tab, select all crash severities, as shown below.

The screenshot displays the Tableau Crash Analysis Tool interface. The 'Main' tab is highlighted with a red box. The 'Crash Severity' dropdown menu is also highlighted with a red box, showing a list of severity options: (All), K-Fatal Injury, A-Ambulatory Injury, B-Visible Injury, C-Non-Visible Injury, and PDO Property Damage Only. The interface includes various filters such as Virginia State Police Division, Planning District, MPO Name, VDOT Districts, Physical Jurisdiction, Queenship, Mainline Ramp, Route Name, Start MP - To MP, Crash Year, Start Date - End Date, Time of Day, Weather Condition, Light Condition, Intersection (Select ft radius in Node Offset), Intersection Node Info, Node Offset (Feet), Road Departure, Speeding, Young (15-20) Driver Related, Senior (Over 65) Driver Related, Occupant Protection, Guard Rail, Motorcycle, Single Unit Truck (2+ Axles), First Harmful Event of Entire Crash, Location of First Harmful Event, Collision Type, Roadway Alignment, Roadway Surface Condition, Distracted Driver, and Animal (Deer). A 'Notes' section is visible at the top right, providing additional information about the data and filters.

- Then, select the VDOT District and Physical Jurisdiction of the study intersection.

[Main](#) | [Route Info](#) | [0.25 Mi Severity \(One Route O...](#) | [0.25 Mi Collision \(One Route O...](#) | [Intersection Info](#) | [Crashes Info](#) | [Map Info](#) | [Overall Summary](#) | [Cheat Sheet](#)

### Crash Analysis Tool

[Virginia State Police Division](#)

[Planned District](#)

[MPO Name](#)

[VDOT District](#)

[Physical Jurisdiction](#)  


- 100 Emporia
- 114 Hampton
- 121 Newport News
- 122 Norfolk
- 124 Portsmouth
- 131 Chesapeake
- 133 Suffolk
- 134 Virginia Beach
- 137 Williamsburg
- 145 Franklin
- 147 Poquoson
- 160 Accomac
- 167 Belle Haven
- 168 Blount
- 174 Boykins
- 175 Brandville
- 182 Cape Charles
- 183 Capron
- 188 Chesler

[Crash Year](#)

[Start Date - End Date](#)  
 -

[Time Sliding](#)

[Weather Condition](#)

[Light Condition](#)

[Intersection \(Select 8 routes or Route Offset\)](#)

[Intersection Route Info](#)

[Route Offset \(Feet\)](#)  
 -

[Crash Severity](#)

[Road Departure](#)

[Functional Class](#)

[Facility Type](#)

[Work Zone Related](#)

[School Zone](#)

[Bicycle](#)

[Pedestrian](#)

[Alcohol Impaired](#)

[Speeding](#)

[Young \(15-20\) Driver Related](#)

[Senior \(Over 65\) Driver Related](#)

[Occupant Protection](#)

[Guard Rail](#)

[Motorcycle](#)

[Single Unit Truck \(2+ Axles\)](#)

[First Harmful Event of Entire Crash](#)

[Location of First Harmful Event](#)

[Collision Type](#)

[Roadway Alignment](#)

[Roadway Surface Condition](#)

[Distracted Driver](#)

[Animal \(Deer\)](#)

[Document - Enter 1 or more & include several](#)

**Notes:**  
 1) Crashes are substantially complete through June 2017 as received from the DMV TREDIS System.  
 2) Filters in the Main Tab are reflected in the other Tabs (except Cheat Sheet). By default, Fatal Crash Severity is shown. Clicked "X" in upper right corner of each filter to show all. UPDATE when performing road segment/corridor crash retrieval RLS now returns both roadway and intersecting route crashes within 250 feet of the roadway intersection. This is different from segment searches in Tableau which only retrieves the roadway crashes.  
 3) To export all crash info of your query number to a CSV file, right click on "View Data" or "Download", "Underlying" tab, "Export All".  
 4) User's Guide and Data Dictionary are available by clicking on the VDOT icon.

3. Then, select the route names for both intersecting routes.

As shown below, Washington Street (Route 337) and N. Main Street (Route 32) were selected for this example.

The screenshot shows a web application interface with a navigation bar at the top containing tabs: Main, Route Info, 0.25 MI Severity (One Route O..., 0.25 MI Collision (One Route O..., Intersection Info, Crashes Info, Map Info, Overall Summary, and Cheat Sheet. Below the navigation bar is a list of routes on the left side, with two routes highlighted by red boxes: R-VA SR00337WB and R-VA SR00337VB. To the right of the route list is a large panel of filter options, including dropdown menus for Crash Severity, Road Departure, Functional Class, Speeding, Location of First Harmful Event, Facility Type, Young (16-20) Driver Related, Collision Type, Work Zone Related, Senior (Over 65) Driver Related, Roadway Alignment, School Zone, Occupant Protection, Roadway Surface Condition, Bicycle, Guard Rail, Distracted Driver, Pedestrian, Motorcycle, Animal (Deer), Alcohol Impaired, and Single Struck Truck (2+ Axles). At the bottom of the filter panel, there are sliders for Start MP - To MP and Node Offset (Feet).

4. Select the “Map\_Info” tab to view the selected crashes.

The screenshot shows the same web application interface, but with the 'Map\_Info' tab selected in the navigation bar. The map displays the selected routes, Washington Street (Route 337) and N. Main Street (Route 32), with colored markers indicating crash locations. A legend in the top right corner of the map area identifies the markers by color: red for 1st Major Injury, orange for 2nd Major Injury, yellow for 3rd Major Injury, green for 4th Major Injury, and blue for 5th Major Injury. The map also shows a street grid and various landmarks.



## 4.4 INTERSECTION CRASH ANALYSIS EXAMPLES

### 4.4.1 Example: MUTCD Traffic Signal Warrant: Warrant 7, Crash Experience

The Crash Experience signal warrant conditions are intended for application at intersections where the severity and frequency of crashes are the principal reasons to consider installing a traffic control signal.

- For a traffic signal to be warranted under Warrant 7, 5 or more crashes that could be correctable by a traffic signal must have occurred within a 12-month period.
- Please see MUTCD Chapter 4C, Traffic Signal Needs Studies, Warrant 7 for full warrant guidelines.

The following steps describe how to use the Tableau Crash Analysis Tool to obtain and examine the crash data needed to complete the Crash Experience Warrant section.

#### 1. Query Crash Data

First, the engineer should query crashes for a minimum of 12 months within 250 feet of the study intersection (or determine intersection influence area as appropriate).

An example is provided for the intersection of Ira Hoffman Lane (Rt. 694) and Rocky Knoll/Burgandine Ave in Culpeper, Virginia over a 5-year study period.

**1a.** The warrant includes fatal, injury, or property damage crashes, therefore, on the “Main” tab, select all crash severities, as shown below.

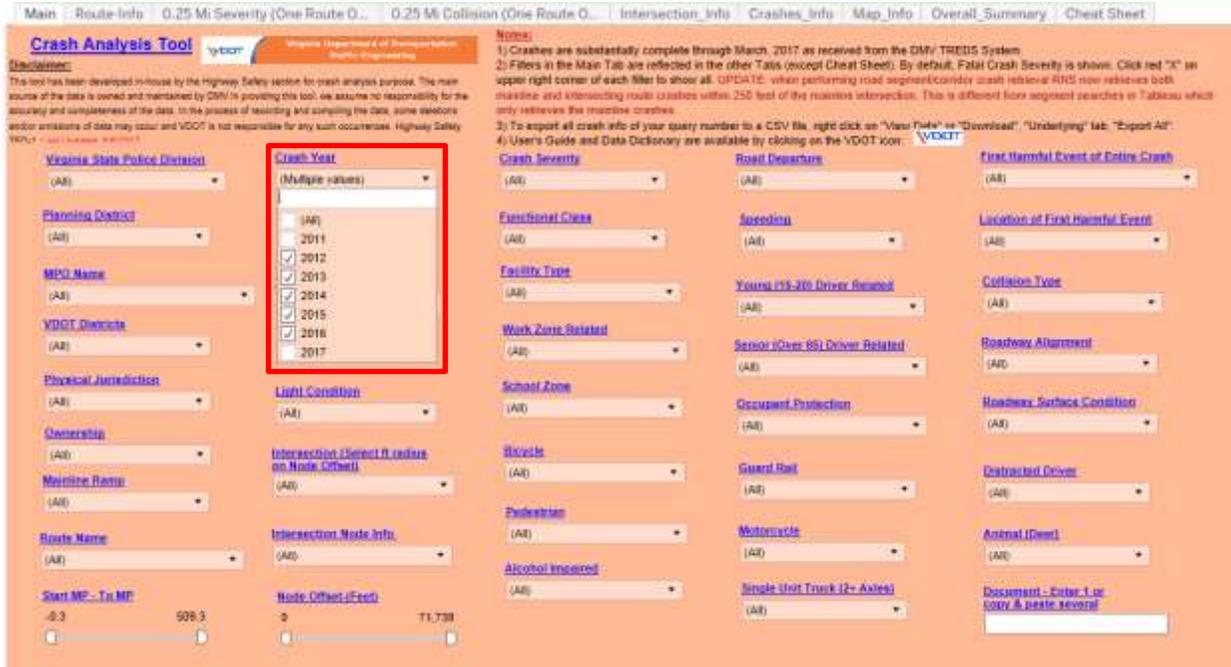
The screenshot shows the Tableau Crash Analysis Tool interface. The top navigation bar includes tabs: Main, Route-Info, 0.25 Mi Severity (One Route O..., 0.25 Mi Collision (One Route O..., Intersection-Info, Crashes-Info, Map-Info, Overall-Summary, and Cheat-Sheet. The 'Main' tab is selected. The interface is divided into several sections for filtering data:

- Crash Analysis Tool** header with a disclaimer and notes.
- Filters:** Virginia State Police Division, Planning District, MPO Name, VDOT Districts, Physical Jurisdiction, Ownership, Maximize Ramp, Route Name, Start MP - To MP, Crash Year, Start Date - End Date, Time Window, Weather Condition, Light Condition, Intersection (Select if roadway or Multi-Offense), Intersection Mode Info, Waze Offset (Feet), Road Repairs, Speeding, Young (15-20) Driver Related, Senior (Over 65) Driver Related, Occupant Protection, Guard Rail, Motorcycle, Single Unit Truck (2+ Axles), First Harmful Event of Entire Crash, Location of First Harmful Event, Collision Type, Roadway Alignment, Roadway Surface Condition, Distracted Driver, Animal (Deer), and Document - Enter 1 for copy & paste search!
- Crash Severity:** A dropdown menu is open, showing the following options: (All), K. Fatal Injury, A. Ambulatory Injury, B. Visible Injury, C. Non-Visible Injury, and PDO Property Damage Only. The 'All' option is selected.

**1b.** Next, select the study crash years. While the warrant requires five correctable crashes to occur within a 12-month period, in order to look at crash trends over time, it is recommended to query 3-5

years of crash data. The five or more crashes can occur within any contiguous 12-month period for the warrant to be met.

This example examines five years of crash data (2012–2016).



1c. Next, select the Intersection Node ID for the study intersection and set node offset to 250 feet or to the determined influence area of the intersection. To identify the Intersection Node ID for the study intersection, see **Section 4.3**.

Other search fields, such as VDOT District, will automatically populate when a node is selected, as seen in the example below.

Though 250 feet is the typical intersection node-offset for a network level screening, after downloading the queried data set, the selected crashes should be reviewed to determine if the crash occurred within the intersection and could be correctable by a traffic signal. For example, check that crashes occurred in the study intersection and not at nearby driveways.

The screenshot displays the 'Crash Analysis Tool' interface with various search filters. The 'Intersection Node Info' field is highlighted with a red box, showing the value '755513\_2300894\_2301285'. The 'Node Offset (Feet)' field is set to 250. Other filters include 'Virginia State Police Division' (2), 'Planning District' (Rappahannock - Rapidan), 'MDG Name' (Null), 'VDOT Districts' (7 Culpeper), 'Physical Jurisdiction' (23 Culpeper), 'Ownership' (All), 'Mainline Status' (MAINLINE), 'Route Name' (All), 'Start MP - To MP' (0.0900 - 0.2348), 'Crash Year' (All), 'Start Date - End Date' (1/7/2012 - 9/23/2016), 'Time Sliding' (All), 'Weather Condition' (All), 'Light Condition' (All), 'Crash Severity' (All), 'Road Detection' (NOT-RT), 'Functional Class' (All), 'Facility Type' (All), 'Work Zone Related' (2. No), 'School Zone' (3. No), 'Bicycle' (Null), 'Parkway' (NOTPED), 'Alcohol Impaired' (All), 'Road Detection' (NOT-RT), 'Severing' (All), 'Young 15-20 Driver Related' (All), 'Senior (Over 65) Driver Related' (All), 'Occupant Protection' (Null), 'Guard Rail' (Null), 'Motorcycle' (All), 'Single Unit Truck (2+ Axles)' (Null), 'First Harmful Event of Entire Crash' (20. Motor Vehicle In Transport), 'Location of First Harmful Event' (1. On Roadway), 'Collision Type' (2. Angle), 'Roadway Alignment' (All), 'Roadway Surface Condition' (All), 'Distracted Driver' (All), 'Animal Impact' (Null), and 'Document - Enter 1 or copy & paste severity'.

1d. To view the results of the query, go to the “Overall\_Summary” tab. The summary tab provides a breakdown of crash statistics by year and severity.

As shown below, 16 crashes occurred at the example intersection from 2012 to 2016.



1e. To download results, click on “Total Crash” and hover the mouse over the column header until an additional menu appears, as shown below. Select the table icon.



Go to the “Full data” tab, and check “Show all columns.” Then select “Download all rows as a text file” to download the crash data as a .csv file that can be opened in Microsoft Excel or other database management programs.

The screenshot shows the 'Full data' tab in the application. The table has columns: ACCESS\_CONTROL, ALCOHOL\_BUTALCOND, AREA\_TYPE, A\_CRASH, A\_PEOPLE, BASETYPEDESC, BEGIN\_NODE\_DSC, BELTED\_UNBELTED, and others. The table contains data for years 2012 through 2019. A red box highlights the 'Download all rows as a text file' option in the dropdown menu.

ACCESS_CONTROL	ALCOHOL_BUTALCOND	AREA_TYPE	A_CRASH	A_PEOPLE	BASETYPEDESC	BEGIN_NODE_DSC	BELTED_UNBELTED
No Access Control	Null	Rural	0	0	Bituminous Concrete (Black Base)	20-01285(0)	Null
No Access Control	Null	Rural	0	0	Bituminous Concrete (Black Base)	20-01285(0)	Null

## 2. Determine if five or more correctable crashes occurred within a 12-month period.

The following analysis should be completed using the data from the .csv file that was queried and downloaded in the previous steps. The analysis can be completed using Microsoft Excel or other database management programs.

The date of each crash can be found in the **CRASH\_DT** attribute of the downloaded data.

The engineer should review crash attributes including collision types (**COLLISION\_TYPE**) and crash descriptions (**CRASH\_DSC**) of the crashes occurring within the selected time period to determine if they could be correctable by a traffic signal. For VDOT users, links to crash diagrams are available in the **DIAGRAM** attribute field. For non-VDOT users, the full FR-300 crash reports can be requested from the Virginia Department of Motor Vehicles (Richmond Office) for additional information.

- Types of crashes correctable by traffic signal include:
  - Right-angle collisions
  - Left-turn collisions
  - Right-angle pedestrian collisions
- Types of crashes not correctable by traffic signal include:
  - Rear-end collisions
  - Sideswipe collisions
  - Head-on collisions.

For the example of Ira Hoffman Lane (Rt. 694) and Rocky Knoll/Burgandine Ave, 14 out of 16 crashes that occurred between 2012 and 2016 could be correctable by a traffic signal (10 right-angle collisions, 3 left-turn collisions, and 1 right-angle pedestrian collision). Of correctable crashes, 6 occurred within a 12-month period between October 2014 and September 2015, meaning that the number of crashes meets the warrant.

The table below shows a sample of the data for correctable crashes at the example intersection. The crashes highlighted in grey occurred within a 12-month period.

Document N	CRASH_DT	COLLISION_TYPE	CRASH_DSC
120135095	1/7/2012	2. Angle	VEHICLE #1, FAILING TO YIELD RIGHT OF WAY
121300187	4/17/2012	2. Angle	V1 WAS STOPPED AT THE STOP SIGN ON BURGANDINE AVE
121670002	5/17/2012	2. Angle	V1 WAS SOUTHBOUND ON IRA HOFFMEN LANE
130155102	12/12/2012	12. Ped	On 12-12-12, Vehicle 1 came to the intersection of Rocky Knoll
130585082	1/30/2013	2. Angle	Vehicle # 2 traveling South on Ira Hoffman Lane
141195240	4/17/2014	2. Angle	Vehicle 1 was stopped at the intersection of Burgandine Ave
143295295	10/30/2014	2. Angle	Vehicle one was travelling South on Ira Hoffman Lane
143365229	11/22/2014	2. Angle	Vehicle 1 was traveling south on Burgandine Ave
150795050	3/19/2015	2. Angle	Vehicle #2 was traveling West on Ira Hoffman
151205104	4/21/2015	2. Angle	Vehicle # 2 traveling south on Ira Hoffman Lane
151975076	7/12/2015	2. Angle	Vehicle 1 was crossing from Burgandine Ave
152785130	9/29/2015	2. Angle	Vehicle 1 was crossing Ira Hoffman from Burgandine Rd
153445231	12/4/2015	2. Angle	Vehicle #2 was traveling east on Ira Hoffman Lane
162705059	9/23/2016	2. Angle	Vehicle 1 was merging from Burgandine onto Ira Hoffman

The engineer should follow the remaining steps in Warrant 7 to determine if the intersection meets all criteria to warrant a traffic signal.

#### 4.4.2 Example: HSIP Intersection Study

VDOT's Highway Safety Improvement Program (HSIP) identifies intersections or highway segments with above average occurrences of injury or total crashes for potential safety improvements. All safety proposals submitted for funding consideration must use the latest Highway Safety Program (HSP) Safety Improvement Proposal Form.

The following steps describe how to use the Tableau Crash Analysis Tool to obtain and examine the crash data needed to complete the Crash History portion of the B-C Analysis on the HSP Safety Improvement Proposal Form for an intersection study.

### 1. Query Crash Data

First, the engineer should query a minimum of three years of crash data within 250 feet of the study intersection node (or determine intersection influence area as appropriate). Start on the "Main" tab.

An example is provided for the intersection of US Route 29 and State Route 626 in Madison, VA over a study period from January 1, 2014 to December 31, 2016.

**1a.** The HSIP application considers fatal, injury, and property damage crashes, therefore, select all crash severities, as shown below.

The screenshot displays the 'Crash Analysis Tool' interface. At the top, a navigation bar includes tabs for 'Main', 'Route-Info', '0.25 Mi Severity (One Route O...', '0.25 Mi Collision (One Route O...', 'Intersection\_Info', 'Crashes\_Info', 'Map\_Info', 'Overall\_Summary', and 'Cheat Sheet'. The 'Main' tab is highlighted with a red box. Below the navigation bar, the 'Crash Analysis Tool' title is shown, followed by a disclaimer. The main area contains various filter categories, each with a dropdown menu set to '(All)'. A red box highlights the 'Crash Severity' filter, which is expanded to show a list of severity options: '(All)', 'K-Fatal Injury', 'A-Ambulatory Injury', 'B-Visible Injury', 'C-Non-Visible Injury', and 'PDO-Property Damage Only'. All these options are checked. Other filter categories include 'Virginia State Police Division', 'Planning District', 'MPO Name', 'VDOE Districts', 'Physical Jurisdiction', 'Ownership', 'Mainline Ramp', 'Route Name', 'Start MP - To MP', 'Crash Year', 'Start Date - End Date', 'Time Mixing', 'Weather Condition', 'Light Condition', 'Intersection (Select it radio in Main Criteria)', 'Intersection Node Info', 'Waste Offset (Feet)', 'Road Disasters', 'Speeding', 'Young (15-20) Driver Related', 'Senior (Over 65) Driver Related', 'Occupant Protection', 'Guard Rail', 'Motorcycle', 'Single Unit Truck (2+ Axles)', 'First Harmful Event of Future Crash', 'Location of First Harmful Event', 'Collision Type', 'Roadway Alignment', 'Roadway Surface Condition', 'Distracted Driver', 'Animal (Deer)', and 'Document - Enter 1 or copy & paste several'.

1b. Next, select the crash study period. HSIP applications typically consider 3 years of crash data.

This example examines crash data from 2014 to 2016.

The screenshot displays the VDOT Crash Analysis Tool interface. At the top, there are navigation tabs: Main, Route-Info, 0.25 Mi Severity (One Route O...), 0.25 Mi Collision (One Route O..., Intersection\_Info, Crashes\_Info, Map\_Info, Overall\_Summary, and Cheat Sheet. The main content area is titled "Crash Analysis Tool" and includes a disclaimer. Below the disclaimer, there are several filter sections:

- Virginia State Police Division:** (All)
- Planning District:** (All)
- MPO Name:** (All)
- VDOT District:** (All)
- Physical Jurisdiction:** (All)
- Ownership:** (All)
- Mechanics/Repair:** (All)
- Route Name:** (All)
- Start MP - To MP:** 0.00 to 500.31

The **Crash Year** filter is highlighted with a red box and shows a list of years from 2011 to 2017. The years 2014, 2015, and 2016 are selected with checkmarks.

Other filters include:

- Crash Severity:** (All)
- Road Departure:** (All)
- First Harmful Event of Entire Crash:** (All)
- Functional Class:** (All)
- Speeding:** (All)
- Location of First Harmful Event:** (All)
- Facility Type:** (All)
- Young (16-20) Driver Related:** (All)
- Collision Type:** (All)
- Work Zone Related:** (All)
- Senior (Over 65) Driver Related:** (All)
- Roadway Alignment:** (All)
- School Zone:** (All)
- Occupant Protection:** (All)
- Roadway Surface Condition:** (All)
- Bicycle:** (All)
- Scout/Patrol:** (All)
- Distraction Driver:** (All)
- Pedestrian:** (All)
- Motorcycle:** (All)
- Animal (Dead):** (All)
- Alcohol Impaired:** (All)
- Single (and) Truck (2+ Axles):** (All)
- Recreant - Enter 1 or copy & paste several:** (All)

- Next, select the Intersection Node ID for the study intersection and set node offset to 250 feet or to the determined influence area of the intersection. To identify the Intersection Node ID for the study intersection, see **Section 4.3**.

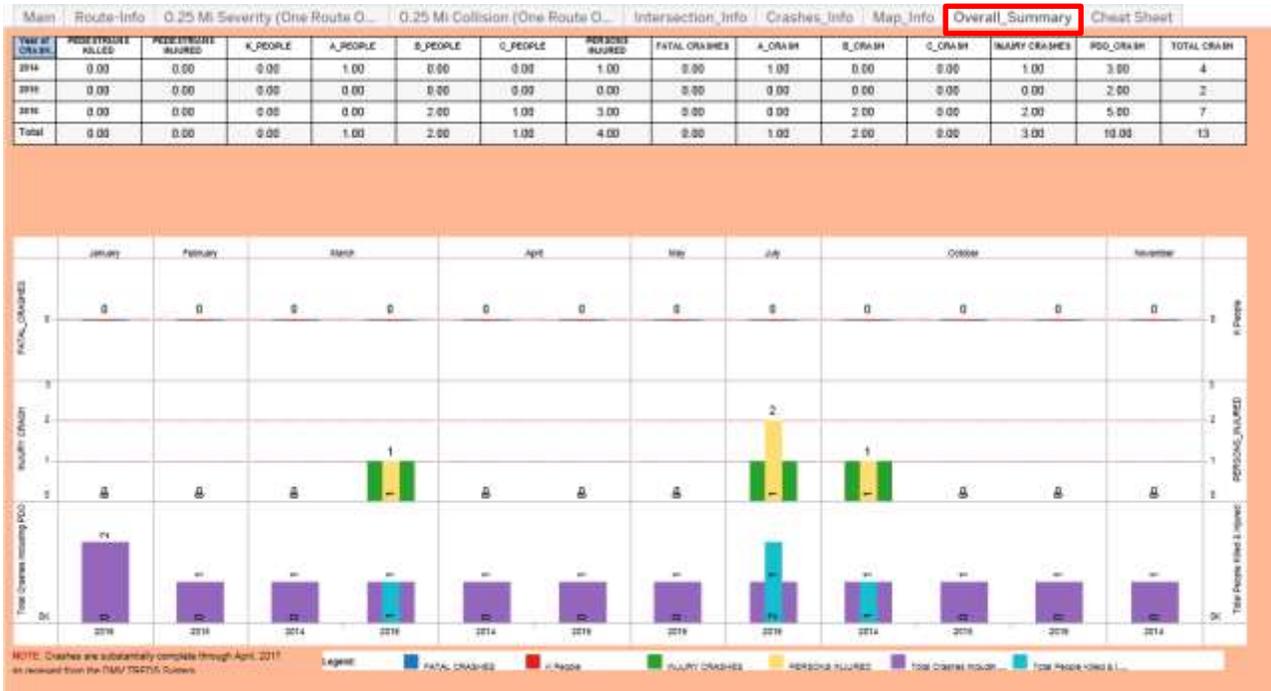
Other search fields, such as VDOT District, will automatically populate when a node is selected, as seen in the example below.

Though 250 feet is the typical intersection node-offset for a network level screening, after downloading the queried data set, the selected crashes should be reviewed to determine if the crash occurred within the study intersection influence area. For example, check that crashes occurred in the study intersection and not at nearby driveways.

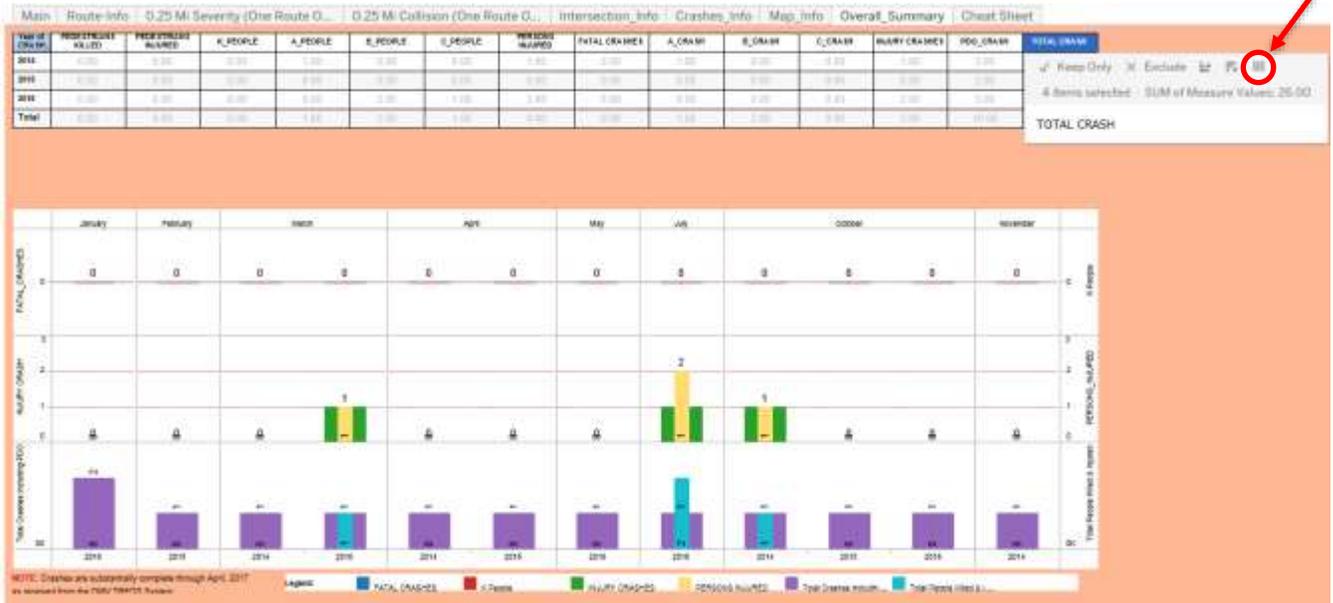
The screenshot displays the 'Crash Analysis Tool' interface with various search filters. The 'Intersection' field is highlighted with a red box, showing the value '443084 5600826 BR00230...'. The 'Node Offset (Feet)' slider is set to 250. Other filters include Virginia State Police Division (2), Planning District (Rappahannock - Rapidan), MPO Name (Null), VDOT District (7 Culpeper), Physical Jurisdiction (All), Ownership (VDOT\_PRG), Mainline Name (MAINLINE), Route Name (All), Start ME - To ME (3.08 to 508.31), Crash Year (35/2014 to 10/21/2016), Time Sliding (All), Weather Condition (All), Light Condition (All), Intersection (Select from table on Route Detail), Intersection Name (443084 5600826 BR00230...), Node Offset (Feet) (0 to 250), Crash Severity (All), Functional Class (All), Facility Type (All), Work Zone Related (2 No), School Zone (3 No), Bicycle (Null), Pedestrian (NOTPED), Alcohol Impaired (Null), Road Direction (NOT-RD), Speeding (All), Young (15-20) Driver Related (Null), Senior (Over 65) Driver Related (All), Occupant Protection (All), Guard Rail (Null), Motorcycle (Null), Single Unit Truck (2+ Axles) (Null), First Harmful Event of Entire Crash (All), Location of First Harmful Event (All), Collision Type (All), Roadway Attachment (All), Roadway Surface Condition (All), Distracted Driver (All), Animal (Deer) (Null), and Document - Enter 1 at GDS & enter several.

1d. To view the results of the query, go to the “Overall\_Summary” tab. The summary tab provides a breakdown of crash statistics by year and severity.

As shown below, 13 crashes occurred at the example intersection from 2014 to 2016.



1e. To download results, click on “Total Crash” and hover the mouse over the column header until an additional menu appears, as shown below. Select the table icon.



Go to the “Full data” tab, and check “Show all columns.” Then select “Download all rows as a text file” to download the crash data as a .csv file that can be opened in Microsoft Excel or other database management programs.

The screenshot shows a 'Full data' tab with a table of crash records. A red box highlights the 'Download all rows as a text file' and 'Show all columns' options. The table has columns for various crash metrics.

ACCESS_CONTROL	ALCOHOL_TOTALCONTR	AREA_TYPE	A_CRASH	A_PEOPLE	BASETYPEDESC	BEGIN_NODE_DESC	BELTED_UNBELTS
No Access Control	Null	Rural	0	0	Bituminous Concrete (Black Base)	20-01285(0)	Null
No Access Control	Null	Rural	0	0	Bituminous Concrete (Black Base)	20-01285(0)	Null

## 2. Crash History

The following analysis should be completed using the data from the .csv file that was queried and downloaded in the previous steps. The analysis can be completed using Microsoft Excel or other database management programs.

Once the crash data has been downloaded from the Tableau Tool, the HSIP application requires the engineer to break down the crash history into the following categories:

### ■ **Crash Type and Severity**

Determine the number of total crashes and a breakdown of crashes by severity broken down by the KABCO Scale, as shown.

- K (Fatal)
- A (Incapacitating Injury)
- B+C (Minor Injury)
- O (Property Damage Only)

In this example, there were 13 total crashes with 1 crashes resulting in A injury, 2 crashes resulting in B or C injuries, and 10 crashes resulting in property damage only. There were no fatalities at the intersection over the three years.

### ■ **Primary Crash Categories**

Identify the total number of crashes that occurred in each primary crash category at the study intersection, then breakdown the number that occurred in each category by severity. The number of crashes in all the primary crash categories should sum up to the total number of crashes.

While the instructions below provide an overview of how to identify crashes in each category, the engineer should first review the overall crash patterns and consider what safety issues they are attempting to address and what countermeasures may be appropriate. Some of the primary crash categories are not mutually exclusive. For example, a vehicle crossing the median could also run off the road, hit a fixed object, hit another vehicle head on, sideswipe a vehicle traveling in the opposite direction, or hit a bicyclist or pedestrian. The engineer should consider what pattern or harmful event they are trying to correct and place the crash counts in the appropriate category.

Additionally, the engineer should review all crash descriptions (**CRASH\_DSC**) to determine if the description provided by the reporting officer is consistent with the coded attributes, and that the crashes are in the most appropriate category.

- **Roadway Departure or Intersection**

- ***Cross median.***

This type of crash may be of a variety of collision types. Crashes in which one of the crash events is **35. Cross Median** or **36. Cross Centerline** are cross median crashes. The crash description (**CRASH\_DSC**) should be also used to determine if the crash is a cross median crash.

- ***Fixed object.***

Fixed object crashes occur when a vehicle collides with a fixed object such as a tree or a light post. Crashes in which the collision type (**COLLISION\_TYPE**) is **6. Fixed Object in Road** or **9. Fixed Object – Off Road** are fixed object crashes. Fixed object crashes could also be run off road or cross median crashes.

- ***Run off road***

Run off road crashes occur when a moving vehicle leaves the roadway. Crashes in which the road departure type (**RD\_TYPE**) is **RD-RIGHT, RD-LEFT, or RD-UNKNOWN** are run off road crashes. Run off road crashes could also be cross median, fixed object, or non-collision crashes.

- ***Head on.***

Head on crashes occur when the front-end of one vehicle collides with the front-end of another vehicle. Crashes in which the collision type (**COLLISION\_TYPE**) is **3. Head on** are head on crashes.

- ***Non-Collision.***

Non-collision crashes can include overturn/rollover, fire/explosion, immersion, jackknife, cargo/equipment loss or shift, equipment failure, separation of units, ran off road, cross median, cross centerline, downhill runaway, fell/jumped from motor vehicle, thrown or falling objects. Crashes in which the collision type (**COLLISION\_TYPE**) is **8. Non-Collision** are non-collision crashes.

- ***Sideswipe.***

Sideswipe crashes occur when the side of a vehicle collides with the side of another vehicle. Crashes in which the collision type (**COLLISION\_TYPE**) is **4. Sideswipe – Same Direction** or **5. Sideswipe – Opposite Direction** are sideswipe crashes. Sideswipe crashes could also be cross median crashes.

- ***Angle.***

Angle crashes occur when vehicles collide while traveling on crossing paths and the front-end of one vehicle collides with the side of another vehicle. Crashes in which the collision type (**COLLISION\_TYPE**) is **2. Angle** are angle crashes. Angle crashes could also be left turn or right turn crashes.

- **Left turn.**  
Left turn crashes involve a vehicle making a left turn. Crashes in which the vehicle maneuver (**VEHICLE\_MANEUVER\_TYPE\_CODE**) is **3. Making Left Turn** are left turn crashes. Left turn crashes are usually angle crashes. The crash description of angle crashes should be reviewed to determine if they are also left turn crashes.
  - **Right turn.**  
Right turn crashes involve a vehicle making a left turn. Crashes in which the vehicle maneuver (**VEHICLE\_MANEUVER\_TYPE\_CODE**) is **2. Making Right Turn** are right turn crashes. Right turn crashes are usually angle crashes. The crash description of angle crashes should be reviewed to determine if they are also right turn crashes.
  - **Rear end.**  
Rear end crashes occur when the front-end of one vehicle collides with the rear end of another vehicle. Crashes in which the collision type (**COLLISION\_TYPE**) is **1. Rear end** are rear end crashes.
- **Non-Motorized**
    - **Pedestrian.**  
Pedestrian crashes include any crash in which a pedestrian was injured or killed by a vehicle. For pedestrian crashes, the **PED\_NONPED** attribute is **PED**.
    - **Bicycle.**  
Bicycle crashes include any crash involving a bicycle. For bicycle crashes, the **BIKE\_NONBIKE** attribute is **BIKE**. Crashes involving bicycles are coded with bicycle as a vehicle type, rather than bicycle as a collision type. Therefore, crashes involving bicycles could fit into several other categories.

- **Secondary Crash Categories**

The HSIP application requires a supplementary set of crash statistics to be provided. Identify the total number of crashes that occurred in each secondary crash category at the study intersection, then breakdown the number that occurred in each category by severity.

- **Environmental Factors**

- ***Nighttime.***

- Crashes in which the light condition (**LIGHT\_CONDITION**) is **4. Darkness – Road Lighted**, **5. Darkness – Road Not Lighted**, or **6. Darkness – Unknown Road Lighting** are considered to be nighttime crashes.

- ***Wet Weather***

- Crashes in which the weather condition (**WEATHER\_CONDITION**) is **3. Fog**, **4. Mist**, **5. Rain**, **6. Snow**, or **7. Sleet/Hail** are considered to be wet weather crashes.

- **Number of Vehicles**

- ***Single vehicle.***

- Single vehicle crashes involve only one vehicle. For single vehicle crashes, the **SINGLE\_MULTI** attribute is **SINGLE\_VEHICLE**.

- ***Multiple vehicle.***

- Multiple vehicle crashes involve more than one vehicle. For multiple vehicle crashes, the **SINGLE\_MULTI** attribute is blank.

- **Driver Behavior**

- ***Speed related.***

- Crashes in which the **SPEED\_NOTSPEED** attribute is **SPEED** are considered to be speed related crashes.

- ***Unbelted.***

- Crashes in which the **BELTED\_UNBELTED** attribute is **UNBELTED** are considered to be unbelted crashes.

- ***Alcohol related.***

- Crashes in which the **ALCOHOL\_NOTALCOHOL** attribute is **ALCOHOL** are considered to be alcohol related crashes.

The completed crash history portion of the HSP Safety Improvement Proposal Form for the example intersection is shown below.

STEP 1 : CRASH HISTORY (Define crashes by type and severity)

APPLICABLE CRASH TYPE AND SEVERITY

Crash Type Categories	All	Crash Severity					Automated Check	
		All (A)	Minor Injury (B-C)	Major Injury (D)	Property Damage Only (E)	Not specified		
<b>Total Crashes</b>	13	0	1	2	10		Yes	
<b>Primary Crash Categories</b> (sum of all 3 must equal total crashes)								
Roadway Departure or Intersection	Cross median	0	0	0	0	0	0	Yes
	Fixed object	0	0	0	0	0	0	Yes
	Run off road	1	0	0	0	1	0	Yes
	Head on	0	0	0	0	0	0	Yes
	Non-Collision	0	0	0	0	0	0	Yes
	Sideswipe	0	0	0	0	0	0	Yes
	Angle	4	0	1	0	3	0	Yes
	Left turn	0	0	0	0	0	0	Yes
	Right turn	2	0	0	1	1	0	Yes
Rear end	6	0	0	1	5	0	Yes	
Non-Motorized	Pedestrian	0	0	0	0	0	0	Yes
	Bicyclist	0	0	0	0	0	0	Yes
<b>Secondary Crash Categories</b>								
Environmental Factors	Nighttime	3	0	0	1	2	0	Yes
	Wet weather	4	0	0	0	4	0	Yes
Number of Vehicles	Single vehicle	0	0	0	0	0	0	Yes
	Multiple vehicle	13	0	1	2	10	0	Yes
Driver Behavior	Speed related	4	0	0	1	3	0	Yes
	Unbelted	1	0	0	0	1	0	Yes
	Alcohol related	0	0	0	0	0	0	Yes
<b>Automated Check</b> (i.e., does total crashes match the sum of RD, INT, and NM crash types?)								
		Yes	Yes	Yes	Yes	Yes	Yes	
		Number of years in crash history: 5		Discount Rate: 2%				

The engineer should then complete the remainder of the B-C Analysis form using the "Read-Me" file provided by VDOT with the application to determine the B-C Ratio for proposed countermeasures.

## 4.5 CORRIDOR CRASH ANALYSIS EXAMPLES

### 4.5.1 Example: Speed Study

Speed studies are generally conducted due to concerns from the public or traffic engineering professionals regarding roadway speeds and are used to determine if conditions warrant raising or lowering the posted speed limit on a corridor or making other safety improvements. The facility's crash experience is examined along with speed samples, road characteristics, road development and environment, parking practices, and pedestrian activity.

The following steps describe how to use the Tableau Crash Analysis Tool to obtain and examine the crash data needed to complete the crash experience section of a speed study.

#### 1. Query Crash Data

First, the engineer should query a minimum of 3 years of crash data from the start milepost to the end milepost of the study corridor. To begin, start on the "Main" tab.

An example is provided for Route 231 from milepost 0 to 10 in the Culpeper District.

1a. Speed studies include fatal, injury, and property damage crashes, therefore, select all crash severities, as shown below.

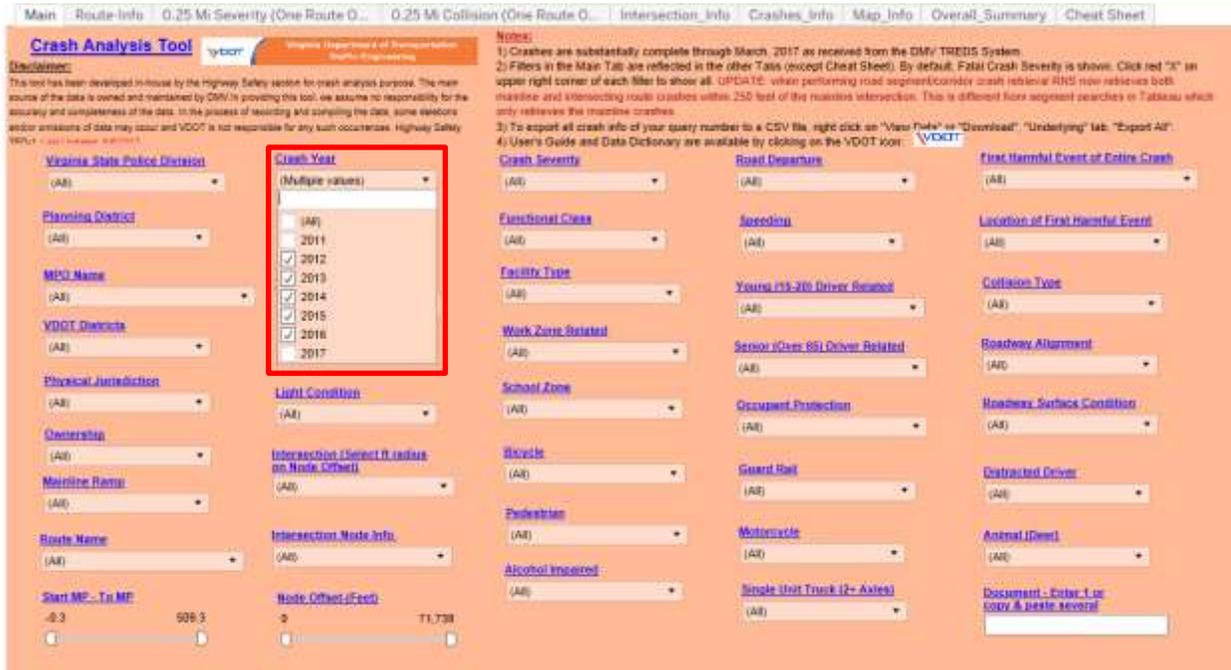
The screenshot displays the Tableau Crash Analysis Tool interface. The 'Main' tab is selected, and the 'Crash Severity' dropdown menu is open, showing the following options:

- (All)
- K. Fatal Injury
- A. Ambulatory Injury
- B. Visible Injury
- C. Non-Visible Injury
- PDO Properly Damage Only

The interface also includes various filters and controls for querying crash data, such as 'Virginia State Police Division', 'Crash Year', 'Start Date - End Date', 'MPO Name', 'Time Interval', 'Weather Condition', 'Physical Jurisdiction', 'Light Condition', 'Ownership', 'Intersection (Select if radius or Mask Offsets)', 'Maximize Ramp', 'Route Name', 'Start MP - To MP', 'Intersection Mode Info', 'Waste Offset (Feet)', 'Crash Severity', 'Road Repairs', 'Speeding', 'Young (15-20) Driver Related', 'Senior (Over 65) Driver Related', 'Occupant Protection', 'Guard Rail', 'Motorcycle', 'Single Unit Truck (2+ Axles)', 'First Harmful Event of Entire Crash', 'Location of First Harmful Event', 'Collision Type', 'Roadway Alignment', 'Roadway Surface Condition', 'Distracted Driver', 'Animal (Deer)', and 'Displacement - Enter 1 for copy & paste result'.

1b. Next, select the study crash years. Speed studies typically consider three to five years of crash data.

This example examines five years of crash data (2012–2016).



- Next, select the Route Name for the route being reviewed. Include both directions of travel for the corridor when applicable. Once the route and direction of travel have been selected, select the start and end milepost.

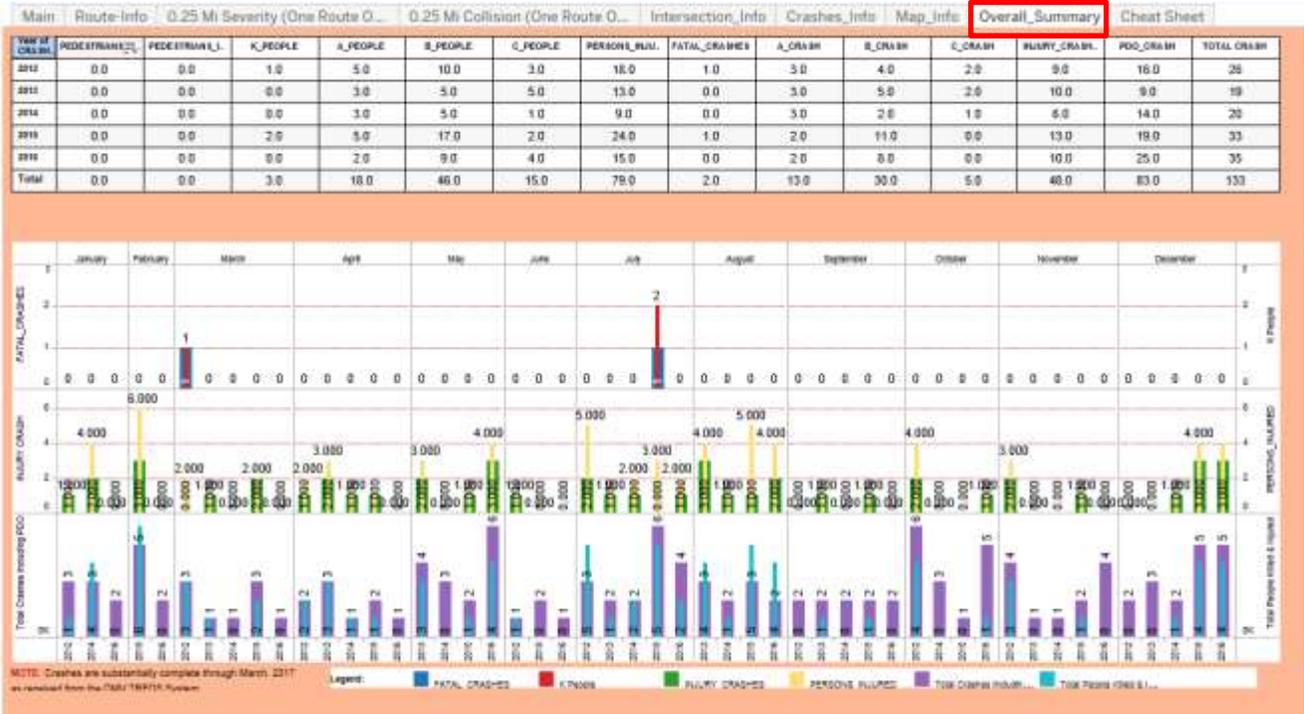
Other search fields, such as VDOT District, will automatically populate when a route and mileposts are selected, as shown in the example below.

Again, for this example, we are conducting a speed study for both directions of travel on Route 231, therefore both northbound and southbound Route 231 were selected. The start and end mileposts were then selected from milepost 0 to milepost 10.



1d. To view the results of the query, go to the “Overall\_Summary” tab. The summary tab provides a breakdown of crash statistics by year and severity.

As shown below, this section of Route 231 experienced 133 crashes in both directions from 2012 to 2016.



The crash severity and collision types are broken down by quarter of a mile on the “0.25 Mi Crash Severity” and the “0.25 Mi Collision Type” tabs, respectively.

1e. To download the results, click on “Total Crash” and hover the mouse over the column header until an additional menu appears, as shown below. Select the table icon.



Go to the “Full data” tab, and check “Show all columns.” Then select “Download all rows as a text file” to download the crash data as a .csv file that can be opened in Microsoft Excel or other database management programs.



## 2. Crash Summary

The following analysis should be completed using the data from the .csv file that was queried and downloaded in the previous steps. The analysis can be completed using Microsoft Excel or other database management programs.

Once the crash data has been obtained, the speed study requires the engineer to provide a crash summary including total crashes, crash rates, collision type percentages, and fatal crash details.

### ■ Total Crashes

The number of total, injury, and fatal crashes are provided in the Overall\_Summary tab in Tableau.

In this example, there were 133 total crashes including 83 injuries and 2 fatalities on the study corridor over the 5-year study period.

### ■ Speed Related Crashes

The engineer may also want to identify crashes along the study corridor that involved speeding. Crashes in which the **SPEED\_NOTSPEED** attribute is **SPEED** are considered to be speed related crashes.

In this example, there were eight speed related crashes including three injury crashes.

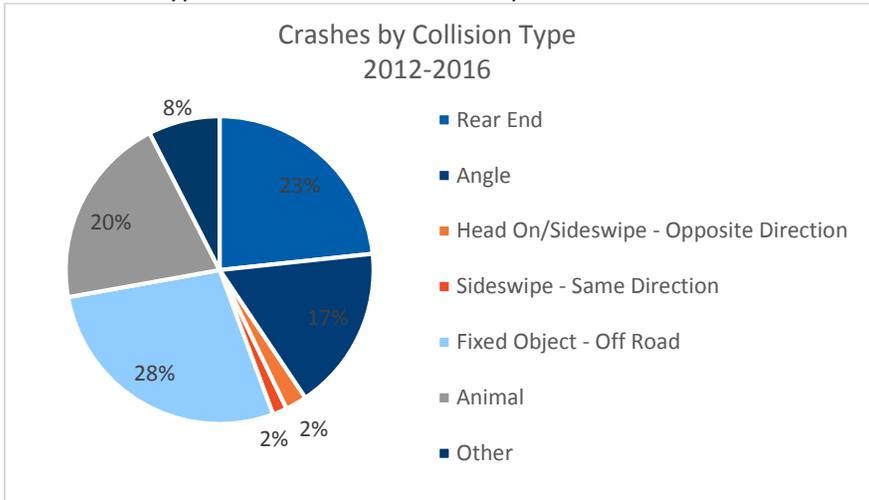
### ■ Crash Rates

Speed studies require the engineer to report the overall crash rate, injury crash rate, and fatality crash rate for the study corridor and compare them to state averages for similar facilities. The crash rates for individual facilities, as well as statewide crash rates for comparison are available in the VDOT Crash Summary Books. Contact the State Traffic Engineer to obtain the VDOT Crash Summary Books. The engineer may also want to report the crash rate for speed related crashes.

■ **Collision Type**

Using the **COLLISION\_TYPE** field of the downloaded table, determine the percentage of total crashes by collision type.

The collision type breakdown for the example corridor is shown below.



### 3. Fatal Crash Details

Give full descriptions of each fatal crash along the segment of the facility, making note of relevant crash data attributes, for example:

- Date (**CRASH\_DT**)
- Time of Day (**CRASH\_MILITARY\_TM**)
- Day of Week (**DAY\_OF\_WEEK**)
- Collision Type (**COLLISION\_TYPE**)
- Roadway Departure (**RD\_TYPE**)
- Crash Description (**CRASH\_DSC**)
- Weather Conditions (**WEATHER\_CONDITION**)
- Direction of Travel (**DIRECTION\_OF\_TRAVEL\_CD**)
- Roadway Alignment (**ROADWAY\_ALIGNMENT**)
- Roadway Surface Condition (**ROADWAY\_SURFACE\_COND**)
- Speeding (**SPEED\_NOTSPEED**)
- Alcohol Impaired (**DRIVER\_DRINKING\_TYPE\_CD, PED\_DRINK**)
- Work Zone Related (**WORK\_ZONE\_RELATED**)
- Milepost (**RNS\_MP**)

Two fatal crashes occurred on the example corridor over the study period. The details of these crashes are provided below.

- A fatal crash occurred midday (12:07 p.m.) on March 2, 2012 when a northbound vehicle ran off the roadway to the right, overcorrected and ran off the roadway to left, and overturned on an embankment. There were two passengers in the car, and the crash resulted in one fatality and two minor/possible injuries. The crash occurred on a curve near milepost 2.06, with the driver reported to be distracted and not looking at the road. The roadway was dry and there were no adverse weather conditions at the time of the crash. The driver had not been drinking, and the vehicle was not speeding at the time of the crash.
- A fatal crash occurred at 6:41 a.m. on July 20, 2015 when a northbound vehicle crossed into the southbound lane and hit a second vehicle head on. The crash resulted in two fatalities and three severe injuries. The crash occurred on a straight segment of roadway approximately 150 feet south of the intersection with Lovers Lane near milepost 7.38. The roadway was dry, and there were no adverse weather conditions at the time of the crash. Neither driver had been drinking, and neither vehicle was speeding at the time of the crash.

#### 4. Discussion of Crash Experience and Relevant Information

The engineer should highlight the important aspects of the crash summary provided in the above sections. This may also include identifying other crash patterns of where, when, or how crashes occurred based on the available crash data attributes.

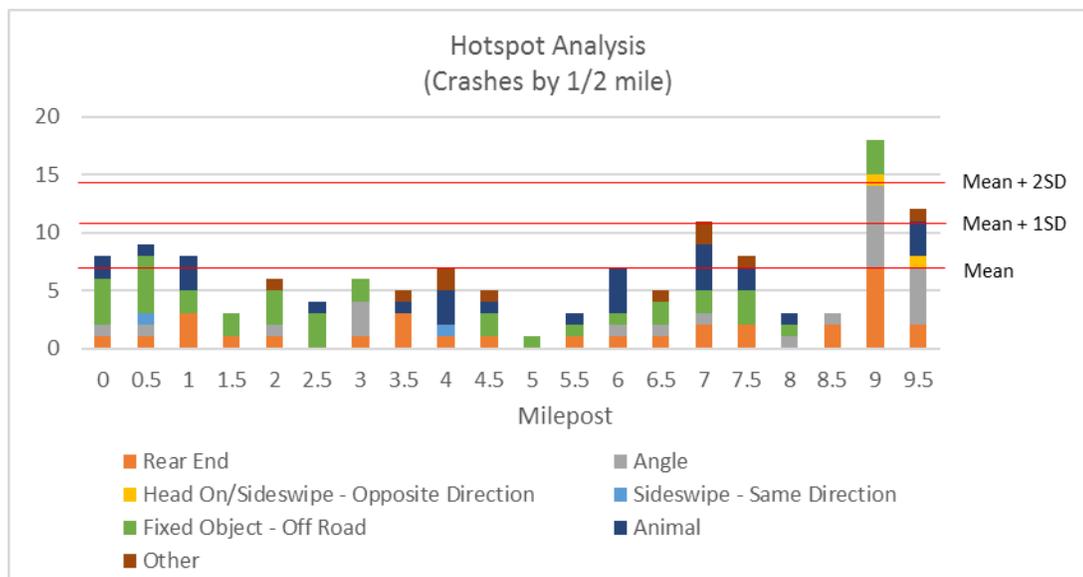
#### 5. Optional Analyses

Depending on the characteristics of the corridor and the impetus of the study, the engineer may choose to further examine or breakdown crash characteristics. For example:

- **Hotspot Analysis**

The roadway can be broken into shorter half-mile or tenth of a mile segments and analyzed to identify hotspots and localized patterns. The **RNS\_MP** attribute provides the exact milepost (MP) at which each crash occurred.

The graph below shows a histogram of crashes on the example corridor broken up by half-mile segments and collision type. For this example, the occurrence of crashes at MP 9 was more than twice the standard deviation above the mean. This indicates that it is a hotspot, and that crashes on that half-mile segment should be analyzed further.



■ **Roadway Departure Analysis**

For certain roadways, it may provide insight summarize roadway departure crashes. Roadway departures can be broken down by direction of travel and direction of departure from the road. The **RD\_TYPE** attribute indicates if a crash was a roadway departure crash and in what direction the departure occurred. The last two characters of the **RTE\_NM** attribute indicate the direction of travel in which the crashes occurred.

The table below shows the breakdown of roadway departure crashes on the example study corridor.

Type of RD Crash	Number			Percentage		
	NB	SB	Total	NB	SB	Total
Not RD	66	29	95	73%	67%	71%
To the left	3	3	6	3%	7%	5%
To the right	13	8	21	14%	19%	16%
Unknown	8	3	11	9%	7%	8%
<b>Total</b>	<b>90</b>	<b>43</b>	<b>133</b>			

### 4.5.2 Example: HSIP Corridor Study

VDOT’s Highway Safety Improvement Program (HSIP) identifies intersections or highway segments with above average occurrences of injury or total crashes for potential safety improvements. All safety proposals submitted for funding consideration must use the latest Highway Safety Program (HSP) Safety Improvement Proposal Form.

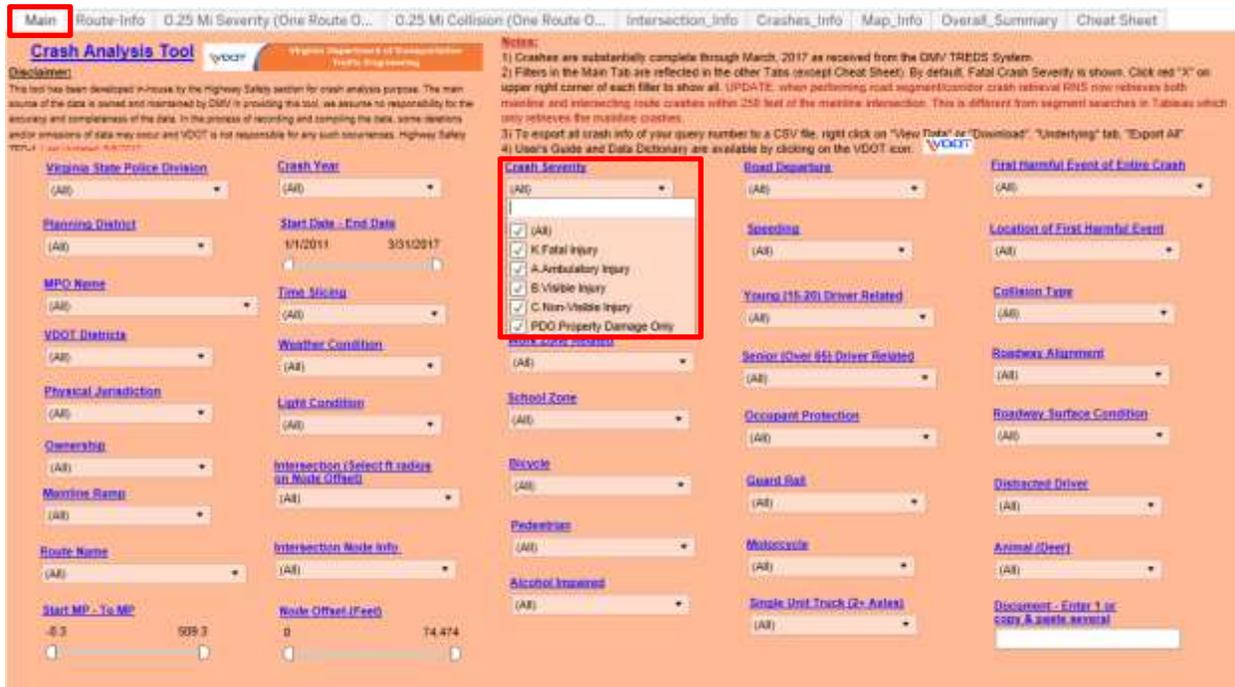
The following steps describe how to use the Tableau Crash Analysis Tool to obtain and examine the crash data needed to complete the Crash History portion of the B-C Analysis on the HSP Safety Improvement Proposal Form for a corridor study.

## 1. Query Crash Data

First, the engineer should query a minimum of three years of crash data from the start to the end milepost of the study corridor. Start on the “Main” tab.

An example is provided for Route 22 from milepost 0 to 10 in the Culpeper District over a study period from January 1, 2014 to December 31, 2016.

1a. The HSIP application considers fatal, injury, and property damage crashes; therefore, select all crash severities, as shown below.



1b. Next, select the crash study period. HSIP applications typically consider three years of crash data.

This example examines crash data from 2014 to 2016.

The screenshot shows the VDOT Crash Analysis Tool interface. The 'Crash Year' dropdown menu is open, showing a list of years from 2011 to 2017. The years 2014, 2015, and 2016 are selected with checkmarks. The interface includes various filters for crash severity, road departure, functional class, facility type, work zone related, school zone, bicycle, pedestrian, alcohol impaired, crash severity, road departure, first harmful event of entire crash, location of first harmful event, collision type, roadway alignment, roadway surface condition, distracted driver, animal (deer), and equipment - Enter 1 or more & use several. There are also sliders for Start MP - To MP and Node Offset (Feet).

- Next, select the Route Name for the route being reviewed. Include both directions of travel for the corridor when applicable. Once the route and direction of travel have been selected, select the start and end milepost.

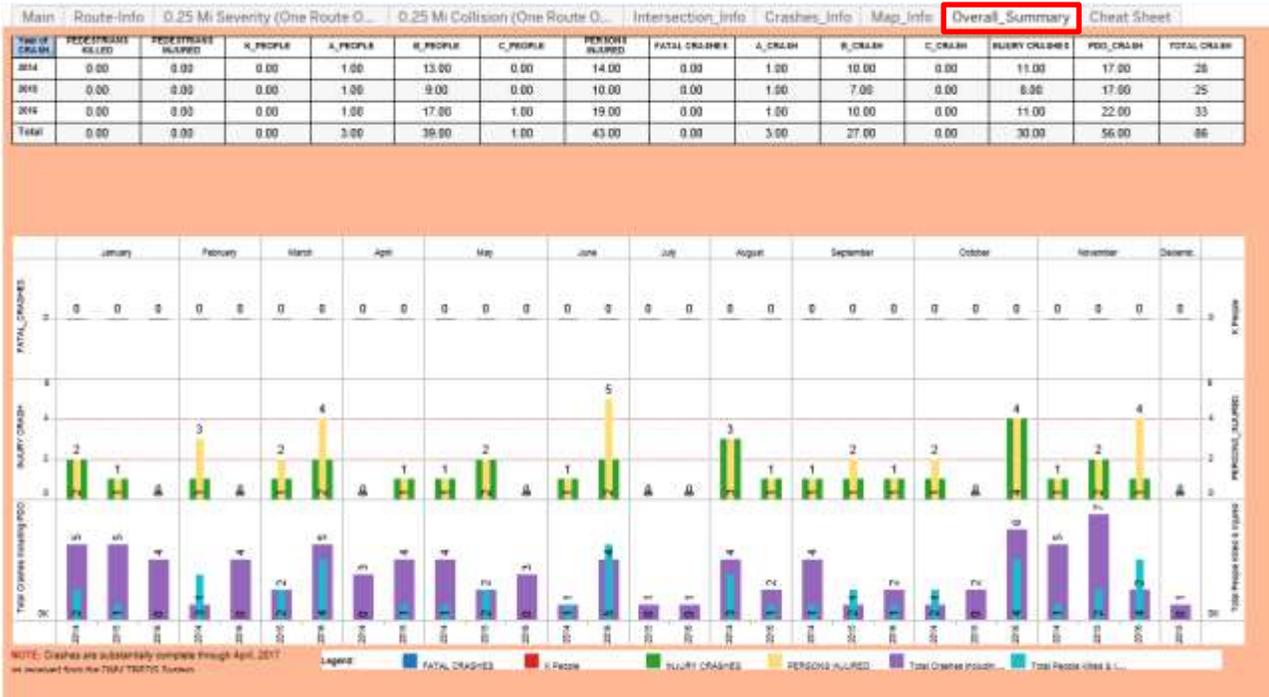
Other search fields, such as VDOT District, will automatically populate when a route and mileposts are selected, as shown in the example below.

Again, for this example, we are conducting an HSIP corridor study for both directions of travel on Route 22, therefore both eastbound and westbound Route 22 were selected. The start and end mileposts were then selected from milepost 0 to milepost 10.

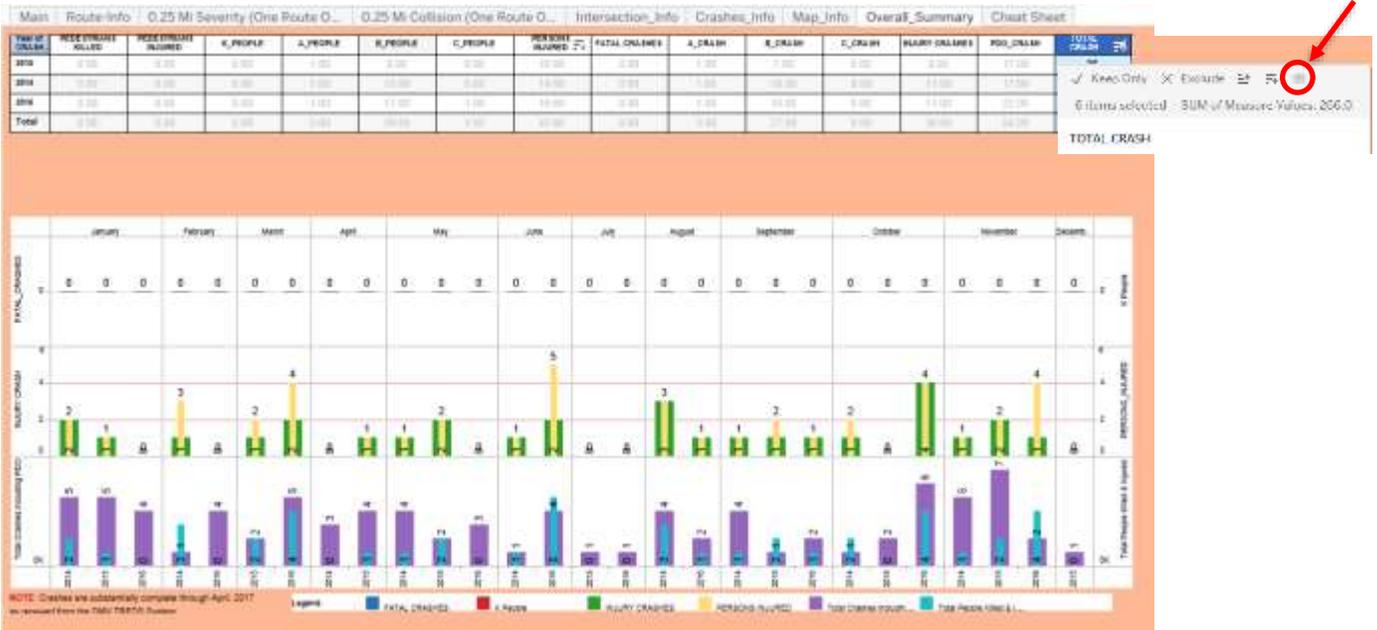
The screenshot displays the VDOT Crash Data Tools interface. On the left, a list of routes is shown, with 'R-VA SR09022EB' and 'R-VA SR09022WB' selected and highlighted with a red box. Below the route list, the 'Start MP - To MP' filter is set to '0 00' to '10 00', also highlighted with a red box. The main panel on the right contains various search filters such as 'Crash Severity', 'Road Departure', 'Functional Class', 'Facility Type', 'Work Zone Related', 'School Zone', 'Bicycle', 'Protection', 'Alcohol Impaired', 'Crash Severity', 'Road Departure', 'First Harmful Event of Entire Crash', 'Location of First Harmful Event', 'Custodian Type', 'Roadway Alignment', 'Roadway Surface Condition', 'Distracted Driver', 'Animal (Dead)', and 'Document - Enter 1 or 2 for R-VA STATE #000000'. The interface is designed for filtering and analyzing crash data based on these criteria.

1d. To view the results of the query, go to the “Overall\_Summary” tab. The summary tab provides a breakdown of crash statistics by year and severity.

As shown below, this section of Route 22 experienced 86 crashes in both directions from 2014-2016.



1e. To download results, click on “Total Crash” and hover the mouse over the column header until an additional menu appears, as shown below. Select the table icon.



Go to the “Full data” tab, and check “Show all columns.” Then select “Download all rows as a text file” to download the crash data as a .csv file that can be opened in Microsoft Excel or other database management programs.



## 2. Crash History

The following analysis should be completed using the data from the .csv file that was queried and downloaded in the previous steps. The analysis can be completed using Microsoft Excel or other database management programs.

Once the crash data has been downloaded from the Tableau Tool, the HSIP application requires the engineer to break down the crash history into the following categories:

### ■ Crash Type and Severity

Determine the number of total crashes and a breakdown of crashes by severity broken down by the KABCO Scale, as shown.

- K (Fatal)
- A (Incapacitating Injury)
- B+C (Minor Injury)
- O (Property Damage Only)

In this example, there were 86 total crashes with three crashes resulting in A injuries, 27 crashes resulting in B or C injuries, and 56 crashes resulting in property damage only. There were no fatalities on the study corridor over the three years.

### ■ Primary Crash Categories

Identify the total number of crashes that occurred in each primary crash category on the study corridor, then breakdown the number that occurred in each category by severity. The number of crashes in all the primary crash categories should sum up to the total number of crashes.

While the instructions below provide an overview of how to identify crashes in each category, the engineer should first review the overall crash patterns and consider what safety issues they are attempting to address and what countermeasures may be appropriate. Some of the primary crash categories are not mutually exclusive. For example, a vehicle crossing the median could also run off the road, hit a fixed object, hit another vehicle head on, sideswipe a vehicle traveling in the opposite direction, or hit a bicyclist or pedestrian. The engineer should consider what pattern or harmful event they are trying to correct, and place the crash counts in the appropriate category.

Additionally, the engineer should review all crash descriptions (**CRASH\_DSC**) to determine if the description provided by the reporting officer is consistent with the coded attributes, and that the crashes are in the most appropriate category.

- **Roadway Departure or Intersection**

- ***Cross median.***

This type of crash may be of a variety of collision types. Crashes in which one of the crash events is **35. Cross Median** or **36. Cross Centerline** are cross median crashes. The crash description (**CRASH\_DSC**) should be also used to determine if the crash is a cross median crash.

- ***Fixed object.***

Fixed object crashes occur when a vehicle collides with a fixed object such as a tree or a light post. Crashes in which the collision type (**COLLISION\_TYPE**) is **6. Fixed Object in Road** or **9. Fixed Object – Off Road** are fixed object crashes. Fixed object crashes could also be run off road or cross median crashes.

- ***Run off road***

Run off road crashes occur when a moving vehicle leaves the roadway. Crashes in which the road departure type (**RD\_TYPE**) is **RD-RIGHT, RD-LEFT, or RD-UNKNOWN** are run off road crashes. Run off road crashes could also be cross median, fixed object, or non-collision crashes.

- ***Head on.***

Head on crashes occur when the front-end of one vehicle collides with the front-end of another vehicle. Crashes in which the collision type (**COLLISION\_TYPE**) is **3. Head on** are head on crashes.

- ***Non-Collision.***

Non-collision crashes can include overturn/rollover, fire/explosion, immersion, jackknife, cargo/equipment loss or shift, equipment failure, separation of units, ran off road, cross median, cross centerline, downhill runaway, fell/jumped from motor vehicle, thrown or falling objects. Crashes in which the collision type (**COLLISION\_TYPE**) is **8. Non-Collision** are non-collision crashes.

- ***Sideswipe.***

Sideswipe crashes occur when the side of a vehicle collides with the side of another vehicle. Crashes in which the collision type (**COLLISION\_TYPE**) is **4. Sideswipe – Same Direction** or **5. Sideswipe – Opposite Direction** are sideswipe crashes. Sideswipe crashes could also be cross median crashes.

- ***Angle.***

Angle crashes occur when vehicles collide while traveling on crossing paths and the front-end of one vehicle collides with the side of another vehicle. Crashes in which the collision type (**COLLISION\_TYPE**) is **2. Angle** are angle crashes. Angle crashes could also be left turn or right turn crashes.





The completed crash history portion of the HSP Safety Improvement Proposal Form for the example corridor is shown below.

STEP 1 - CRASH HISTORY (Define crashes by type and severity)								
APPLICABLE CRASH TYPE AND SEVERITY								
Crash Type Categories	All	Crash Severity					Automated Check	
		All	Fatal (K)	Incapacitating Injury (A)	Minor Injury (B+C)	Property Damage (D)		Not specified
<b>Total Crashes</b>	All	86	0	3	27	56	Yes	
<b>Primary Crash Categories</b> (sum of all 3 must equal total crashes)								
Roadway Departure or Intersection	Cross median	1	0	0	0	1	0	Yes
	Fixed object	8	0	0	1	7	0	Yes
	Run off road	49	0	1	20	28	0	Yes
	Head on	0	0	0	0	0	0	Yes
	Non-Collision	2	0	1	0	1	0	Yes
	Sideswipe	4	0	0	1	3	0	Yes
	Angle	4	0	0	1	3	0	Yes
	Left turn	2	0	0	0	2	0	Yes
	Right turn	1	0	0	0	1	0	Yes
Non-Motorized	Rear end	15	0	1	4	10	0	Yes
	Pedestrian	0	0	0	0	0	0	Yes
	Bicycle	0	0	0	0	0	0	Yes
<b>Secondary Crash Categories</b>								
Environmental Factors	Nighttime	24	0	0	7	17	0	Yes
	Wet weather	11	0	0	2	9	0	Yes
Number of Vehicles	Single vehicle	54	0	2	21	31	0	Yes
	Multiple vehicle	32	0	1	6	25	0	Yes
Driver Behaviour	Speed related	7	0	0	3	4	0	Yes
	Unbelted	3	0	0	3	0	0	Yes
	Alcohol related	5	0	0	3	2	0	Yes
<b>Automated Check</b> (i.e., does total crashes match the sum of RD, INT, and NM crash types?)								
	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
	Number of years in crash history		3	Discount Rate		2%		

The engineer should then complete the remainder of the HSIP B-C Analysis form using the "Read-Me" file provided by VDOT with the application to determine the B-C Ratio for proposed countermeasures.

# Appendix A

## FR-300 Crash Report

Commonwealth of Virginia - Department of Motor Vehicles  
**Police Crash Report**

FR300P (Rev 1/12)  
Page \_\_\_\_ of \_\_\_\_

Revised Report

**CRASH**

Crash Date: MM DD YYYY Day of Week: \_\_\_\_\_ MILITARY Time (24 hr clock): \_\_\_\_\_ County of Crash: \_\_\_\_\_ Official DMV User: \_\_\_\_\_

City or Town of: \_\_\_\_\_ City or Town Name: \_\_\_\_\_ Landmarks at Scene: \_\_\_\_\_

Location of Crash (route/street): \_\_\_\_\_ Railroad Crossing (ID no. if within 100 ft.): \_\_\_\_\_ Local Case Number: \_\_\_\_\_

Location of Crash (route/street): \_\_\_\_\_ Location of Crash (route/street): \_\_\_\_\_ Mile Marker Number: \_\_\_\_\_ Number of Vehicles: \_\_\_\_\_

At Intersection With or \_\_\_\_\_ Miles \_\_\_\_\_ Feet N S E W \_\_\_\_\_ of \_\_\_\_\_

GPS Lat: \_\_\_\_\_ GPS Long: \_\_\_\_\_

**VEHICLE #** \_\_\_\_\_

**DRIVER** Driver Flew Scene

Driver's Name (Last, First, Middle): \_\_\_\_\_ Gender: \_\_\_\_\_

Address (Street and Number): \_\_\_\_\_

City: \_\_\_\_\_ State: \_\_\_\_\_ ZIP: \_\_\_\_\_

Birth Date: MM DD YYYY Drivers License Number: \_\_\_\_\_ State: \_\_\_\_\_ DL: \_\_\_\_\_ CDL: \_\_\_\_\_

Safety Equip. Used: \_\_\_\_\_ Air Bag: \_\_\_\_\_ Ejected: \_\_\_\_\_ Date of Death: MM DD YYYY Injury Type: \_\_\_\_\_ EMS Transport: \_\_\_\_\_

Summons Issued As Result of Crash: \_\_\_\_\_ Offenses Charged to Driver: \_\_\_\_\_

**VEHICLE**

Vehicle Owner's Name (Last, First, Middle): \_\_\_\_\_ Same as Driver

Address (Street and Number): \_\_\_\_\_

City: \_\_\_\_\_ State: \_\_\_\_\_ ZIP: \_\_\_\_\_

Vehicle Year: \_\_\_\_\_ Vehicle Make: \_\_\_\_\_ Vehicle Model: \_\_\_\_\_ Disabled: \_\_\_\_\_ CMV: \_\_\_\_\_ Towel: \_\_\_\_\_

Vehicle Plate Number: \_\_\_\_\_ State: \_\_\_\_\_ Approximate Repair Cost: \_\_\_\_\_

VIN: \_\_\_\_\_ Oversize: \_\_\_\_\_ Cargo Spill: \_\_\_\_\_

Name of Insurance Company (not agent): \_\_\_\_\_

Speed Before Crash: \_\_\_\_\_ Speed Limit: \_\_\_\_\_ Maximum Safe Speed: \_\_\_\_\_ Under 8: \_\_\_\_\_ 8-17: \_\_\_\_\_ 18-21: \_\_\_\_\_ Over 21: \_\_\_\_\_

**VEHICLE #** \_\_\_\_\_

**DRIVER** Driver Flew Scene

Driver's Name (Last, First, Middle): \_\_\_\_\_ Gender: \_\_\_\_\_

Address (Street and Number): \_\_\_\_\_

City: \_\_\_\_\_ State: \_\_\_\_\_ ZIP: \_\_\_\_\_

Birth Date: MM DD YYYY Drivers License Number: \_\_\_\_\_ State: \_\_\_\_\_ DL: \_\_\_\_\_ CDL: \_\_\_\_\_

Safety Equip. Used: \_\_\_\_\_ Air Bag: \_\_\_\_\_ Ejected: \_\_\_\_\_ Date of Death: MM DD YYYY Injury Type: \_\_\_\_\_ EMS Transport: \_\_\_\_\_

Summons Issued As Result of Crash: \_\_\_\_\_ Offenses Charged to Driver: \_\_\_\_\_

**VEHICLE**

Vehicle Owner's Name (Last, First, Middle): \_\_\_\_\_ Same as Driver

Address (Street and Number): \_\_\_\_\_

City: \_\_\_\_\_ State: \_\_\_\_\_ ZIP: \_\_\_\_\_

Vehicle Year: \_\_\_\_\_ Vehicle Make: \_\_\_\_\_ Vehicle Model: \_\_\_\_\_ Disabled: \_\_\_\_\_ CMV: \_\_\_\_\_ Towel: \_\_\_\_\_

Vehicle Plate Number: \_\_\_\_\_ State: \_\_\_\_\_ Approximate Repair Cost: \_\_\_\_\_

VIN: \_\_\_\_\_ Oversize: \_\_\_\_\_ Cargo Spill: \_\_\_\_\_

Name of Insurance Company (not agent): \_\_\_\_\_

Speed Before Crash: \_\_\_\_\_ Speed Limit: \_\_\_\_\_ Maximum Safe Speed: \_\_\_\_\_ Under 8: \_\_\_\_\_ 8-17: \_\_\_\_\_ 18-21: \_\_\_\_\_ Over 21: \_\_\_\_\_

**PASSENGER (only if injured or killed)**

Name of Injured (Last, First, Middle): \_\_\_\_\_ EMS Transport: \_\_\_\_\_ Date of Death: MM DD YY

Position in/on Vehicle: \_\_\_\_\_ Safety Equip. Used: \_\_\_\_\_ Airbag: \_\_\_\_\_ Ejected: \_\_\_\_\_ Injury Type: \_\_\_\_\_ Birthdate: MM DD YYYY Gender: \_\_\_\_\_

Name of Injured (Last, First, Middle): \_\_\_\_\_ EMS Transport: \_\_\_\_\_ Date of Death: MM DD YY

Position in/on Vehicle: \_\_\_\_\_ Safety Equip. Used: \_\_\_\_\_ Airbag: \_\_\_\_\_ Ejected: \_\_\_\_\_ Injury Type: \_\_\_\_\_ Birthdate: MM DD YYYY Gender: \_\_\_\_\_

Name of Injured (Last, First, Middle): \_\_\_\_\_ EMS Transport: \_\_\_\_\_ Date of Death: MM DD YY

Position in/on Vehicle: \_\_\_\_\_ Safety Equip. Used: \_\_\_\_\_ Airbag: \_\_\_\_\_ Ejected: \_\_\_\_\_ Injury Type: \_\_\_\_\_ Birthdate: MM DD YYYY Gender: \_\_\_\_\_

**PASSENGER (only if injured or killed)**

Name of Injured (Last, First, Middle): \_\_\_\_\_ EMS Transport: \_\_\_\_\_ Date of Death: MM DD YY

Position in/on Vehicle: \_\_\_\_\_ Safety Equip. Used: \_\_\_\_\_ Airbag: \_\_\_\_\_ Ejected: \_\_\_\_\_ Injury Type: \_\_\_\_\_ Birthdate: MM DD YYYY Gender: \_\_\_\_\_

Name of Injured (Last, First, Middle): \_\_\_\_\_ EMS Transport: \_\_\_\_\_ Date of Death: MM DD YY

Position in/on Vehicle: \_\_\_\_\_ Safety Equip. Used: \_\_\_\_\_ Airbag: \_\_\_\_\_ Ejected: \_\_\_\_\_ Injury Type: \_\_\_\_\_ Birthdate: MM DD YYYY Gender: \_\_\_\_\_

Name of Injured (Last, First, Middle): \_\_\_\_\_ EMS Transport: \_\_\_\_\_ Date of Death: MM DD YY

Position in/on Vehicle: \_\_\_\_\_ Safety Equip. Used: \_\_\_\_\_ Airbag: \_\_\_\_\_ Ejected: \_\_\_\_\_ Injury Type: \_\_\_\_\_ Birthdate: MM DD YYYY Gender: \_\_\_\_\_

**Codes**

**POSITION IN/ON VEHICLE**

1. Driver
- 2-6. Passengers
7. Cargo Area
8. Riding/Hanging On Outside
- 9-99. All Other Passengers

**SAFETY EQUIPMENT USED**

1. Lap Belt Only
2. Shoulder Belt Only
3. Lap and Shoulder Belt
4. Child Restraint
5. Helmet
6. Other
7. Booster Seat
8. No Restraint Used
9. Not Applicable

**AIRBAG**

1. Deployed - Front
2. Not Deployed
3. Unavailable/Not Applicable
4. Keyed Off
5. Unknown
6. Deployed - Side
7. Deployed - Other (Knee, Air Belt, etc.)
8. Deployed - Combination

**EJECTED FROM VEHICLE**

1. Not Ejected
2. Partially Ejected
3. Totally Ejected

**SUMMONS ISSUED AS A RESULT OF CRASH**

1. Yes
2. No
3. Pending

**INJURY TYPE**

1. Dead
2. Serious Injury
3. Minor/Possible Injury
4. No Apparent Injury
0. No Injury (Driver only)

Investigating Officer: \_\_\_\_\_

Badge/Code Number: \_\_\_\_\_

Agency/Department Name and Code: \_\_\_\_\_

Resolving Officer: \_\_\_\_\_

Report File Date: \_\_\_\_\_



Officer Initials \_\_\_\_\_ Badge # \_\_\_\_\_

Commonwealth of Virginia - Department of Motor Vehicles



FR300P (Rev 1/12)

## Police Crash Report

Revised Report

Page \_\_\_\_\_ of \_\_\_\_\_

CRASH					
Crash Date	MM DD YYYY	MILITARY Time (24 hr clock)	County of Crash	City of Town of	Local Case Number

### CRASH INFORMATION

<b>Location of First Harmful Event in Relation to Roadway</b> C1 <input type="radio"/> 1. On Roadway <input type="radio"/> 2. Shoulder <input type="radio"/> 3. Median <input type="radio"/> 4. Roadside <input type="radio"/> 5. Core <input type="radio"/> 6. Separator <input type="radio"/> 7. In Parking Lane or Zone <input type="radio"/> 8. Off Roadway, Location Unknown <input type="radio"/> 9. Outside Right-of-Way	<b>Traffic Control Type</b> C5 <input type="radio"/> 1. No Traffic Control <input type="radio"/> 2. Officer or Flagger <input type="radio"/> 3. Traffic Signal <input type="radio"/> 4. Stop Sign <input type="radio"/> 5. Slow or Warning Sign <input type="radio"/> 6. Traffic Lanes Marked <input type="radio"/> 7. No Passing Lines <input type="radio"/> 8. Yield Sign <input type="radio"/> 9. One Way Road or Street <input type="radio"/> 10. Railroad Crossing With Markings and Signs <input type="radio"/> 11. Railroad Crossing With Signals <input type="radio"/> 12. Railroad Crossing With Gate and Signals <input type="radio"/> 13. Other <input type="radio"/> 14. Pedestrian Crosswalk <input type="radio"/> 15. Reduced Speed - School Zone <input type="radio"/> 16. Reduced Speed - Work Zone <input type="radio"/> 17. Highway Safety Corridor	<b>Roadway Description</b> C9 <input type="radio"/> 1. Two-Way, Not Divided <input type="radio"/> 2. Two-Way, Divided, Unprotected Median <input type="radio"/> 3. Two-Way, Divided, Positive Median Barrier <input type="radio"/> 4. One-Way, Not Divided <input type="radio"/> 5. Unknown  <b>Roadway Defects</b> C10 <input type="radio"/> 1. No Defects <input type="radio"/> 2. Holes, Ruts, Bumps <input type="radio"/> 3. Soft or Low Shoulder <input type="radio"/> 4. Under Repair <input type="radio"/> 5. Loose Material <input type="radio"/> 6. Damaged Width <input type="radio"/> 7. Sick Pavement <input type="radio"/> 8. Roadway Obstructed <input type="radio"/> 9. Other <input type="radio"/> 10. Edge Pavement Drop Off	<b>Intersection Type</b> C12 <input type="radio"/> 1. Not at Intersection <input type="radio"/> 2. Two Approaches <input type="radio"/> 3. Three Approaches <input type="radio"/> 4. Four Approaches <input type="radio"/> 5. Five-Point, or more <input type="radio"/> 6. Roundabout  <b>Work Zone</b> C13 <input type="radio"/> 1. Yes <input type="radio"/> 2. No  <b>Work Zone Workers Present</b> C14 <input type="radio"/> 1. With Law Enforcement <input type="radio"/> 2. With No Law Enforcement <input type="radio"/> 3. No Workers Present  <b>Work Zone Location</b> C15 <input type="radio"/> 1. Advance Warning Area <input type="radio"/> 2. Transition Area <input type="radio"/> 3. Activity Area <input type="radio"/> 4. Termination Area
<b>Weather Condition</b> C2 <input type="radio"/> 1. No Adverse Condition (Clear/Cloudy) <input type="radio"/> 2. Fog <input type="radio"/> 3. Mist <input type="radio"/> 4. Rain <input type="radio"/> 5. Snow <input type="radio"/> 6. Sleet/Hail <input type="radio"/> 7. Smoke/Dust <input type="radio"/> 8. Other <input type="radio"/> 9. Blowing Sand, Soil, Dirt, or Snow <input type="radio"/> 10. Severe Crosswinds	<b>Roadway Alignment</b> C6 <input type="radio"/> 1. Straight - Level <input type="radio"/> 2. Curve - Level <input type="radio"/> 3. Grade - Straight <input type="radio"/> 4. Grade - Curve <input type="radio"/> 5. Hillcrest - Straight <input type="radio"/> 6. Hillcrest - Curve <input type="radio"/> 7. Dip - Straight <input type="radio"/> 8. Dip - Curve <input type="radio"/> 9. Other <input type="radio"/> 10. No Off-Ramps	<b>Relation to Roadway</b> C11 <b>Interchange Area:</b> <input type="radio"/> 1. Main-Line Roadway <input type="radio"/> 2. Acceleration/Deceleration Lanes <input type="radio"/> 3. Gore Area (Between Ramp and Highway Edgelines) <input type="radio"/> 4. Collector/Distributor Road <input type="radio"/> 5. On Entrance/Exit Ramp <input type="radio"/> 6. Intersection at end of Ramp <input type="radio"/> 7. Other location not listed above within an interchange area (median, shoulder and roadside)  <b>Intersection Area:</b> <input type="radio"/> 8. Non-Intersection <input type="radio"/> 9. Within Intersection <input type="radio"/> 10. Intersection-Related - Within 150' <input type="radio"/> 11. Intersection-Related - Outside 150'  <b>Other Location:</b> <input type="radio"/> 12. Crossover Related <input type="radio"/> 13. Driveway, Alley-Access - Related <input type="radio"/> 14. Railway Grade Crossing <input type="radio"/> 15. Other Crossing (Crossings for Bikes, School, etc.)	<b>Work Zone Type</b> C16 <input type="radio"/> 1. Lane Closure <input type="radio"/> 2. Lane Shift/Crossover <input type="radio"/> 3. Work on Shoulder or Median <input type="radio"/> 4. Intermittent or Moving Work <input type="radio"/> 5. Other  <b>School Zone</b> C17 <input type="radio"/> 1. Yes <input type="radio"/> 2. Yes - With School Activity <input type="radio"/> 3. No  <b>Type of Collision</b> C18 <input type="radio"/> 1. Rear End <input type="radio"/> 2. Angle <input type="radio"/> 3. Head On <input type="radio"/> 4. Sideswipe - Same Direction <input type="radio"/> 5. Sideswipe - Opposite Direction <input type="radio"/> 6. Fixed Object in Road <input type="radio"/> 7. Train <input type="radio"/> 8. Non-Collision <input type="radio"/> 9. Fixed Object - Off Road <input type="radio"/> 10. Deer <input type="radio"/> 11. Other Animal <input type="radio"/> 12. Pedestrian <input type="radio"/> 13. Bicyclist <input type="radio"/> 14. Motorcyclist <input type="radio"/> 15. Backed Into <input type="radio"/> 16. Other
<b>Light Conditions</b> C3 <input type="radio"/> 1. Dawn <input type="radio"/> 2. Daylight <input type="radio"/> 3. Dusk <input type="radio"/> 4. Darkness - Road Lighted <input type="radio"/> 5. Darkness - Road Not Lighted <input type="radio"/> 6. Darkness - Unknown Road Lighting <input type="radio"/> 7. Unknown	<b>Roadway Surface Condition</b> C7 <input type="radio"/> 1. Dry <input type="radio"/> 2. Wet <input type="radio"/> 3. Snowy <input type="radio"/> 4. Icy <input type="radio"/> 5. Muddy <input type="radio"/> 6. Oil/Other Fluids <input type="radio"/> 7. Other <input type="radio"/> 8. Natural Debris <input type="radio"/> 9. Water (Standing, Moving) <input type="radio"/> 10. Slush <input type="radio"/> 11. Sand, Dirt, Gravel	<b>Roadway Surface Type</b> C8 <input type="radio"/> 1. Concrete <input type="radio"/> 2. Blacktop, Asphalt, Bituminous <input type="radio"/> 3. Brick or Block <input type="radio"/> 4. Slag, Gravel, Stone <input type="radio"/> 5. Dirt <input type="radio"/> 6. Other	<b>Traffic Control Device</b> C4 <input type="radio"/> 1. Yes - Working <input type="radio"/> 2. Yes - Working and Obscured <input type="radio"/> 3. Yes - Not Working <input type="radio"/> 4. Yes - Not Working and Obscured <input type="radio"/> 5. Yes - Missing <input type="radio"/> 6. No Traffic Control Device Present

Officer Initials \_\_\_\_\_ Badge # \_\_\_\_\_ Commonwealth of Virginia - Department of Motor Vehicles FR300P (Rev 1/12)  
**Police Crash Report** Page \_\_\_\_\_ of \_\_\_\_\_

**Revised Report**

**CRASH**

Crash Date: MM/DD/YYYY MILITARY Time (24 hr clock) County of Crash: \_\_\_\_\_ City of \_\_\_\_\_ Town of \_\_\_\_\_ Local Data Number: \_\_\_\_\_

**CRASH DIAGRAM**

**VEHICLE #** \_\_\_\_\_

Fill In Impact Area(s).  
Initial Impact:

Veh Dir of Travel--N/S/E/W

Indicate North by Arrow

**VEHICLE #** \_\_\_\_\_

Fill In Impact Area(s).  
Initial Impact:

Veh Dir of Travel--N/S/E/W

**VEHICLE #** \_\_\_\_\_

Fill In Impact Area(s).  
Initial Impact:

Veh Dir of Travel--N/S/E/W

**VEHICLE #** \_\_\_\_\_

Fill In Impact Area(s).  
Initial Impact:

Veh Dir of Travel--N/S/E/W

**DAMAGE TO PROPERTY OTHER THAN VEHICLES**

Approx. Repair Cost: \_\_\_\_\_ Object Struck (Tree, Fence, etc.): \_\_\_\_\_ Property Damaged (Road, Sign, Fire, Mailed) \_\_\_\_\_ Address (Street and Number): \_\_\_\_\_ VDOT Property:  Yes  No

**CRASH DESCRIPTION**

SAMPLE COPY

**CRASH EVENTS**

Vehicle #	First Event	Second Event	Third Event	Fourth Event	Most Harmful Event

- |   |  |  |
|---|--|--|
| <p><b>COLLISION WITH FIXED OBJECT</b></p> <ol style="list-style-type: none"> <li>1. Bank Or Ledge</li> <li>2. Trees</li> <li>3. Utility Pole</li> <li>4. Fence Or Post</li> <li>5. Guard Rail</li> <li>6. Parked Vehicle</li> <li>7. Tunnel, Bridge, Underpass, Culvert, etc.</li> <li>8. Sign, Traffic Signal</li> <li>9. Impact Cushioning Device</li> <li>10. Other</li> <li>11. Jersey Wall</li> <li>12. Building/Structure</li> <li>13. Curb</li> <li>14. Ditch</li> <li>15. Other Fixed Object</li> <li>16. Other Traffic Barrier</li> <li>17. Traffic Sign Support</li> <li>18. Mailbox</li> </ol> | <p><b>COLLISION WITH PERSON, MOTOR VEHICLE OR NON-FIXED OBJECT</b></p> <ol style="list-style-type: none"> <li>19. Pedestrian</li> <li>20. Motor Vehicle In Transport</li> <li>21. Train</li> <li>22. Bicycle</li> <li>23. Animal</li> <li>24. Work Zone</li> <li>25. Maintenance Equipment</li> <li>26. Other Movable Object</li> <li>27. Other</li> </ol> | <p><b>NON-COLLISION</b></p> <ol style="list-style-type: none"> <li>28. Ran Off Road</li> <li>29. Jack Knife</li> <li>30. Overturn (Rollover)</li> <li>31. Downhill Runaway</li> <li>32. Cargo Loss or Shift</li> <li>33. Explosion or Fire</li> <li>34. Separation of Units</li> <li>35. Cross Median</li> <li>36. Cross Centerline</li> <li>37. Equipment Failure (Tire, etc)</li> <li>38. Immersion</li> <li>39. Fall/Jumped From Vehicle</li> <li>40. Thrown or Falling Object</li> <li>41. Non-Collision Unknown</li> <li>42. Other Non-Collision</li> </ol> |
|---|--|--|

Officer Initials \_\_\_\_\_ Badge # \_\_\_\_\_ Commonwealth of Virginia - Department of Motor Vehicles  
**Police Crash Report** FR300P (Rev 1/12)  
 Revised Report  Page \_\_\_\_\_ of \_\_\_\_\_

**CRASH**

Crash Date: MM/DD/YYYY MILITARY Time (24 hr clock) County of Crash City of Town of Local Case Number

**COMMERCIAL MOTOR VEHICLE SECTION**

This form is being completed because the vehicle is:

A Truck or Truck Combination Rating Greater Than 10,000 lbs. (GVWR/GCWR)
  Any Motor Vehicle That Seats 9 or More People, Including the Driver
  A Vehicle of Any Type with a Hazardous Materials Placard Regardless of Weight

**AND The crash resulted in:**

A fatality: any person(s) killed in or outside of any vehicle (truck, bus, car, etc.) involved in the crash or who dies within 30 days of the crash as a result of an injury sustained in the crash
  OR
  An injury: any person(s) injured as a result of the crash who immediately receives medical treatment away from the crash scene
  OR
  A tow-away: any motor vehicle (truck, bus, car, etc.) disabled as a result of the crash and transported away from the scene by a tow truck or other vehicle

**VEHICLE #**

Vehicle Configuration V10	Cargo Body Type V11	License Class P8	Commercial Endorsement P9
<input type="radio"/> 1. Passenger Car (Only if Vehicle Has Hazardous Materials Placard) <input type="radio"/> 2. Light Truck (Only if Vehicle Has Hazardous Materials Placard) <input type="radio"/> 3. Bus (Seats 5-15 People, Including Driver) <input type="radio"/> 4. Bus (Seats for 16 People or More, including Driver) <input type="radio"/> 5. Single Unit Truck (2 Axles, 8 Tires) <input type="radio"/> 6. Single Unit Truck (3 or More Axles) <input type="radio"/> 7. Truck Trailer(s) (Single Unit Truck Pulling Trailer(s)) <input type="radio"/> 8. Truck Tractor (Semi-trail) <input type="radio"/> 9. Tractor/Semi-trailer (Doe Trailer) <input type="radio"/> 10. Tractor/Doubles (Two Trailers) <input type="radio"/> 11. Other Truck (Greater Than 10,000 lbs. (Not Listed Above))	<input type="radio"/> 1. Bus (Seats 5-15 People, Including Driver) <input type="radio"/> 2. Bus (Seats For 16 People or More, Including Driver) <input type="radio"/> 3. Van/Enclosed Box <input type="radio"/> 4. Cargo Tank <input type="radio"/> 5. Flatbed <input type="radio"/> 6. Dump <input type="radio"/> 7. Concrete Mixer <input type="radio"/> 8. Auto Transporter <input type="radio"/> 9. Garbage/Refuse <input type="radio"/> 10. Grain/Chips/Gravel <input type="radio"/> 11. Pole-Trailer <input type="radio"/> 12. Vehicle Towing Another Motor Vehicle <input type="radio"/> 13. Intermodal Container-Chassis <input type="radio"/> 14. Logging <input type="radio"/> 15. Other Cargo Body (Not Listed Above) <input type="radio"/> 16. Not Applicable/ No Cargo Body	<input type="radio"/> Class A <input type="radio"/> Class B <input type="radio"/> Class C <input type="radio"/> Class DRL (regular drivers license) <input type="radio"/> Class M	<input type="radio"/> T-Double Trailer <input type="radio"/> P-Passenger Vehicle <input type="radio"/> N-Tank Vehicle <input type="radio"/> H-Required To Be Placarded for Hazardous Materials <input type="radio"/> X-Combined Tank/HAZMAT <input type="radio"/> O-Other

**Hazardous Material**  
 Hazardous Material Placard:    
 HM 4-Digit:     HM Placard Name:  HM Class:  HM Cargo Present:   HM Cargo Released:

**Carrier Identification**  
 Commercial Motor Carrier Name:  Address (P.O. Box if No Street Address):   
 Carrier's ID Number:  State (abbreviate):  City:  State:  Zip:   
 US DOT#:

**Commercial/Non-Commercial V13**  
 1. Interstate Carrier  
 2. Intrastate Carrier  
 3. Not in Commerce-Government (Trucks and Buses)  
 4. Not in Commerce-Other Truck (Over 10,000 lbs.)

**VEHICLE #**

Vehicle Configuration V10	Cargo Body Type V11	License Class P8	Commercial Endorsement P9
<input type="radio"/> 1. Passenger Car (Only if Vehicle Has Hazardous Materials Placard) <input type="radio"/> 2. Light Truck (Only if Vehicle Has Hazardous Materials Placard) <input type="radio"/> 3. Bus (Seats 5-15 People, Including Driver) <input type="radio"/> 4. Bus (Seats for 16 People or More, including Driver) <input type="radio"/> 5. Single Unit Truck (2 Axles, 8 Tires) <input type="radio"/> 6. Single Unit Truck (3 or More Axles) <input type="radio"/> 7. Truck Trailer(s) (Single Unit Truck Pulling Trailer(s)) <input type="radio"/> 8. Truck Tractor (Semi-trail) <input type="radio"/> 9. Tractor/Semi-trailer (Doe Trailer) <input type="radio"/> 10. Tractor/Doubles (Two Trailers) <input type="radio"/> 11. Other Truck (Greater Than 10,000 lbs. (Not Listed Above))	<input type="radio"/> 1. Bus (Seats 5-15 People, Including Driver) <input type="radio"/> 2. Bus (Seats For 16 People or More, Including Driver) <input type="radio"/> 3. Van/Enclosed Box <input type="radio"/> 4. Cargo Tank <input type="radio"/> 5. Flatbed <input type="radio"/> 6. Dump <input type="radio"/> 7. Concrete Mixer <input type="radio"/> 8. Auto Transporter <input type="radio"/> 9. Garbage/Refuse <input type="radio"/> 10. Grain/Chips/Gravel <input type="radio"/> 11. Pole-Trailer <input type="radio"/> 12. Vehicle Towing Another Motor Vehicle <input type="radio"/> 13. Intermodal Container-Chassis <input type="radio"/> 14. Logging <input type="radio"/> 15. Other Cargo Body (Not Listed Above) <input type="radio"/> 16. Not Applicable/ No Cargo Body	<input type="radio"/> Class A <input type="radio"/> Class B <input type="radio"/> Class C <input type="radio"/> Class DRL (regular drivers license) <input type="radio"/> Class M	<input type="radio"/> T-Double Trailer <input type="radio"/> P-Passenger Vehicle <input type="radio"/> N-Tank Vehicle <input type="radio"/> H-Required To Be Placarded for Hazardous Materials <input type="radio"/> X-Combined Tank/HAZMAT <input type="radio"/> O-Other

**Hazardous Material**  
 Hazardous Material Placard:    
 HM 4-Digit:     HM Placard Name:  HM Class:  HM Cargo Present:   HM Cargo Released:

**Carrier Identification**  
 Commercial Motor Carrier Name:  Address (P.O. Box if No Street Address):   
 Carrier's ID Number:  State (abbreviate):  City:  State:  Zip:   
 US DOT#:

**Commercial/Non-Commercial V13**  
 1. Interstate Carrier  
 2. Intrastate Carrier  
 3. Not in Commerce-Government (Trucks and Buses)  
 4. Not in Commerce-Other Truck (Over 10,000 lbs.)

Officer Initials \_\_\_\_\_ Badge # \_\_\_\_\_ Commonwealth of Virginia - Department of Motor Vehicles FR300P (Rev 1/12)  
**Revised Report**  **Police Crash Report** Page \_\_\_\_\_ of \_\_\_\_\_

<b>CRASH</b>	
Crash Date MM DD YYYY	MILITARY Time (24 hr clock)
County of Crash	City of _____ Town of _____
Local Case Number	

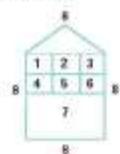
<b>PEDESTRIAN #</b>				<b>PEDESTRIAN #</b>			
Name of Injured (Last, First, Middle)				Name of Injured (Last, First, Middle)			
Address (Street and Number)				Address (Street and Number)			
City		State		City		State	
ZIP		ZIP		ZIP		ZIP	
Driver's License #				Driver's License #			
Gender	EMS Transport	Injury Type	Birthdate	Date of Death	Gender	EMS Transport	Injury Type
MM DD YYYY	MM DD YYYY	MM DD YYYY	MM DD YYYY	MM DD YYYY	MM DD YYYY	MM DD YYYY	MM DD YYYY

<b>Pedestrian Actions</b> P10		<b>Pedestrian Drinking</b> P11		<b>Method of Alcohol Determination by Police</b> P13	
<input type="radio"/> 1. Crossing At Intersection With Signal <input type="radio"/> 2. Crossing At Intersection Against Signal <input type="radio"/> 3. Crossing At Intersection No Signal <input type="radio"/> 4. Crossing At Intersection Diagonally <input type="radio"/> 5. Crossing Not At Intersection - Rural <input type="radio"/> 6. Crossing Not At Intersection - Urban <input type="radio"/> 7. Coming From Behind Parked Car <input type="radio"/> 8. Getting Off Or On School Bus <input type="radio"/> 9. Playing In Roadway <input type="radio"/> 10. Getting Off Or On Another Vehicle <input type="radio"/> 11. Hitching On Vehicle <input type="radio"/> 12. Walking In Roadway With Traffic - Sidewalks Available <input type="radio"/> 13. Walking In Roadway With Traffic - Sidewalks Not Available <input type="radio"/> 14. Walking In Roadway Against Traffic - Sidewalks Available <input type="radio"/> 15. Walking In Roadway Against Traffic - Side Walks Not Available <input type="radio"/> 16. Working In Roadway <input type="radio"/> 17. Standing In Roadway <input type="radio"/> 18. Lying In Roadway <input type="radio"/> 19. Not In Roadway <input type="radio"/> 20. Other	<input type="radio"/> 1. Had Not Been Drinking <input type="radio"/> 2. Drinking - Obviously Drunk <input type="radio"/> 3. Drinking - Ability Impaired <input type="radio"/> 4. Drinking - Ability Not Impaired <input type="radio"/> 5. Drinking - Not Known Whether Impaired	<input type="radio"/> 1. Blood <input type="radio"/> 2. Breath <input type="radio"/> 3. Refused <input type="radio"/> 4. No Test			
<b>Condition of Pedestrian Contributing to the Crash</b> P12		<b>Pedestrian Drug Use</b> P14		<b>Pedestrian Wear Reflective Clothing</b> P15	
<input type="radio"/> 1. No Defects <input type="radio"/> 2. Eyesight Defective <input type="radio"/> 3. Hearing Defective <input type="radio"/> 4. Other Body Defects <input type="radio"/> 5. Illness <input type="radio"/> 6. Fatigued <input type="radio"/> 7. Apparently Asleep <input type="radio"/> 8. Other		<input type="radio"/> 1. Yes <input type="radio"/> 2. No <input type="radio"/> 3. Unknown	<input type="radio"/> 1. Yes <input type="radio"/> 2. No		

Use sections below for additional passengers.

<b>VEHICLE #</b>				<b>VEHICLE #</b>			
<b>PASSENGER (only if injured or killed)</b>				<b>PASSENGER (only if injured or killed)</b>			
Name of Injured (Last, First, Middle)				Name of Injured (Last, First, Middle)			
Position In/On Vehicle	Safety Equip Used	Airbag Ejected	Injury Type	Birthdate	Gender	EMS Transport	Date of Death
MM DD YYYY	MM DD YYYY	MM DD YYYY	MM DD YYYY	MM DD YYYY	MM DD YYYY	MM DD YYYY	MM DD YYYY

**Codes**



- POSITION IN/ON VEHICLE**
1. Driver
  - 2-6. Passengers
  7. Cargo Area
  8. Riding/Hanging On Outside
  - 9-00. All Other Passengers

- SAFETY EQUIPMENT USED**
1. Lap Belt Only
  2. Shoulder Belt Only
  3. Lap and Shoulder Belt
  4. Child Restraint
  5. Helmet
  6. Other
  7. Booster Seat
  8. No Restraint Used
  9. Not Applicable

- AIRBAG**
1. Deployed - Front
  2. Not Deployed
  3. Unavailable/Not Applicable
  4. Keyed Off
  5. Unknown
  6. Deployed - Side
  7. Deployed - Other (Knee, Air Belt, etc.)
  8. Deployed - Combination

- EJECTED FROM VEHICLE**
1. Not Ejected
  2. Partially Ejected
  3. Totally Ejected
- SUMMONS ISSUED AS A RESULT OF CRASH**
1. Yes
  2. No
  3. Pending

- INJURY TYPE**
1. Dead
  2. Serious Injury
  3. Minor/Possible Injury
  4. No Apparent Injury