Two-Lane Rural Highways Safety Performance Functions

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Final Report

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16. Abstract

This report documents findings from a comprehensive set of safety performance functions developed for the entire state two-lane rural highway system in Washington. The findings indicate that random parameter models and heterogeneous negative binomial models with dispersion parameter models as functions of roadside variables are effective in capturing the simultaneous impact of roadway and roadside geometrics on two-lane rural roadway safety performance. This study underscores the importance and utility of roadside data inventories in safety performance function development.

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1. Hariharan B., Hong J., Shankar V., Venkataraman N., Milton J., Schalkwyk I. "Roadside Geometry Effects on the Overdispersion Parameter," the 95th Annual Meeting of the Transportation Research Board, Washington D.C., 2016.
2. Hong J., Hariharan B., Shankar V., Venkataraman N., Huang S., Kheziyur A., Milton J., Schalkwyk I. "Random Parameter Framework for Two-Lane Rural Roadways: Findings from Washington State," the 95th Annual Meeting of the Transportation Research Board, Washington D.C., 2016.

1.0 Executive Summary

The objectives of this research are two-fold, 1) to develop Safety Performance Functions (SPFs) of the basic and advanced kind, namely, fixed parameter models (Negative binomial models) and segment specific models (Heterogeneous dispersion Negative Binomial and Random Parameter Negative Binomial), and 2) to compare the model behaviors due to roadside information, existence of intersection segments, and route effects. Micro-scale SPFs to estimate safety performance at a route-specific level were also developed as a means to glean valuable insight concerning broader safety policy in regard to data collection and prediction testing. The study area focuses on approximately 5,443 miles on two-lane rural highways along 142 State Routes in Washington State, with data aggregated from 2002 to 2010. Homogeneous segments were chosen for the SPF estimations summarized in this paper. Homogenous roadway segments are defined as segments that maintain consistency in roadway geometry characteristics for the length of the segment, with a new segment being defined with changes in geometry. The roadway geometric data used to define the segment homogeneity, consisted of horizontal alignment, vertical alignment, lane characteristics, and shoulder information. The homogeneous roadway segments database was generated in two separate forms for the modeling aspect of this study: 1) including intersection locations/segments (intersection segments being defined as 250 foot sections on either side of the center of the intersection), and 2) pure mid-block segments excluding intersection segments. The motivation behind creating the two separate modeling databases is to examine the effect that intersection segments have on crash prediction. The effect of intersection locations on crash prediction is examined by isolating the mid-block characteristics of non-intersection crashes, followed by comparing models estimated on the two different datasets. The resulting datasets consisted of 62,598 homogenous roadway segments across all two-lane rural highways, and a total of 47,394 homogenous mid-block roadway segments for the 9-year panel data.

The overall structure of the modeling process involved model development for: 1) Traditional SPFs, 2) Advanced SPFs with roadway geometrics, 3) Advanced SPFs with roadway geometrics and roadside features, 4) Route Specific Advanced SPFs of the basic type, 5) Advanced SPFs-Heterogeneity in dispersion due to roadside features, and 6) Random Parameter advanced SPF.

With the aim of finding appropriate methodological typologies and regressors, at each stage of the process, models were developed for 31 crash classifications, with comparisons drawn between specifications including combinations of roadway geometry and roadside characteristics.

It was found that models estimated on homogeneous pure mid-block segment datasets showed statistically different dispersion parameters, R-squares, and ADT effects than those that were estimated on homogeneous segment datasets containing intersection segments. Another interesting takeaway from this study is that the IRRs for ADT showed significant variation across the modeling methods, and were found to be much higher for the models specified on the dataset containing intersection segments indicating a possible correlation between the intersection segments and the ADT effects on crashes.

The primary finding of this research was that the impact of roadside information on model performance was significant on route specific NB models, even though the model for total crashes on all routes combined did not show any significant improvements when roadside characteristics were included. It was found that in providing segment specific dispersion estimates based on

roadside characteristics, the HNB method fit the data much better than the NB specifications. In identifying roadside features that significantly affect certain crash classifications, the results of this study could be used to target proactive countermeasures for specific crash types, while allowing for investments in areas that require crash mitigation strategies such as methods to prevent run-off road crashes in the case of roadside fatalities versus reducing such crashes in areas with low fatalities but high property damage. Some key findings of this research were that the roadside presence of a culvert, ditch, guardrail, or fixed object along a segment of roadway led to the segment having lower over-dispersion for total crashes than the other segments. Along these lines, roadway segments with guardrails, side slopes, or a ditch extending to between 90 and 100% of the segment length, exhibit more over-dispersion than those without these features. Similarly, the over-dispersion for fatal crashes on segments with a culvert or roadside ditch was found to be lesser than otherwise, but higher for segments with a roadside fence. Severe injury crashes were found to be dispersed higher for segments with guardrail lengths between 90 and 100% the length of the segment.

By accounting for the effect that these roadside characteristics have on the crash count heterogeneity, this study enables the identification of roadway segments with high or low propensities of certain specific crash types. This would further enable efficient procedures for crash reduction or mitigation strategy implementations, for both new developments, and existing roadway segments. Additionally, by providing insight into roadside features that could potentially influence different types of crashes, while taking both roadway geometry and traffic exposure into account, this work could provide the means for proactive approaches to roadway safety management, as opposed to post crash reactive strategies.

To obtain segment specific parameters, RPNB model specification were also performed, and it was found that the parameters for ADT, segment length, the roadway geometry such as algebraic difference in gradients, average lane width, number of lanes, horizontal curve angle and degree of curvature, and rate of vertical curvature could be random under a normal distribution for certain crash types, and depending on their mean and standard deviation, could have varying effects on the predicted crash frequency.

This study concludes that the HNB and RPNB models for each crash frequency classification provided better predictive insight into the safety effects of roadway geometry and roadside characteristics for two-lane rural highways. As such, this study provides a process for large scale SPF estimation, providing guidance on the types of models that can be utilized based on data available and specific application, and roadway or roadside characteristics that need to be investigated.

2.0 Introduction

The American Association of State Highway and Transportation Officials (AASHTO), defines an SPF as a function of exposure, represented by the segment length and annual average daily traffic (AADT) associated with a study section of highway segments *(1)*. Along with segment length and AADT, numerous studies exist that have attempted to estimate the impact of roadway geometry *(2-5)*, and roadside characteristics *(6-9)* on crash occurrences.

In terms of statistical analysis of crash data, several methodological issues have been identified in the extant literature, namely, over-dispersion due to the variance being larger than the mean; low sample means caused by a large number of segments with zero or very few crashes; and fixed parameter models assuming that explanatory variables have the same effect and magnitude across all roadway segments *(10)*. These issues have driven the application of new and evolving methodological alternatives to better predict the probability of crashes. Initial applications for predicting crash occurrence, included the Poisson model for capturing discrete and non-negative crashes *(11)*, leading into negative binomial regressions due to the over-dispersion frequently observed in crash data *(3,12-14)*. Following this, since the Negative Binomial model was found to be unreliable for datasets with many zero-crash segments, the zero-inflated Poisson and zero-inflated negative binomial *(2, 13, 15)* were employed. While providing improved estimates, these methodologies still generated parameters that were fixed across segments, and could thus not correct for heterogeneity due to the explanatory variables effectively. More recent studies have attempted to use random effect *(16-18)* and random parameter *(19-22)* approaches to obtain segment specific parameters based on roadway geometry effects. The HNB provides a segment specific parameterization of the over-dispersion parameter (α), allowing for an estimate of how model predictors influence over-dispersion *(23)*.

The scope of this study is to provide a detailed analysis of all non-interstate highways of the Washington State network by analyzing crash data that identifies priority locations for treatment and crash mitigation in terms of roadway features. The importance of roadside variables will be demonstrated in this report through an evolving series of models that carries the reader through a radically different way to view safety. The research objectives are two-fold, 1) to develop micro-scale Safety Performance Functions (SPFs) of the basic and advanced kind, and 2) to compare the cost of statistical information loss due to the exclusion of roadside information. The micro-scale SPFs refer to estimating safety performance at the route-specific level for different components in highway segments or intersections. Detailed SPFs at the route-specific level will provide valuable insight concerning broader safety policy in regard to data collection and prediction testing.

To accomplish the research objectives, this study has been organized into the following tasks:

1) Literature survey,
2) SPF Development,
3) SPF Benchmarking, and
4) Report Submission.

The literature survey in Task 1 will reference theories and concepts pertinent to this work and how they have been applied to this study. The theoretical motivations that drive the modeling evolution will be discussed, while also addressing the potential impact in transportation safety research. The SPF Development in Task 2 comprises the majority of the modeling efforts in which SPFs will be presented in increasing complexity and refinement for all of the Washington State Routes. The SPFs will first be presented as Traditional SPFs, then progress to more advanced SPFs of varying degrees of predictive power. Upon completion of Task 2, SPF comparisons across the different model types will be made and explanations in differences of model type performances will be described. SPF Benchmarking in Task 3 follows the SPF Development in which out-of-sample

prediction testing is conducted to validate model prediction effectiveness. Lastly, Task 4 signifies the completion of the study in which a Final Report will be submitted that presents all of the findings from the study. The Final Report will include an Excel file that organizes all of the modeling results in an interactive matrix that allows the reader to more easily navigate the modeling results.

2.1 Overview of Study Area

The study area for this research focuses on all State Routes in Washington State. The following figure displays all state routes for Washington as shown by the Washington State Department of Transportation (WSDOT).

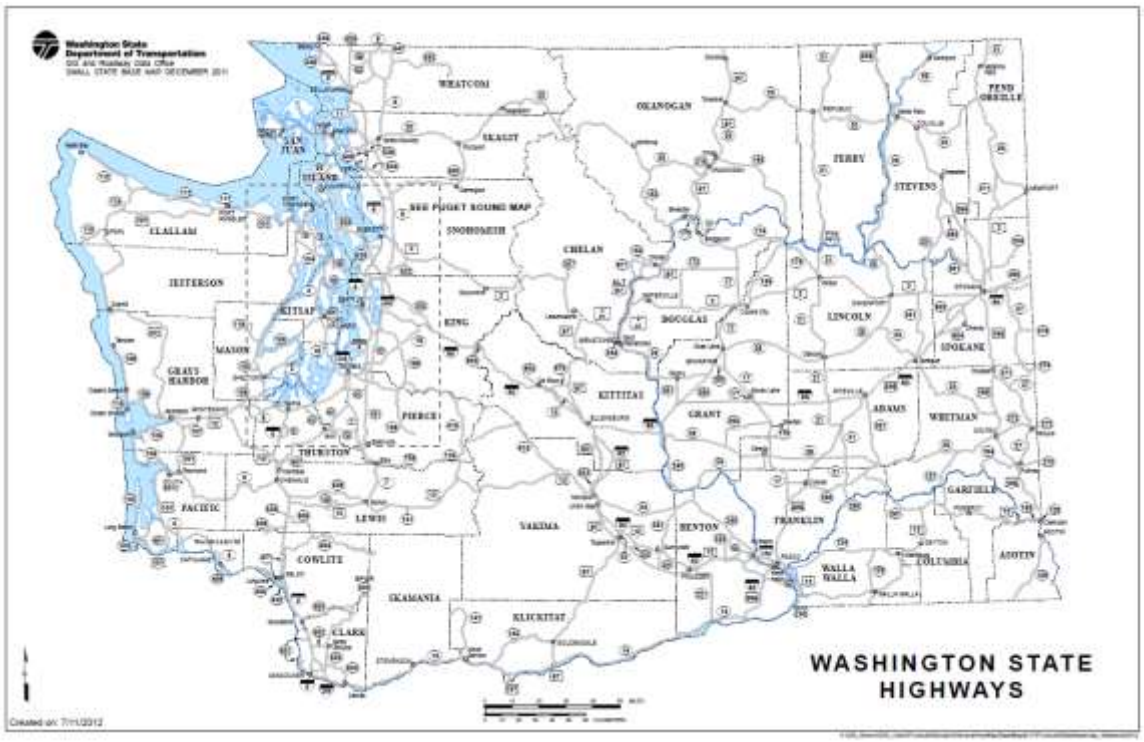

Figure 2.1: Washington State Highway Map.

The figure displays the WSDOT highway map which also includes the seven interstate routes of I-5, I-7, I-82, I-84, I-90, I-405, and I-705. This map can be found on the WSDOT website under the link for the "State Base Map – Statewide".

Table 1.1 lists all of the State Routes from Washington State that are included in the study. The State Routes are listed by number with their associated route mileage shown in parentheses.

Table 2.1: Washington State Routes and Total Mileage.

State Route # (Mileage)				
2(325.36 miles)	104(23.97 miles)	165(14.66 miles)	270(.65 miles)	508(32.41 miles)
3(60.02 miles)	105(44.5 miles)	169(17.67 miles)	271(8.38 miles)	510(7.83 miles)
4(55.24 miles)	106(20.09 miles)	170(3.68 miles)	272(19.2 miles)	525(20.53 miles)
6(50.95 miles)	107(7.91 miles)	172(32.86 miles)	274(1.4 miles)	530(50.71 miles)
7(39.09 miles)	108(11.92 miles)	173(11.84 miles)	278(5.44 miles)	531(5.48 miles)
9(68.37 miles)	109(35.83 miles)	174(40.56 miles)	281(9.68 miles)	532(8.99 miles)
10(15.86 miles)	110(11.02 miles)	182(.31 miles)	282(4.43 miles)	534(5.04 miles)
11(17.96 miles)	112(61.07 miles)	193(2.4 miles)	283(14.86 miles)	536(1.29 miles)
12(408.96 miles)	113(9.59 miles)	194(20.08 miles)	290(1.37 miles)	539(3.57 miles)
14(161.77 miles)	115(2.28 miles)	195(80.38 miles)	291(24.66 miles)	542(52.39 miles)
17(136.53 miles)	116(7.2 miles)	197(1.65 miles)	292(5.91 miles)	543(.86 miles)
18(6.76 miles)	119(10.92 miles)	202(17.12 miles)	300(3.35 miles)	544(9.01 miles)
19(14.09 miles)	121(5.01 miles)	203(23.19 miles)	302(9.31 miles)	546(8.02 miles)
20(436.91 miles)	122(6.41 miles)	206(14.2 miles)	305(2.71 miles)	547(10.59 miles)
21(189.51 miles)	123(1.57 miles)	207(4.26 miles)	307(5.13 miles)	548(12.82 miles)
22(35.69 miles)	124(43.3 miles)	211(14.55 miles)	395(95.05 miles)	702(9.32 miles)
23(65.79 miles)	125(15.5 miles)	215(6.24 miles)	401(12. miles)	706(13.58 miles)
24(72.73 miles)	127(27.02 miles)	221(26.07 miles)	409(3.64 miles)	730(6.07 miles)
25(121.09 miles)	128(1.74 miles)	223(3.74 miles)	410(90.21 miles)	821(24.6 miles)
26(133.49 miles)	129(35.01 miles)	224(4.68 miles)	411(7.44 miles)	900(2.22 miles)
27(81.99 miles)	131(1.95 miles)	225(11.32 miles)	432(.84 miles)	902(12.08 miles)
28(122.01 miles)	141(29.06 miles)	231(75.16 miles)	500(5.83 miles)	903(10. miles)
31(26.03 miles)	142(34.39 miles)	240(21.38 miles)	501(11.12 miles)	904(16.77 miles)
41(.33 miles)	150(11.7 miles)	241(25.21 miles)	502(2.92 miles)	906(2.48 miles)
97(335.99 miles)	153(30.7 miles)	243(28.26 miles)	503(44.81 miles)	970(10. miles)
100(4.61 miles)	155(80.4 miles)	260(39.34 miles)	504(50.05 miles)	971(14.48 miles)
101(350.12 miles)	160(3.8 miles)	261(62.47 miles)	505(19.29 miles)	
102(2.8 miles)	161(15.59 miles)	262(22.45 miles)	506(11.11 miles)	
103(19.36 miles)	164(7.07 miles)	263(.81 miles)	507(38.97 miles)	

2.2 Analytical Approach

The process for analyzing the collision histories of all non-interstate routes in the Washington State network can be organized into three main components: 1) Data Collection/Analysis, 2) Model Development, and 3) Evaluations and Findings. Figure 1.2 displays a basic flow chart that illustrates the steps involved in the evaluation process with particular attention centered on the data collection portion.

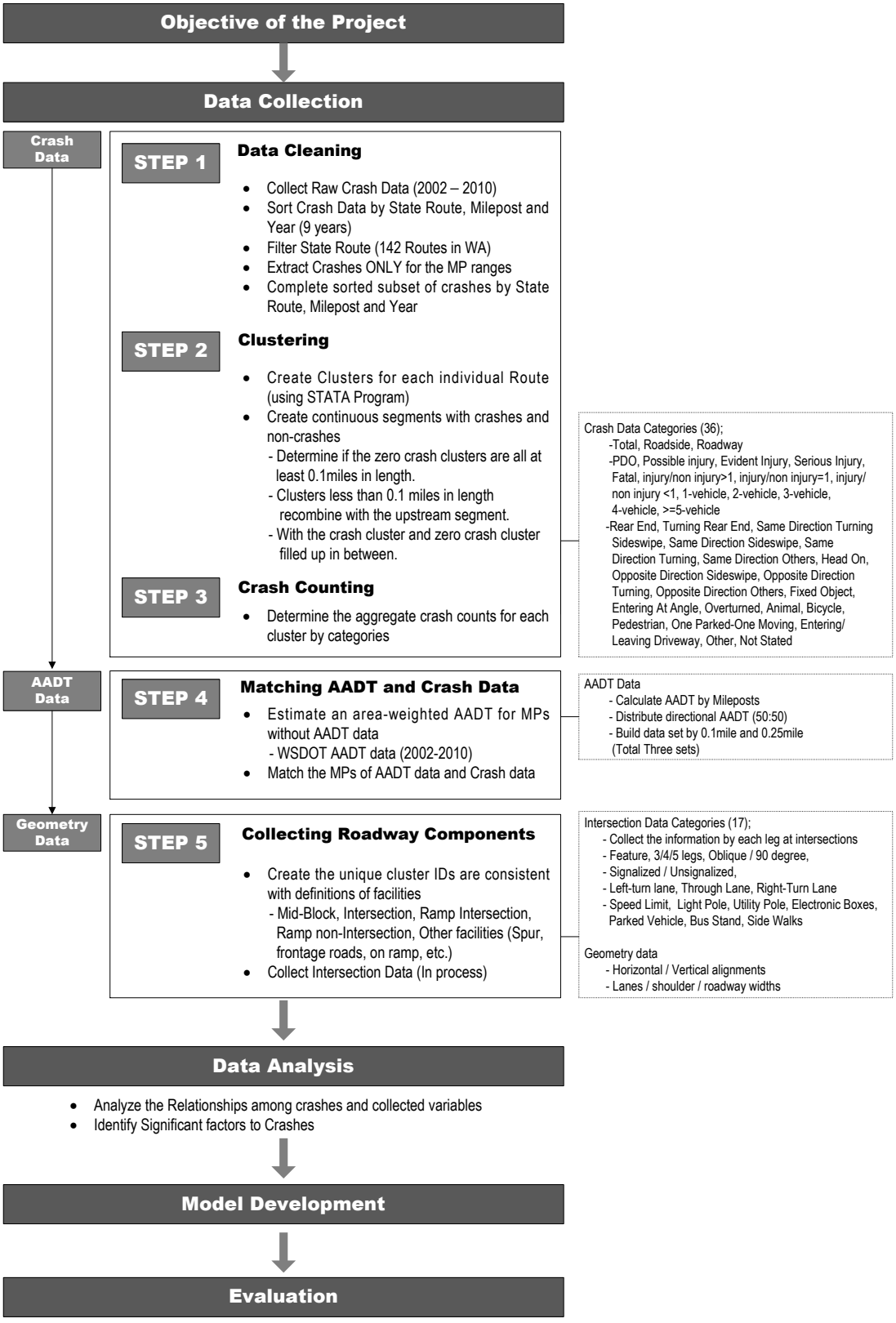

Figure 2.2: Process Flow Chart for Analyzing Non-Interstate Routes.

The process for preparing the necessary data required to undertake such an intensive analysis requires substantial data processing efforts. The data obtain for the study in its raw form presents four different sources of information on crashes, arterial traffic volume, roadway geometrics, and roadside features. The four different data sources require much processing and fine-tuning to synchronize the four data sources into several useable databases dedicated to modeling purposes.

The extent of complexity incorporated into the series of models hinges on the quality of the database. Consequently, much attention is focused on examining the four sources of data in their raw forms, as well as how they are processed and formatted. Moreover, the manner in which the processed data is integrated is also significant because of the model types that are involved in the analysis. From the data integration and database development, the model development process outlined in Task 2 for SPF Development can be executed. Task 3 for SPF Benchmarking is considered the Evaluation portion of the analytical approach flow chart.

2.3 Organization of Report

The report is organized in the following manner:

Data Description – the four data sources of crash, annual average daily traffic, roadway geometrics, and roadside features will be described in their raw forms. The procedure for processing the data into useable formats will be discussed. The chapter will conclude by presenting the final databases and explaining the manner in which the processed data are integrated, as well as the various segmentation bases that were established. Each section will also mention which databases corresponds to which model type.

Modeling Evolution – the progression of models will be explained and the framework for model development will be shown visually in a process flow chart. The manner in which the models progress is crucial to addressing the research goal of demonstrating the importance of incorporating roadside variables into crash prediction models. Due to the sheer number of models to be run (over 4,000), the modeling output and results are collected in a separate file that organizes the results according to their corresponding phase and model type. Thus, the chapter will conclude by describing the modeling matrix and how it can be used.

Washington State Route Analysis – the models developed in Phase II for SPF Development will be discussed in the sequence presented in the Modeling Evolution chapter. The modeling discussion will discuss how additional parameters incorporated into the modeling lexicon impact model prediction performance as the models become increasingly more complex.

Conclusions and Direction of Future Research – the final chapter of the Interim Final Report will describe the next steps in the analysis for all Washington State Routes as outlined in the modeling framework. The current stage of the study is the development of the random parameter models as Phase III of the modeling process. The final portion of the study will be Phase IV, which has yet to be implemented, in which the SPF benchmarks will be determined through out-of-sample prediction techniques.

3.0 Data Description

The database used in this research maintains crash records for nine years of raw crash data, 2002 to 2010 for all State Routes in Washington State. This chapter of the report will describe the

initial raw data used for this research, followed by the process for transforming the raw data, and then the resulting final databases that will be used for modeling. All of the raw data has been obtained from WSDOT sources. The raw crash data is the most extensive dataset provided by WSDOT, while the raw Average Annual Daily Traffic (AADT) Data for all State Routes contained AADT information for various mile posts along each route. The roadway geometrics and roadside data were acquired through different sources from WSDOT using the Washington State Highway Log (26), Roadside Feature Inventory Program (RFIP), WSDOT GeoPortal Map Application, and Washington State Route Web Tool (SRweb) to create the databases. In order to combine the four different databases, several calculations and modifications needed to be implemented to ensure consistency among the four sources. These adjustments and calculations will be explained in the Processed Data discussion. The Final Databases section will explain how the four databases are combined resulting in complete and comprehensive databases that can be employed for modeling purposes. The final databases are: 1) intersections, 2) clustered roadway segments, 3) 0.1 mile roadway interval segments, 4) 0.25 mile roadway interval segments, and 5) homogeneous roadway segments. The methods employed across the processed crash data, processed AADT data, processed roadway geometrics data, and processed roadside data permit all of the data to be integrated into each of the five separate databases.

3.1 Raw Data

The raw data obtained from WSDOT includes crash information, Annual Average Daily Traffic (AADT) information, and roadway geometrics and roadside data. These data are contained in different datasets that will be aggregated into a complete dataset to be used for modeling purposes. This section of the report will describe the format of the raw datasets. All State Routes in Washington State are represented in these datasets.

3.1.1 Raw Crash Data

The crash data, which is the most comprehensive, is initially presented in two different datasets that span from 2002-2005 and 2006-2010. These crash reports were formally requested from the WSDOT Statewide Travel and Collision Data Office (STCDO). These datasets include 528,385 observations for the 2002-2005 dataset, 627,311 observations for the 2006-2010 dataset, with 120 columns for each dataset. To better explain the information contained in the Detailed History Reports, the descriptors recorded in the raw datasets have been catalogued in this report into seven categories: 1) Date and Time, 2) Location 3) Facility Information, 4) Collision Data, 5) Driver Information, 6) Environmental Conditions, and 7) Vehicle Information.

The identification information used by WSDOT is based on unique identifiers assigned to each crash observation. The identifying information for all observations is listed in Table 3.1.

Table 3.1: Raw Crash Data Identifying Information.

Identification Information	Description
History Indicator	Yes, No, Suspected
Collision Report Number	Report Identifier
Collision Report Type	State Route

The History Indicator, as suggested, determines whether the vehicle or individuals involved in the crash have a record for being involved in prior crashes. The responses for the History Indicator are labeled as Yes, No, or Suspected. The Collision Report Number serves as the identification number to distinguish each observation. As such, repeated Collision Report Numbers corresponds to multiple persons or vehicles involved in a single crash. The Collision Report Type refers to the jurisdiction or facility associated to the crash; since this report examines all of the crashes involved along all State Routes, all observations in the raw crash data are labeled as State Route in the Collision Report Type category. The Date and Time information listed for each observation provides temporal related descriptors. While the information is somewhat repetitive, the date and time descriptors display the same information in various ways, perhaps to ensure continuity of the date and time related information. One unique category consists of the Quarter Number attached to each observation, which is more indicative of the time of year to imply seasonal considerations. The information categories of Date and Time are presented in Table 3.2 with a brief description that details how the information is expressed.

Table 3.2: Raw Crash Data Date and Time Information.

Date and Time	Description
Full Date	month/day/year
Year	4-digit year
Year month	year (4-digit), month (2-digit)
Month Name	full name of month
Month Number	numerical month (1 - 12)
Day Of Week	numerical day (1 - 7)
Quarter number	Q1, Q2, Q3, Q4
Full Time	XX:XX AM/PM
Full Time 24	XX:XX
Hour 24	XX00

The location information is of particular importance because of the State Route identification and the mile post markers associated with each observation. Within the raw data, the nearest mile post is recorded as the nearest known location of the crash, with an indicator as to whether the mile post marker is ahead or behind the mile post. Additionally, the accumulated route mileage (ARM) divulges the actual location, estimated at the time of the report, of where the crash took place. The location related information contained in the raw crash dataset is captured by the variables listed in Table 3.3.

The Related Roadway Type (RRT) and Related Roadway Qualifier (RRQ) classify the roadway facility based on the identifying acronyms established by WSDOT. The descriptors associated with RRT and RRQ will be explained in further detail in the section of the report that describes the raw roadway geometric data. The Facility Information from the raw crash datasets contains brief descriptors on the roadway facility where the crash occurred. The facility descriptors are based on standards established by WSDOT and the Federal Highway Administration (FHWA) and are listed according to their requirements. The facility variables are listed in Table 3.4.

Table 3.3: Raw Crash Data Location Information.

Location	Description
SR	State Route Number
ID	7-digit character indicates non-mainline facility type
Mile Post	nearest mile post marker
Mile Post Ahead Back Indicator	location of mile post marker to crash location (A, B)
ARM	Accumulated Route Mileage
State Route Number	State Route Number
Related Roadway Type	facility type based on RRT acronym
Related Roadway Qualifier	supplemental facility information for RRT (if required)
Region Name	geographic region of Washington
City Name	reported if occurred within city boundaries
County Name	name of county

Table 3.4: Raw Crash Data Facility Information.

Facility Information	Description
State Functional Class Code	2-character code
Urban Rural	Urban or Rural classification
Federal Functional Class Name	federal class name of facility
Traffic Control Type Description	traffic control device (if applicable)
Posted Speed Limit	speed limit
Roadway Type Description	description of arterial

The State Functional Class Code consists of a two character identification code with the prefix of R or U signifying rural or urban arterial classification. The numerical value associated with the R/U prefix is predicated on the classification code consistent with WSDOT and FHWA guidelines. The Urban Rural column simply lists whether the facility is considered as an urban or rural arterial, while the Federal Functional Class Name uses the FHWA standards for naming the facility (see FHWA Directive 23 CFR 470).

Description of the Traffic Control Device form each observation is dependent on the facility and location of the crash, i.e. and intersection would determine whether a stop-controlled or signal served as the traffic control device. The Roadway Type Description briefly distinguishes features of the roadway that may not be captured by the state or federal classification standards, such as whether the arterial was undivided or the presence of a roadway barrier.

The category that contains the most extensive amount of information is the data identified as Collision Information. The raw crash related data essentially serves as the crux of the State Route analyses. Table 3.5 displays the 43 descriptors that provide collision related information in the dataset.

Table 3.5: Raw Crash Data Collision Information.

Collision Information	Description

Number Of Fatalities	count of fatalities (0-5)
Number Of Injuries	count of all injury types (max = 47)
Number Of Pedal Cyclists Involved	count of pedal cyclists (max = 4)
Number Of Pedestrians Involved	count of pedestrians (max = 7)
Number Of Motor Vehicles Involved	count of motor vehicles (max = 33)
Vehicle 1 Compass Direction Description	compass direction (NW, N, NE, etc.)
Vehicle 1 Movement Description	vehicle movement: straight, turning movement, etc.
Vehicle 1 Milepost Direction Description	direction of travel: increasing, decreasing, entering, etc.
Diagram Collision Type Description	description of collision
Vehicle 2 Compass Direction Description	compass direction (NW, N, NE, etc.) (if applicable)
Vehicle 2 Movement Description	vehicle movement: straight, turning movement, etc. (if applicable)
Vehicle 2 Milepost Direction Description	direction of travel: increasing, decreasing, entering, etc. (if applicable)
Impact Location Description	facility type, lane, direction of travel
Second Impact Position Description	facility type, lane, direction of travel (if applicable)
Unit Number	number assigned to person/vehicle involved in crash
Unit Type Description	mode of transportation
Most Severe Injury Type	most severe reported: dead at scene
Collision Severity	fatal, PDO, injury
First Collision Type	initial crash type
First Object Struck	applicable to fixed object collision
Second Collision Type	subsequent crash that occurred (if applicable)
Second Object Struck	applicable to subsequent fixed object collision
Junction Relationship	junction related (intersection, driveway, roundabout, etc.)
Hazardous Material	Hazmat transport released or not released (if applicable)
Fire	yes, no
Stolen	yes, no
Hit And Run	yes, no
Contributing Circumstance 1	event that led to crash
Contributing Circumstance 2	subsequent secondary event that led to crash (if applicable)
Contributing Circumstance 3	subsequent tertiary event that led to crash (if applicable)

Table 3.5(continued): Raw Crash Data Collision Information.

Collision Information	Description

DRE Assessment Code 1	Drug Recognition Expert Code 1 (0-9)
DRE Assessment Code 2	Drug Recognition Expert Code 2 (0-9)
Involved Person Action 1	action that person 1 did related to the crash
Involved Person Action 2	action that person 2 did related to the crash (if applicable)
Involved Person Action 3	action that person 3 did related to the crash (if applicable)
Pedacyclist Actions	action that pedal cyclist did related to the crash (if applicable)
Pedestrian Actions	action that pedestrian did related to the crash (if applicable)
Sequence Of Event 1	description of crash event
Sequence Of Event 2	description of secondary crash event (if applicable)
Sequence Of Event 3	description of tertiary crash event (if applicable)
Sequence Of Event 4	description of quaternary crash event (if applicable)
Compass Direction From	direction of travel departure
Compass Direction To	direction of travel arrival

The number of fatalities within the raw data ranges from zero to five; the Number of Injuries in the raw data has a maximum recorded count of 47 and a minimum of zero. The nonmotorized collision information reports a maximum of four for Pedal Cyclists and seven for Pedestrians, respectively, while Motor Vehicles report a maximum of 33. Data pertaining to vehicle involvement in the collision is captured by the vehicle prefix descriptors; in some cases, like hit-fixed-object crashes, the Vehicle 2 prefix in not applicable. The Diagram of Collision Type briefly describes the nature of the crash by providing some more detail than just identifying the crash type (i.e. rear end, side swipe). Impact Location Description identifies the type of arterials the crash took place, as well as where it occurred in terms of the location on the arterial (i.e. which lane, or section of the roadway). The collision data related to crash outcome are expressed by the descriptors referring to resulting injury and collision type (Most Severe Injury Type, Collision Severity, First Collision Type, First Object Struck, Second Collision Type, and Second Object Struck). Circumstantial information related to factors contributing to the crash are explained by Contributing Circumstance, DRE Assessment Code, Involved Person Action, Pedacyclist Action, and Pedestrian Actions. Descriptions of the crash event are explained by the Sequence of Event columns.

Data determined to be related to Driver Information are listed in Table 3.6. This information includes role of the individual (passenger, driver, pedestrian) in the crash, as well as some basic demographic related data (age, gender).

Table 3.6: Raw Crash Data Driver Information.

Driver Information	Description
Involved Person Type	vehicle (passenger, driver), pedal cyclist (passenger, driver), pedestrian
Age	age of individual
Gender	male, female
Air Bag Type	type of air bag, deployed (yes, no), equipped (yes, no)
Ejection Status	not ejected, partially ejected, totally ejected, unknown
Helmet Use	used, not used, unknown (if applicable)
Injury Type	dead at scene, dead on arrival, died at hospital, evident injury, no injury, non-traffic fatality, non-traffic injury, possible injury, serious injury, unknown
Seat Position	location individual was seated in at time of crash
Sobriety Level	had been drinking or not, level of impairment
Liability Insurance	yes, no
On Duty Indicator	yes, no
Restraining System Type	type of seatbelt used
Alcohol Test Result	Blood Alcohol Content (if applicable)
Clothing Visibility Type	light, dark, mixed, reflective (if applicable)
Pedestrian Pedacyclist Was Using	pedestrian facility used (i.e. crosswalk, sidewalk)
Pedestrian Pedacyclist Type	nonmotorized mode of transportation used

Some driver/vehicle related crash outcomes are contained within the Driver Information. These outcomes relate to deployment of airbag, ejection status of occupant, and most importantly, the resulting Injury Type to the individual involved in the crash. Within Table 2.6, all of the possible recorded Injury Types are listed in the description column. Contributing factors related to the crash or occupant Injury Type are also displayed within Driver Information related data. Crash related factors are described by Sobriety Level, Alcohol test Result, Clothing Visibility Type, Pedestrian Pedacyclist Was Using (pedestrian facility), and Pedestrian Pedacyclist Type (nonmotorized transportation). Injury related factors are explained by Helmet Use, Seat Position, and Restraining System Type.

The Environmental Conditions category contains seven descriptors that depict the physical environment at the time of the reported crash. These environmental descriptors detail the roadway environment, weather conditions, and special circumstances. The Environmental Conditions data describes the weather and roadway characteristics, as shown in Table 3.7.

Table 3.7: Raw Crash Data Environmental Conditions.

Environmental Conditions	Description
Weather	Clear, fog, rain, snow, etc.
Roadway Surface Condition	wet, dry, ice, etc.
Lighting Condition	daylight, streetlights, etc.
Location Characteristics	unique roadway elements (bridge, parking lot, school zone, etc.)
Roadway Characteristic	straight, curve, grade, etc.
Work zone	within work zone boundaries (if applicable)
Investigative Agency	agency responsible for investigating crash (if applicable)

Weather succinctly illustrates the climate conditions at the time of the reported crash; the Weather classifications are limited to visibility-related designations. Similarly, the Roadway Surface Condition category identifies the elements on the roadway at the time of the reported crash and are appropriately labeled as dry, ice, oil, other, sand/mud/dirt, snow/slush, standing water, unknown, or wet. Lighting Conditions identifies the source of illumination while loosely implying the time of day by indicating daylight or dark with or without street lights. Location Characteristics highlight unique features (bridge, parking lot, shopping mall, tunnel, etc.) of the arterial that may have some involvement with those particular crashes; for the majority of the observations, this column remains blank. Roadway Characteristic provides a concise description of the geometrics for the arterial; these descriptions simply identify if the roadway was straight or had some type of curve. The Work Zone descriptor is not applicable to all observations as it is contingent on the presence of a work zone at the location of the reported crash. As such, there are only three possible outcomes listed in the Work Zone parameter: In External Traffic Backup, Within Work Zone, and Workers Present. The Investigative Agency descriptor is only necessary when the reported crash requires additional assistance to gather information about the crash for such situations as a hit and run.

The last category of Vehicle Information lists the descriptors that define both personal and commercial vehicles involved in the crash. Of course, the commercial carrier and commercial vehicle information only applies if those types of vehicles were involved in the reported crash. The vehicle involved in the crash, regardless of personal or commercial transport classification, is described by Vehicle Type, Vehicle Classification, Vehicle Use, VIN, and Registered State. Vehicle Action explains what activity the vehicle was engaged in at the time of the crash, while Vehicle Condition pertains to the operating condition of the vehicle prior to involvement in the crash. For instance, if the vehicle's headlights were not in operating condition prior to the crash, it may be a contributing factor to causing the crash. Commercial Carrier and Commercial Vehicle descriptors are explained by the remaining parameters in the Vehicle Information category. The raw data for Vehicle Information is listed in Table 3.8.

Table 3.8: Raw Crash Data Vehicle Information.

Vehicle Information	Description
Vehicle Type	type of vehicle involved in crash
Vehicle Classification	applicable to non-passenger cars
Vehicle Use	special vehicle purpose (law enforcement, tow truck, vanpool, etc.)
VIN	Vehicle Identification Number
Registered State	state vehicle is registered in
Vehicle Action 1	action vehicle 1 was engaged in at the time of the crash (turning, parked, etc.)
Vehicle Condition 1	operating condition of vehicle 1 before crash
Vehicle Condition 2	operating condition of vehicle 2 before crash (if applicable)
Vehicle Condition 3	operating condition of vehicle 3 before crash (if applicable)
Commercial Carrier Address	applies to crash involving commercial transport vehicle
Commercial Carrier City Name	applies to crash involving commercial transport vehicle
Commercial Carrier Name	applies to crash involving commercial transport vehicle
Commercial Carrier State Code	applies to crash involving commercial transport vehicle
Commercial Carrier Zip Code	applies to crash involving commercial transport vehicle
Commercial Vehicle Cargo Body Type	transport type/purpose (bus, dump, flatbed, garbage/refuse, etc.)
Commercial Vehicle Class	class: bus, tractor/doubles/semi-trailer/triples, truck tractor, etc.
Commercial Vehicle Name Source	driver, log book, shipping papers, side of vehicle
GVWR	Gross Vehicle Weight Rating
Hazardous Material Name	applies if hazardous materials transported
Interstate Intrastate	intrastate or interstate travel
Number Of Axles	axle count (max = 60)
Placard Number	1-to-4-digit identification code
Placard Suffix Type Code	combustible, corrosive, explosive, gas, radioactive, infectious, oxidizer, other
USDOT Number	1-to-10-digit identification code

The raw crash data provides the basis for the modeling dataset. This data will be built upon to serve as the foundation for adjusting and modifying the raw AADT data and roadway geometric and roadside data to align with the raw crash data.

3.1.2 Raw AADT Data

The AADT data obtained from WSDOT lists the AADT values for each State Route at specific mile post markers. The WSDOT regularly releases the Annual Traffic Report (ATR) that presents the AADT data collected at various station locations around Washington State. These traffic counts are presented for each State Route and are further disaggregated by year. The data of interest for the purposes of this report concern the AADT counts for each of the State Routes and their respective recorder locations. A sample of the AADT results, captured by the Transportation Information and Planning Support (TRIPS) system, from the ATR is displayed in Figure 3.1.

STATE OF WASHINGTON - DEPARTMENT OF TRANSPORTATION
T R I P S S Y S T E M
ANNUAL TRAFFIC REPORT

STATE ROUTE	STATE ROUTE MILEPOST	LOCATION	COUPLET	FUNCT CLASS	TRUCK PERCENTAGES SNGL	DBL	TRIPLE	TOTAL	AVERAGE DAILY TRAFFIC VOLUME 2007 UNITS	2008 UNITS	2009 UNITS	2010 UNITS
	STATE ROUTE NO 002 MAINLINE SR 5/EVERETT TO IDAHO											
002	000.00B	AFTER JCT SR 529-MAPLE ST*BEG ROUTE		1					9500*	9400	9500	6500*
002	000.11B	AFTER WALNUT ST		1					12000*	12000	12000	9000*
002	000.06	AFTER JCT HEWITT AVE WYE CONN		1					21000	20000	21000	21000*
002	000.26	AT PTR LOCATION R052		1	10	01		11	69000*	68000*	72000*	73000+
002	002.03	BEFORE RAMP EBEY ISLAND		1								71000*
002	002.09	BEFORE RAMP SR 204-HEWITT AVE		1					67000*	66000	70000	72000*
002	002.45	AT EBEY SLOUGH BRIDGE		1					27000*	26000	27000	28000*
002	003.54	BEFORE RAMP BICKFORD AVE (OLD SR 2)		1					31000*	29000	30000	31000*
002	003.54	AFTER RAMP BICKFORD AVE (OLD SR 2)		1					26000*	25000	26000	26000*
002	004.75	BEFORE RAMP SR 9		1					23000*	23000	23000	24000*
002	005.04	AT SR 9		1					16000*	15000	15000	16000*
002	005.35	AFTER RAMP SR 9		1					21000*	21000	21000	21000*
002	006.51	AT CAMPBELL RD		1					19000*	18000	18000	17000*
002	006.80	AFTER RAMP CAMPBELL RD		1					28000*	27000	27000	25000*
002	010.08	AFTER JCT WESTWICK RD		1					25000	24000	24000	24000*
002	013.86	BEFORE JCT 179TH AVE SE WYE CONN		1								22000*
002	013.87	AFTER JCT 179TH AVE SE		1					25000	24000	25000	26000*
002	014.37	BEFORE RAMP SR 522		1					27000	26000	25000*	26000
002	014.38	AFTER RAMP SR 522 WYE CONN		1					38000	37000	37000*	37000
002	014.92	BEFORE JCT CHAIN LAKE RD*SR 203		1					34000	32000	31000*	31000
002	014.92	AFTER JCT CHAIN LAKE RD*SR 203		1					30000	29000	28000*	28000
002	015.21	BEFORE JCT MAIN ST WYE CONN		1					22000	21000	21000*	21000
002	015.24	AFTER JCT OLD OWEN RD WYE CONN		1					20000	19000	19000*	19000
002	016.98	AFTER JCT SOFIE RD*CALHOUN RD		1					19000	18000	19000*	19000
002	022.30	BEFORE JCT 4TH ST		1					19000	18000	19000*	19000
002	022.30	AFTER JCT 4TH ST		1					18000	17000	17000*	17000

* BASED ON ACTUAL COUNT
+ SOURCE OF TRUCK PERCENTAGES

Figure 3.1: Sample Annual Traffic Report from TRIPS

These AADT measurements were recorded at various mile posts dispersed along the state route; that is to say, the AADT counts were not reported for every mile post along the specific route. Instead, these AADT values were obtained at mile markers that were separated by more than 10 miles in distance. Additionally, these AADT values were not obtained at the same mile markers as the raw crash data. Therefore, to establish consistency between the AADT data with the crash data, the omitted mileposts were calculated via area-weighted AADT. This process will be described in further detail in the Processed Data section of this report.

3.1.3 Raw Roadway Geometrics Data

To accumulate the roadway geometrics for all of the State Routes in Washington State, two different sources from WSDOT were referred to during the data collection process. The first source concerning geometric information has been captured by the Washington State Highway Log, which

is released by WSDOT on a yearly basis and accounts for all road mileage in Washington State. The Washington State Highway Log is divided into seven separate data files that include one comprehensive log, and six regional logs. The format of the raw data was in GIS; the information contained in the report lists each State Route and their associated highway features, width and surface information, and classifications by mile post. The State Highway Log differentiates this information through three unique descriptors: 1) State Route Number, 2) Related Roadway Type (RRT), and 3) Related Roadway Qualifier (RRQ). The State Route (SR) is identified by a three-digit number for the specific route, ranging from SR 002 to SR 971. The RRT identifies the type of the roadway by the indicators listed in Table 3.9.

Table 3.9: State Highway Log Related Roadway Type Identifiers.

RRT	Definition
AR	Alternate Route
CO	Couplet
FD	Frontage Road Dec
FI	Frontage Road Inc
FS	Ferry Ship (Boat)
FT	Ferry Terminal
PR	Proposed Route
RL	Reversible Lane
SP	Spur
TB	Transitional Turnback
TR	Temporary Route
CD	Collector Distributor Dec
CI	Collector Distributor Inc
LX	Crossroad within Interchange
P1 – P9	Off Ramp, Inc
Q1 – Q9	On Ramp, Inc
R1 – R9	Off Ramp, Dec
S1 – S9	On Ramp, Dec
HD	Grade-Separated HOV-Dec
HI	Grade-Separated HOV-Inc
ML	Mainline (Implied RRT—field is blank)
UC	Under Construction

Within the Washington State Highway Logs, the RRTs used in the report include Alternate Route, Couplet, Reversible Lane, Spur, Grade-Separated HOV-Dec, Grade-Separated HOV-Inc, and Mainline. The RRQ further characterizes the SR and RRT information by listing locational information such as street information and mile post. The RRTs that are assigned RRQ information include: Alternate Route (AR), Couplet (CO), Proposed Route (PR), Reversible Lane (RL), Spur (SP), Transitional Turnback (TB), and Temporary Route (TR). The Alternate Routes do not contain any RRW information. The resulting road log released by the Washington State TRIPS system, as

part of the State Highway Log Report, contains the basis for the geometric database. A sample portion of the TRIPS report is shown in Figure 3.2.

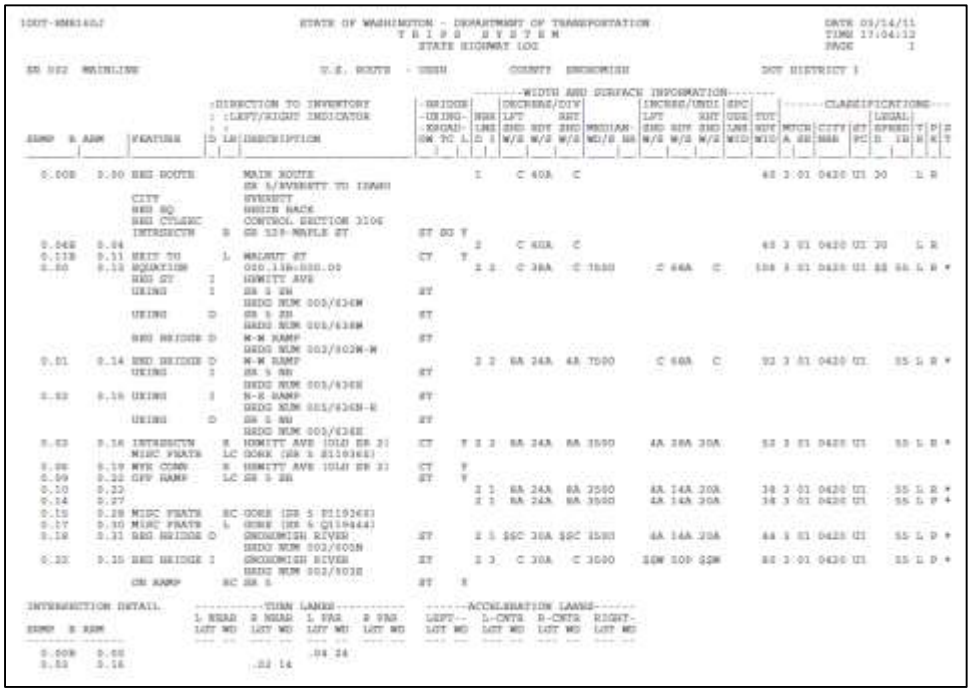

Figure 3.2: Sample Highway Log Report from TRIPS.

Table 3.10: Raw Geometric Data Horizontal Alignment Information.

Horizontal Alignment Information	Definition
LRS_Date	Date input into Linear Referencing System
SRID	State Route ID
SR	State Route
RRT	Related Route Type
RRQ	Related Route Qualifier
BegARM	Beginning Accumulated Route Mileage
EndARM	Ending Accumulated Route Mileage
BegMP	Beginning Mile Post
BegAB	Beginning Mile Post Ahead/Back
EndMP	Ending Mile Post
EndAB	Ending Mile Post Ahead/Back
HorizontalCurvePointOfTangencyArm	Horizontal Curve PT Accumulated Route Mileage
HorizontalCurvePointOfCurvatureArm	Horizontal Curve PC Accumulated Route Mileage
HorizontalCurveType	Horizontal Curve or Angle
HorizontalCurveRadius	Radius of Curve (R)
HorizontalCurveMaximum(Super)Elevation	Max Super Elevation (e)
HorizontalCurveLength	Length of Curve (L) in feet
HorizontalCurveDirection	Curve Left or Curve Right
HorizontalCurveCentralAngle	Angle of Deflection (Δ) in degrees

Additionally, the WSDOT GIS and Roadway Data Office (GRDO) provided further detailed roadway geometric data from the Linear Referencing System (LRS) that lists horizontal and vertical alignment information, number of lanes and roadway width information, and shoulder width information. This geometric data is compiled in excel spreadsheets for each geometric roadway features. The horizontal alignment, number of lanes and roadway width information, and shoulder width information, covers the geometric data from 2004 to 2011, while the vertical alignment data spans from 2006 to 2011. The raw horizontal alignment data lists the main components of each horizontal curve; some elements of horizontal curvature are omitted from the data. Of particular note for this raw data is that all of the horizontal curves listed progress in the increasing mile post direction. The horizontal curve elements included in this dataset are listed in Table 3.10. The vertical alignment data includes all of the pertinent vertical curvature information for all State Routes. This raw data uses different nomenclature to reference all vertical curve attributes to mile post markers. For instance, instead of using the definition of Vertical Point of Curvature (VPC), the raw data references the Beginning Vertical Curve Accumulated Route Mileage. The raw vertical alignment data is displayed in Table 3.11. The raw data for the number of lanes and roadway width information differentiates between the increasing and decreasing mile post directions for the State Routes is listed in Table 3.12.

Table 3.11: Raw Geometric Data Vertical Alignment Information.

Vertical Alignment Information	Definition
LRS_Date	Date input into Linear Referencing System
SRID	State Route ID
State Route Number	State Route
Related Route Type	Related Route Type
Related Route Qualifier	Related Route Qualifier
Begin ARM	Beginning Accumulated Route Mileage
End ARM	Ending Accumulated Route Mileage
Begin SRMP	Beginning State Route Mile Post
Begin AB	Beginning Mile Post Ahead/Back
End SRMP	Ending State Route Mile Post
End AB	Ending Mile Post Ahead/Back
Begin SRMP2	Beginning State Route Mile Post (Ahead/Back)
End SRMP2	Ending State Route Mile Post (Ahead/Back)
Related Roadway Type Description	RRT Description
State Route Description	State Route and Cross Street
RRT_RRQ	RRQ Description
Vertical Curve Bvc Arm	Beginning Vertical Curve Accumulated Route Mileage
Vertical Curve Vpi Arm	Vertical Point of Intersection Accumulated Route Mileage
Vertical Curve Evc Arm	Ending Vertical Curve Accumulated Route Mileage
Vertical Curve Type	Crest or Sag Curve
Vertical Curve Length	Length of Curve (ft.)
Vertical Curve Percent Grade Ahead	Grade (%) ahead of Curve
Vertical Curve Percent Grade Back	Grade (%) back of Curve

Table 3.12: Raw Geometric Data Number of Lanes and Roadway Width Information.

Number of Lanes and Roadway Width	Definition
LRS_Date	Date input into Linear Referencing System
SRID	State Route ID
SR	State Route
RRT	Related Route Type
RRQ	Related Route Qualifier
BegARM	Beginning Accumulated Route Mileage
EndARM	Ending Accumulated Route Mileage
BegMP	Beginning Mile Post
BegAB	Beginning Mile Post Ahead/Back
EndMP	Ending Mile Post
EndAB	Ending Mile Post Ahead/Back
RoadwayDirection	Increasing or Decreasing or Bothways
NumberOfLanesIncreasing	Number of Lanes in Increasing Direction
NumberOfLanesDecreasing	Number of Lanes in Decreasing Direction
RoadwayWidthInc	Roadway Width (ft.) in Increasing Direction
RoadwayWidthDec	Roadway Width (ft.) in Decreasing Direction

Similarly, the raw shoulder width data also accounts for increasing and decreasing mile post directions for the State Routes. The shoulder locations are referenced as Left, Left Center, Right Center, and Right. The shoulder width descriptors and their definitions are listed in Table 3.13.

Table 3.13: Raw Geometric Data Shoulder Width Information.

Shoulder Widths	Definition
LRS_Date	Date input into Linear Referencing System
SRID	State Route ID
SR	State Route
RRT	Related Route Type
RRQ	Related Route Qualifier
BegARM	Beginning Accumulated Route Mileage
EndARM	Ending Accumulated Route Mileage
BegMP	Beginning Mile Post
BegAB	Beginning Mile Post Ahead/Back
EndMP	Ending Mile Post
EndAB	Ending Mile Post Ahead/Back
RoadwayDirection	Increasing or Decreasing or Bothways
ShoulderWidthLeft	Shoulder Width (ft.) of outer portion of Decreasing Direction
ShoulderWidthLeftCenter	Shoulder Width (ft.) of median side of Decreasing Direction
ShoulderWidthRightCenter	Shoulder Width (ft.) of median side of Increasing Direction
ShoulderWidthRight	Shoulder Width (ft.) of outer portion of Increasing Direction

The roadway geometric data will be included in the complete database that contains elements of horizontal and vertical alignment, number of lanes and roadway width, and shoulder width. Supplemental geometric and roadside information was manually recorded and obtained through the use of WSDOT Geoportal map and SRweb programs.

3.1.4 Raw Roadside Data

The roadside data was provided by the WSDOT GRDO through the Roadside Features Inventory Program (RFIP) from which GIS information was obtained through various metadata files. The metadata files (58 files), which were separated according to specific roadside features listed in Table 3.14, were extracted from GIS, using raw roadway geometric segmentation scales.

Table 3.14: Roadside Feature Metadata Files from RFIP.

Roadside Feature/Metadata Files	
Bridge rail	guardrail
Bridge structure	guywire
cabinet	hydrant
cable barrier	Impact attenuator
concbaeesctnlngthevent	intersection point
concbarrtypeevent	mailbox
concrete barrier	Miscellaneous fixed object
concretebarrfacetrtmntevent	pedestal
culvert	pipe end
culvert end	redirectional landform
curb	regulatory outfall
ditch	road approach
ditch back slope event	roadside slope
ditch depth event	roadsideslopehtevent
ditchforeslopeevent	roadsideslopeslopevent
ditch width event	rockout cropping
downguy	special use barrier
downguy anchor	specialusebarrierhtevent
drainage inlet	storm water pond
drywell	storm water vault
fence	support
fence height event	table
fence type event	tree
glare screen	tree group
glarescreenheightevent	wall
grdrldoublesidedevent	wall height event
grdrlpostmatltypeevent	wall material type event
grdrlpostspacingevent	wall type event
grdrtypeevent	water hazard

For each roadside feature database, extensive data inventory information is captured in 61 descriptors. For the purposes of this study, the information of particular interest is the location information of the roadside feature that concerns State Route, Beginning Mile Post, and Ending Mile Post. Supplemental geometric and roadside information was recorded and obtained through the use of WSDOT Geoportal map and SRweb programs. The roadway information recorded using these services will be discussed in further detail in the Processed Data discussion.

3.2 Processed Data

This section of the report will discuss the manner in which each of the raw datasets were processed to format the data for integration. As previously mentioned, the four data components will be combined to create five complete datasets that comprises crash information, AADT data, and roadway geometric and roadside data. Each data component will be presented and the procedure for creating the processed data will be explained. The five final databases, which include Intersections, Clustered Roadway Segments, Roadway interval Segments (0.1 mile and 0.25 mile), and Homogeneous Roadway Segments, will be referenced to in the discussion on processed data, with the final databases being presented in the following section.

3.2.1 Processed Crash Data

The raw crash data from 2002 to 2010 has been formatted to sort all crashes by their associated State Route, mile post, and year. The crash data is then arranged by the "Collision Severity" category, which lists the crashes are Fatal, Injury, or PDO. The other categories from the raw data that are sorted and parsed include "Number of Injuries", "Number of Motor Vehicles Involved", "Impact Location Description", "Collision Severity", "First Collision Type", and "Injury Type". The most critical information disclosed by the crash database concerns the mile post markers that define the locations of the crashes. The mile post markers play an integral part in organizing the crash data in the final crash databases. Additionally, having the known locations of crash occurrence along each State Route also divulges the non-crash areas along the routes. Therefore, in regard to segmentation, the crashes are associated to roadway segments based on what range the mile marker locations are located within.

The manner in which the crash information is accounted for is transposed from mile marker to roadway segment. The procedure for assigning crashes to roadway segments remains consistent for all of the segment databases since the crashes are tabulated by counts within a segment. The way in which the segmentation ranges are established alters how the crash counts are accounted for among the different databases. That is to say, the 0.1 mile roadway segment interval database will show different segment crash results than the 0.25 mile roadway segment interval database because of the difference of the segment lengths. Similarly, the crash count procedure was also implemented for tabulating crash counts that occurred at intersection locations for the intersection database. This form of the processed crash data has been employed for the five databases of varying structural formats; additional crash related attributes are also included consistent with the count format. The processed data will be explained in further detail in the section that describes the final databases.

3.2.2 Processed AADT Data

AADT data obtained from WSDOT Highway Log provided AADT counts at selected mile post recording locations. The mile posts used in the crash database required AADT calculations for additional mile posts that were omitted in the raw AADT data provided by WSDOT because most of the mile post recording locations were more than 10 miles apart on some State Routes. The AADT information required for the formulation of the modeling datasets require high resolution AADT counts at closely bound mile post sections or narrower mile post intervals. Therefore, the AADT counts were interpolated to obtain the weighted-area AADT for those unaccounted mileposts listed in the different roadway segment databases. While the roadway segment lengths differ among the datasets, the procedure used to interpolate the AADT counts applies to all of the modeling datasets. The manner in which the weighted-area AADT calculations are executed will be explained using an example shown in Figure 2.3.

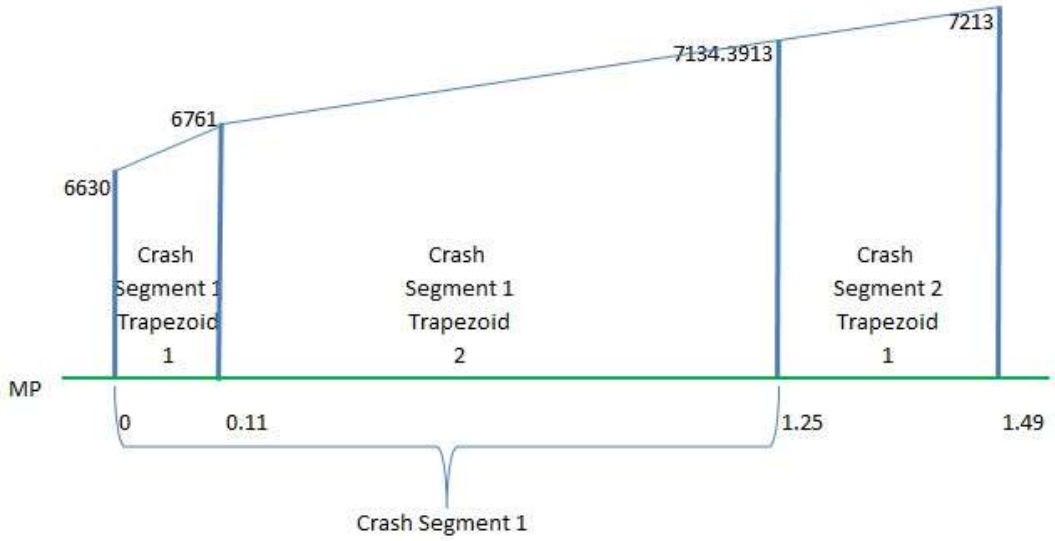

Figure 3.3: AADT Segment Interpolation.

The first step is to identify the ARM of the mile posts where WSDOT ADT counts were observed; from this, the Beginning Mile Post (BMP) and the Ending Mile Post (EMP) are established as the bounds for the analysis segment that ADT is to be obtained. From the example in Figure 3.3, the BMP ADT is 6,761 at mile post 0.11 while the EMP ADT is 7,213 at mile post 1.49. Next, we identify the location of the EMP of the crash analysis segment, which in this example is mile post 1.25 denoted by "Crash Segment 1" at the bottom of the figure. Subsequently, linear interpolation is applied to obtain the ADT at the end of the crash analysis segment at mile post 1.25. To accomplish this, we calculate the trapezoidal areas and divide by the known ADT ordinates within the crash segment limits, then add the trapezoidal areas and divide by the length of the segment.

$$BMP\ ADT + \frac{(EMP\ ADT - BMP\ ADT) * (CSEMP - BMP)}{(EMP - BMP)} = CSEMP\ ADT$$

where: *BMP ADT* is the count at the Beginning Mile Post
EMP ADT is the count at the Ending Mile Post
BMP is the location of the Beginning Mile Post marker
EMP is the location of the Ending Mile Post marker
CSEMP is the location of the Crash Segment Ending Mile Post marker
CSEMP ADT is the count at the Crash Segment Ending Mile Post

From the example in Figure 2.3 this calculation procedure to obtain the length-based weighted ADT is demonstrated as:

$$6761 + \frac{(7213 - 6761) * (1.25 - 0.11)}{(1.49 - 0.11)} = 7134.39\ ADT\ at\ mile\ post\ 1.25$$

The interpolation procedure has been applied to all of the final databases, but at different mile marker locations and distances. Since the basis of the interpolation procedure centers on the locations of known mile post markers, the calculations can be implemented for all of the each of the five databases.

3.2.3 Processed Roadway Geometrics Data

The raw geometric data consisted of three main sources: The Washington State Highway Log, the WSDOT GRDO geometrics files, and the manually recorded geometric observations from WSDOT Geoportal map and SRweb programs. The geometric data was transposed and integrated in various formats depending on the final dataset accepting the data. Similar to the processed crash data, the method in which the roadway geometric data is transposed to the roadway segments are dependent on the mile marker locations. For instance, the 0.1 mile roadway segment interval database will present the roadway geometric information differently when compared to the clustered roadway segments database. In this sense, the raw geometric data was not altered in any way with regard to assembling a stand-alone base processed geometric dataset. Instead, the raw geometric data was pulled from the various data sources and incorporated into the final databases in some fashion. However, the geometric information for the final intersection database had to be manually created.

The WSDOT GRDO geometric files include the raw data for horizontal alignment, vertical alignment, number of lanes and roadway width, and shoulder width, which supports the geometric information encompassed by four of the final databases: clustered roadway segments, 0.1 mile roadway interval segments, 0.25 mile roadway interval segments, and homogenous roadway segments. The fifth final database for intersections was created manually by examining other resources provided by WSDOT: WS Highway Log, WSDOT Geoportal map, and SRweb. The intersection location information is given by the WS Highway Logs, and additional geometric intersection information was manually recorded from visual images using the WSDOT Geoportal map and SRweb services. The nature of the geometric data in the final databases will be explained in greater detail in the final database discussion.

3.2.4 Processed Roadside Data

Assembling the roadside data for modeling purposes required the raw data to be structured and integrated into the existing data structure according to roadway segment attributes. The raw data was not altered in any way, but rather presented in a different manner based on the clustered road segments, which will be discussed in further detail in the Final Database portion of this report. Therefore, the roadside data was processed to be presented in two different forms: as dummy indicators and percent of presence in the length of the segment. To make this formation possible, the raw data was adjusted to aggregate related roadside features. The raw roadside data contains 58 roadside features and have been condensed in the processed roadside data to total 37. The roadside features in the processed data are listed in Table 3.15.

Table 3.15: Processed Data Roadside Features.

Roadside Feature	
Bridge rail	Intersection point
Bridge structure	Mailbox
Cabinet	Miscellaneous fixed object
Cable Barrier	Pedestal
Concrete Barrier	Pipe end
Culvert	Redirectional landform
Culvert end	Regulatory outfall
Curb	Road approach
Ditch	Roadside slope
Downguy	Rockout cropping
Downguy anchor	Special use barrier
Drainage inlet	Storm water pond
Drywell	Storm water vault
Fence	Support
Glare screen	Tree
Guardrail	Tree group
Guywire	Wall
Hydrant	Water hazard
Impact attenuator	

The 21 roadside features that were aggregated from the raw dataset include:

- Cable Barrier (cable_barrier, concbaeesctnlngthevent, concbarrtypeevent),
- Concrete Barrier (concrete_barrier, concretebarrfacetrtmntevent),
- Ditch (ditch, ditchbackslopeevent, ditchdepthevent, ditchforeslopeevent, ditchwidthevent),
- Fence (fence, fenceheightevent, fencetypeevent),
- Glare Screen (glarescreen, glarescreenheightevent),
- Guardrail (guardrail, grdrldoublesidedevent, grdrlpostmatltypeevent, grdrlpostspacingevent, grdrtypeevent),

- Roadside Slope (roadsideslope, roadsideslopehtevent, roadsideslopeslopevent),
- Special Use Barrier (specialusebarrier, specialusebarrierhtevent),
- Support (support, table), and
- Wall (wall, wallheightevent, wallmaterialtypeevent, walltypeevent).

By reducing the roadside features from 58 elements to 37, the roadside dataset becomes more manageable by aggregating the closely related roadside features. The roadside features are grouped together because the differentiation among the features within the group are marginal; that is to say, the characteristics are similar and do not require individual categories.

3.3 Final Databases

The data that encompasses crash information, AADT counts, roadway geometrics, and roadside data, have been compiled into several databases as the basis for intensive modeling purposes. The extensive nature of the raw databases permits flexibility in developing the different datasets. As a result, five different databases have been created using the raw data and processed data: 1) *Intersection Crash Database*, 2) *Clustered Roadway Segments* (structured according to crash and zero-crash clusters), 3) *Roadway Interval Segments at 0.1 mile* increments, 4) *Roadway Interval Segments at 0.25 mile* increments, and 5) *Homogeneous Roadway Segments*. This section of the report will describe the nature of the data for each of the five databases. Of particular note, the discussion on these final databases center on the content of the data; for modeling purposes, the base data contained within these databases may be altered in some form according to type of model executed for analysis.

3.3.1 Intersection Crash Database

The *Intersection Crash Database* is complete with geometric features and crash indicators. The WS Highway Log defines the locations, by mile post, of the intersections along each State Route by listing the State Route Mile Post (SRMP) and ARM. Having known each location, the initial database begins with the demarcations of the SRMP and ARM for each intersection, along with additional information disclosed from the WS Highway Log, including a description of the intersection location with identification of the cross street. Also included within the *Intersection Crash Database* are ramp locations and some interchange arrangements that are classified as intersections. In all, the database inventories the RRTs of Couplet, Spur, On Ramp (Q1-Q9 and S1-S9), Off Ramp (P1-P9 and R1-R9), and Mainline, based on the information provided by the WS Highway Log which serves as the foundation for the database. Additional data integrated in the *Intersection Crash Database* were obtained from the Geoportal map and SRWeb services provided by WSDOT. The Geoportal map is a topographic map imagery service that was used to record the geometric data of number of legs at each intersection, and the angle of approach (oblique or 90 degrees). The SRWeb service, which provides a driver's perspective of the roadway, was referenced to determine the traffic control device type at each intersection, i.e. stop-controlled or signalized. The crash counts are location specific in the sense that the counts are accumulated for each intersection based on mile post marker. That is, the intersections are denoted by specific individual mile post locations, unlike the roadway segment arrangements that span distances marked by a beginning mile post and ending mile post. The mile post specific intersection locations

report limited or low crash counts; as a result, the crash information was expressed to indicate the presence of a crash occurring or not. Table 3.16 lists the columns contained in the intersection crash database with a description for each parameter.

Table 3.16: Intersection Crash Location Parameters.

Parameter	Description
SRMP	Starting Ramp Mile Post
ARM	Accumulated Route Mileage
FEATURE	location description of intersection
INTRSECTN	presence of intersection
3/4/5 legs	number of legs in the intersection
Oblique/90	Oblique or 90 degree angle
Signalized/Unsignalized	type of traffic control at intersection
Ramp	indicator for ramp
Couplet	indicator for couplet
Spur	indicator for spur
Crash	indicator for crash occurrence

Extending the intersection analysis area from specific mile post location to an area around the intersection that ranges from 0.01 miles, up to 0.05 miles, revealed that the crash counts did not demonstrate a significant increase in the amount of crashes. Therefore, the crash presence indicator was deemed to be sufficient for the intersection database. No models have been run with this intersection specific database; this data analysis primarily served as the foundation for creating the intersection segments and non-intersection segments databases.

3.3.2 Clustered Roadway Segments

Crashes were clustered to the degree of 0.1 miles in distance; that is, all crashes that occurred on the State Route that were within 0.1 miles upstream of another crash were clustered together to create a crash segment based on the reported mile post locations. Zero crash clusters were populated to account for the omitted crash segments and mile posts between the recorded crash clusters. The crash clusters and zero-crash clusters collectively account for all mileage along the State Routes. The AADT information, roadway geometric, and roadside data populate these heterogeneous roadway segments according to the crash and zero-crash cluster segments. That is to say, the manner in which the road segments were determined (dictated by the presence or non-presence of crash occurrence) will serve as the basis for which the additional roadway data will be populated. Thus, the structure of this database is predicated on a clustered segmentation basis that contains 49 columns, with 36 pertaining to crash related descriptors. The formulation of the crash cluster segments themselves span across all nine years of crash data (2002-2010). However, each individual cluster segment contains nine rows that correspond to each year of crash data to disaggregate the recorded crashes by year. Thus, the aggregate nine years of crash data dictates the delineation of the crash cluster segments while the rows for each cluster segment are disaggregated according to year. Table 3.17 shows the columns contained in the clustered roadway segments database with a brief description for each parameter.

Table 3.17: Clustered Roadway Segments Database Parameters.

Parameter	Description
Segment ID	identification number assigned to the roadway segment
Begin MP	beginning Mile Post of segment
End MP	ending Mile Post of segment
Begin ARM	beginning Accumulated Route Mileage of segment
End ARM	ending Accumulated Route Mileage of segment
Length	length of segment (in miles)
Year	year of recorded data
Average ADT-Segment	average Annual Daily Traffic for segment
Total	total count of roadside and roadway crashes in segment
Roadside	count of roadside crashes in segment
Roadway	count of roadway crashes in segment
PDO Crashes	count of reported Property Damage Only from crashes in segment
Possible Injury	count of reported Possible Injury from crashes in segment
Evident Injury	count of reported Evident Injury from crashes in segment
Serious Injury	count of reported Serious Injury from crashes in segment
Fatal	count of reported Fatal from crashes in segment
Injury/non injury>1	dummy if injury-noninjury ratio is greater than 1
Injury/non injury=1	dummy if injury-noninjury ratio is equal to 1
Injury/non injury <1	dummy if injury-noninjury ratio is less than 1
1-vehicle	count of crashes in segment involving 1 vehicle
2-vehicle	count of crashes in segment involving 2 vehicles
3-vehicle	count of crashes in segment involving 3 vehicles
4-vehicle	count of crashes in segment involving 4 vehicles
>=5-vehicle	count of crashes in segment involving 5 or more vehicles
Rear End	count of Rear End type crashes in segment
Turning Rear End	count of Turning Rear End type crashes in segment
Same Direction Turning Sideswipe	count of Same Direction Turning Sideswipe type crashes in segment
Same Direction Sideswipe	count of Same Direction Sideswipe type crashes in segment
Same Direction Turning	count of Same Direction Turning type crashes in segment
Same Direction Others	count of Same Direction Others type crashes in segment
Head On	count of Head On type crashes in segment
Opposite Direction Sideswipe	count of Opposite Direction Sideswipe type crashes in segment
Opposite Direction Turning	count of Opposite Direction Turning type crashes in segment
Opposite Direction Others	count of Opposite Direction Others type crashes in segment
Fixed Object	count of Fixed Object type crashes in segment
Entering At Angle	count of Entering At Angle type crashes in segment
Overturned	count of Overturn type crashes in segment
Animal	count of Animal type crashes in segment
Bicycle	count of Bicycle type crashes in segment
Pedestrian	count of Pedestrian type crashes in segment
One Parked/One Moving	count of One Parked/One Moving type crashes in segment
Entering/Leaving Driveway	count of Entering/Leaving Driveway type crashes in segment
Other	count of crashes classified as Other in segment
Not Stated	count of crashes classified as Not Stated in segment

Of particular note within the crash cluster segment database is that the crash information is transposed to the segmentation context. That is, the crashes recorded within the segments are captured in the counts of crash severity (PDO, Possible Injury, Evident Injury, etc.), vehicles/persons involved in the crash (injury/non injury > 1, injury/non-injury = 1, 1-vehicle, 2-vehcile, etc.), and crash type (Rear End, Turning Rear End, Same Direction Turning Sideswipe, etc.). The "injury/non injury" categories pertain to motor vehicles involved in crashes; additionally, crashes with less than one "injury/non injury" indicates the occurrence of a nonmotorized crash involving pedestrians or bicyclists. The total number of recorded crashes along the segment includes both roadway and roadside crashes; these crashes are further classified in crash severity and crash type. Thus, the summation of the crash severity counts and the crash type counts are equal to the total crashes recorded on the segment. Some exploratory Traditional SPF models were run with particular database, but were found to lack in performance compared to the *Homogeneous Roadway Segments* database.

3.3.3 Roadway Interval Segments (0.1 mile)

The database for the 0.1 mile roadway interval segments uses the same 49 parameters listed in Table 2.17 for the clustered roadway segments database, but accounts for the segments incrementally by units of 0.1 miles. As a result, the segments are homogeneous in length since all segments, stretching the length of all of the State Routes, are 0.1 mile in length. The ADT calculations were interpolated for each 0.1 mile segment, including the zero crash segments. The nine years of crash data are listed for each segment in the same disaggregate manner as the clustered roadway segments. Consequently, the number of segments in the 0.1 mile roadway interval segment database exceeds the number of segments in the clustered roadway segment database. Exploratory Traditional SPF models were performed with this database, but did not produce results as well as the *Homogeneous Roadway Segments* database.

3.3.4 Roadway Interval Segments (0.25 mile)

The parameters used in the 0.25 mile roadway interval segments database are also the same 49 parameters listed in Table 2.17 for the clustered roadway segments database. The segments within this dataset are arranged in incremental units of 0.25 miles covering all mileage along the State Routes. The ADT calculations were interpolated on the 0.25 mile basis, including the zero crash segments. Nine years of crash data are disaggregated for each 0.25 mile roadway segment. The number of segments in the 0.25 mile roadway interval segment database is greater than the number of segments in the clustered roadway segment database, but less than the number of segments in the 0.1 mile roadway interval segment database. Similar to the *0.1 Mile Roadway Interval Segments* database, exploratory Traditional SPF models with the *0.25 Mile Roadway Interval Segments* database did not perform as well as the *Homogeneous Roadway Segments* database.

3.3.5 Homogenous Roadway Segments

Homogenous roadway segments are defined as segments that maintain consistency in characteristics for the length of the segment, with a new segment being defined when the roadway characteristics change. For this database, the characteristics that dictate the homogenous segments are the roadway geometrics. The raw geometric data consisting of horizontal alignment, vertical

alignment, number of lanes and roadway width, and shoulder width comprise the characteristics that govern the homogenous segments. As such, the shortest segment length that maintains consistent roadway geometrics measures 0.01 miles in length. This fine level of detail increases the segment count within the database as the total number of observations is 563,382 for nine years of crash data in the homogenous roadway segment database.

A total number of 138 parameters are captured in the database which covers crash descriptors, roadway geometrics, roadside information, and AADT values. However, not all segments contain complete roadway geometric information; these cells with omitted geometric information within the dataset were populated with the value -99 to signify missing data. Additionally, 25 State Routes are omitted from this database because no roadway geometric information is available for those routes. The omitted State Routes are: 2, 19, 41, 100, 102, 103, 110, 113, 116, 119, 121, 122, 131, 170, 194, 197, 225, 262, 263, 278, 300, 508, 546, 547, and 971. Table 3.18 lists the parameters in the homogenous roadway segments database with a brief description for each one.

Table 3.18: Homogeneous Roadway Segments Database Parameters.

Parameter	Description
Year	Crash year
SR	State Route Number
BARM	Beginning Accumulated Route Mileage
EARM	Ending Accumulated Route Mileage
Length	length of segment (miles)
totalacc	total count of roadside, roadway, and other location crashes in segment
rdside	count of roadside crashes in segment
rdway	count of roadway crashes in segment
othloc	count of other location crashes in segment
pdo	count of reported Property Damage Only from crashes in segment
pinj	count of reported Possible Injury from crashes in segment
evi	count of reported Evident Injury from crashes in segment
sinj	count of reported Serious Injury from crashes in segment
fatal	count of reported Fatal from crashes in segment
unknown	count of reported Unknown Injury from crashes in segment
hiinj	Dummy if injury-noninjury ratio is greater than 1
justinj	Dummy if injury-noninjury ratio is equal to 1
loinj	Dummy if injury-noninjury ratio is less than 1
veh1	count of crashes in segment involving 1 vehicle
veh2	count of crashes in segment involving 2 vehicles
veh3	count of crashes in segment involving 3 vehicles
veh4	count of crashes in segment involving 4 vehicles
veh5	count of crashes in segment involving 5 vehicles
othveh	count of crashes in segment involving more than 5 vehicles
rend	count of Rear End type crashes in segment
trend	count of Turning Rear End type crashes in segment

Table 3.18 (continued): Homogeneous Roadway Segments Database Parameters.

Parameter	Description
sdirtsw	count of Same Direction Turning Sideswipe type crashes in segment
sdirsw	count of Same Direction Sideswipe type crashes in segment
sdirt	count of Same Direction Turning type crashes in segment
sdiroth	count of Same Direction Others type crashes in segment
headon	count of Head On type crashes in segment
odirsw	count of Opposite Direction Sideswipe type crashes in segment
odirt	count of Opposite Direction Turning type crashes in segment
odiroth	count of Opposite Direction Others type crashes in segment
fobj	count of Fixed Object type crashes in segment
eang	count of Entering At Angle type crashes in segment
oturn	count of Overturn type crashes in segment
animal	count of Animal type crashes in segment
bicycle	count of Bicycle type crashes in segment
ped	count of Pedestrian type crashes in segment
onepark	count of One Parked vehicle type crashes in segment
onemove	count of One Parked/One Moving type crashes in segment
entlvdr	count of Entering/Leaving Driveway type crashes in segment
other	count of crashes classified as Other in segment
nostate	count of crashes classified as Not Stated in segment
truck	count of Truck type crashes in segment
NumberOfLanesIncreasing	Number of Lanes in Increasing Direction
NumberOfLanesDecreasing	Number of Lanes in Decreasing Direction
RoadwayWidthInc	Roadway Width (ft.) in Increasing Direction
RoadwayWidthDec	Roadway Width (ft.) in Decreasing Direction
HorizontalCurvePointOfTangencyArm	Horizontal Curve PT Accumulated Route Mileage
HorizontalCurvePointOfCurvatureArm	Horizontal Curve PC Accumulated Route Mileage
HorizontalCurveRadius	Radius of Curve (R)
HorizontalCurveMaximumElevation	Max Super Elevation (e)
HorizontalCurveLength	Length of Curve (L) in feet
HorizontalCurveCentralAngle	Curve Left or Curve Right
VerticalCurveBvcArm	Beginning Vertical Curve Accumulated Route Mileage
VerticalCurveVpiArm	Vertical Point of Intersection Accumulated Route Mileage
VerticalCurveEvcArm	Ending Vertical Curve Accumulated Route Mileage
VerticalCurveLength	Length of Curve (ft.)
VerticalCurvePercentGradeAhead	Grade (%) ahead of Curve
VerticalCurvePercentGradeBack	Grade (%) back of Curve
ShoulderWidthLeft	Shoulder Width (ft.) of outer portion of Decreasing Direction
ShoulderWidthLeftCenter	Shoulder Width (ft.) of median side of Decreasing Direction
ShoulderWidthRightCenter	Shoulder Width (ft.) of median side of Increasing Direction
ShoulderWidthRight	Shoulder Width (ft.) of outer portion of Increasing Direction
nlanei	number of lanes in increasing direction
nlaned	number of lanes in the decreasing direction
hcang1	horizontal curve angle
A1	difference in gradients for vertical Curve

Table 3.18 (continued): Homogeneous Roadway Segments Database Parameters.

Parameter	Description
K1	K-value for vertical curve
dgc1	degree of curvature for horizontal curve
RLNw	average lane width (ft.)
Swr23l67	dummy right shoulder width 2-3 ft. increasing | 6-7 ft. decreasing
Swr45l01	dummy right shoulder width 4-5 ft. increasing | <1 ft. decreasing
Swr45l23	dummy right shoulder width 4-5 ft. increasing | 2-3 ft. decreasing
Swr89l01	dummy right shoulder width 8-9 ft. increasing | <1 ft. decreasing
Swr89l10	dummy right shoulder width 8-9 ft. increasing | >10 ft. decreasing
Swr10l01	dummy right shoulder width >10 ft. increasing | <1 ft. decreasing
Swr10l23	dummy right shoulder width >10 ft. increasing | 2-3 ft. decreasing
Swr10l45	dummy right shoulder width >10 ft. increasing | 4-5 ft. decreasing
Swc19	dummy center shoulder width 1-9 ft.
AADT	Average Annual Daily Traffic
Dbridgerail	dummy for bridge rail
Lbridgerail	percent length of segment for bridge rail
Dbridgstructure	dummy for bridge structure
DCabinet	dummy for cabinet
DCablebarrier	dummy for cable barrier
LCablebarrier	percent length of segment for cable barrier
DConcretebarrier	dummy for concrete barrier
LConcretebarrier	percent length of segment for concrete barrier
DCulvert	dummy for culvert
LCulvert	percent length of segment for culvert
Dculvertend	dummy for culvert end
DCurb	dummy for curb
LCurb	percent length of segment for curb
DDitch	dummy for ditch
LDitch	percent length of segment for ditch
DDownguy	dummy for down guy
LDownguy	percent length of segment for down guy
Ddownguyanchor	dummy for down guy anchor
Ddrainagelet	dummy for drainage inlet
Ddrywell	dummy for drywell
Dfence	dummy for fence
Lfence	percent length of segment for fence
Dglarescreen	dummy for glare screen
Lglarescreen	percent length of segment for glare screen
Dguardrail	dummy for guardrail
Lguardrail	percent length of segment for guardrail
DGuywire	dummy for guywire
LGuywire	percent length of segment for guywire
DHydrant	dummy for hydrant

DImpactattenuator	dummy for impact attenuator
DIntersectionpoint	dummy for intersection point
DMailbox	dummy for mailbox
DMiscellaneousfixedobject	dummy for miscellaneous fixed object

Table 3.18 (continued): Homogeneous Roadway Segments Database Parameters.

Parameter	Description
DPipend	dummy for pipe end
Dredirectionallanform	dummy for directional land form
Lredirectionallanform	percent length of segment for directional land form
DRegulatoryoutfall	dummy for regulatory outfall
Droadapproach	dummy for road approach
DRoadsideslope	dummy for roadside slope
LRoadsideslope	percent length of segment for roadside slope
Drockoutcropping	dummy for rock outcropping
Lrockoutcropping	percent length of segment for rock outcropping
Dspecialusebarrier	dummy for special use barrier
Lspecialusebarrier	percent length of segment for special use barrier
Dstormwaterpond	dummy for storm water pond
Dstormwatervault	dummy for storm water vault
Dsupport	dummy for support
Dtree	dummy for tree
Dtreegroup	dummy for tree group
Ltreegroup	percent length of segment for tree group
Dwall	dummy for wall
Lwall	percent length of segment for wall
Dwaterhazard	dummy for water hazard
Lwaterhazard	percent length of segment for water hazard

3.3.5.1 Intersection and Non-Intersection Databases

The *Homogeneous Roadway Segments Database* is expressed in the form of two separate modeling databases: 1) including intersection locations/segments and 2) excluding intersection locations/segments. The motivation behind creating the two separate modeling databases is to examine the effect that intersection segments have on crash prediction. Intersections may affect the SPF of the models, therefore, the databases were disaggregated to include and exclude segments that contain intersections to demonstrate the impact intersections may have. That is, if the data were to be segmented in such a manner where intersection locations are identified and removed, how would the predictive models behave? The effect of intersection locations on crash prediction is examined by isolating the mid-block characteristics of non-intersection crashes, hence, comparing two different sets of models that include and exclude intersection locations.

The *Intersection Segments Database* contains the 563,382 observations described in the prior section. The *Non-Intersection Segments Database* omits defined intersection segments from the data and contains pure mid-block segments. Roadway segments within the *Homogeneous Roadway Segments Database* that contain intersections are demarcated by approximately 0.05 miles (250 feet) prior and immediately following the intersection mile post as identified by the WS Highway Log. From these intersection mile post locations, the segments deemed to be influenced by an intersection were clustered to create the intersection segment. That is, the 250 foot boundary establishes the center lines of the intersections, but does not necessarily reflect the effect on the traffic stream. In some instances, intersection segments may be recorded as being several miles in length due to succession of intersections along a roadway. Within the *Homogeneous Roadway Segments Database*, the greatest intersection segment length spans over 10 miles. When excluding

intersection segments from the *Homogeneous Roadway Segments Database*, a total number of 136,836 intersection segments were removed, which results in 426,546 total observations for the *Non-Intersection Segments Database*.

4.0 Modeling Evolution

The primary database used for crash prediction modeling is the *Intersection and Non-Intersection Homogeneous Roadway Segments Database*. The depth of roadside information available for the State Routes has allowed modeling efforts to include greater detail with additional predictors and regressors. This added complexity permits the SPFs to be conducted on a route-by-route basis as opposed to functional class alone. The statistical basis for the route-by-route estimation is important since many of the route dummies are significant in the overall model. For instance, 37 dummies are significant in the *Non-Intersection Segments* model. The overall evolution of the modeling process involves model development for:

1) Traditional SPFs,
2) Advanced SPFs of the Basic Type,
3) Route Specific Advanced SPFs of the Basic Type,
4) Generalized Advanced SPFs, and
5) Random Parameter Advanced SPF.

The model typology is organized in the following manner shown in Table 4.1 which describes the model development for each type. These models correspond to Task 2 for SPF development and increasingly become more advanced in complexity and predictive power.

Table 4.1: Model Typology.

Model Type	Variables/Regressors	Description
Traditional SPF	ADT+Length Offset	***# Models equals 31:*** including total crashes, severity types, collision types, and vehicle involvement types
Advanced SPF of the Basic Type	ADT+Length- Offset+Roadway-Geometrics+Route-Dummies	***# Models equals 31:*** including total crashes, severity types, collision types, and vehicle involvement types
Route Specific Advanced SPF of the Basic Type	ADT+Length-Offset+Roadway-Geometrics for Specific Routes	***# Models equals 2,046:*** including total crashes, severity types, collision types, and vehicle involvement types; for 62 route categories
Generalized Advanced SPF	ADT+Length-Offset+Roadway-Geometrics +Route-Dummies-with Dispersion-Heterogeneity-Due-to-Roadside	***# Models equals 31:*** including total crashes, severity types, collision types, and vehicle involvement types
Random Parameter, Advanced SPF	ADT+Length-Offset+Roadway-Geometrics +Route-Dummies-with Random Parameter-Heterogeneity-Due-to-Roadside	***# Models equals 31:*** including total crashes, severity types, collision types, and vehicle involvement types

Of particular note in Table 4.1 is the inclusion of additional variables in the models as they advance from the Traditional SPF to the Random Parameter SPFs. Of course, the variables and regressors listed in the table only show the generalized categorical regressor of roadway geometrics which does not reflect the full scope of including all possible roadway characteristics into the models. Nevertheless, the model typology proceeds in additional variable inclusion.

4.1 Modeling Framework

To visualize the overall evolution of the modeling system, Figure 4.1 depicts a flow chart that illustrates the modeling evolution categorized into four phases: Fixed Parameter Models, Heterogeneity SPFs, Random Parameter Models, and Validation.

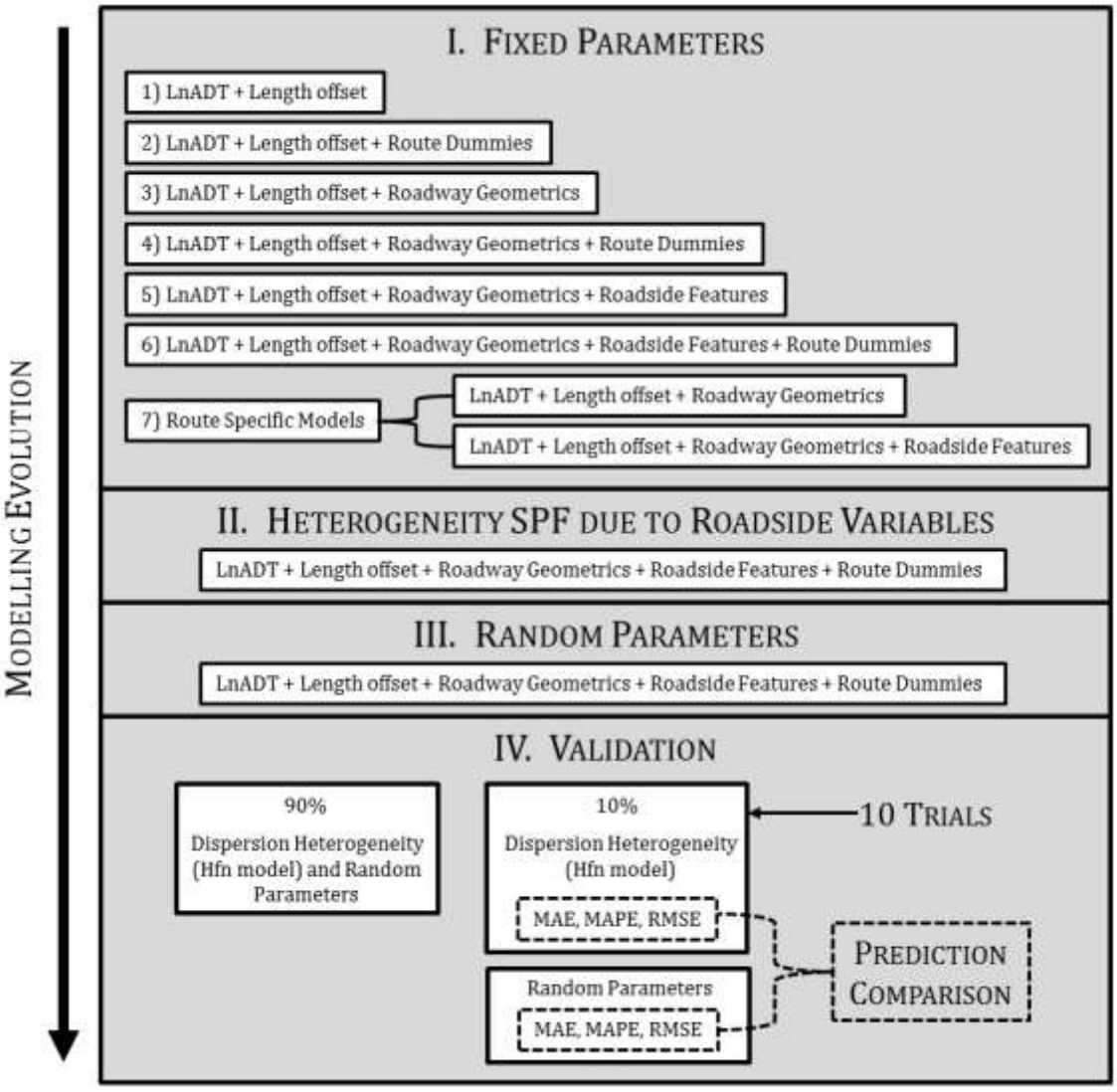

Figure 4.1: Modeling Evolution Flow Chart.

The representation of the modeling evolution into different phases is intended to align the modeling work with the tasks outlined in the project evolution, with respect to the model typology.

As such, Phases I, II, and III coincide with Task 2 for SPF development, while Phase IV corresponds to Task 3 for SPF benchmarking. The Fixed Parameter Models in Phase I refer to the Traditional SPFs, Advanced SPFs, and Route Specific Advanced SPFs of the Basic Type. The model types captured in the Heterogeneity SPF due to Roadside Variables in Phase II correspond to the Generalized Advanced SPF models, while the Random Parameters Advanced SPF model type is characterized by Phase III.

4.2 Modeling Output Matrix

The purpose of the modeling output matrix serves as the appendix for this report which lists the results for all of the models conducted for the Washington State Route analysis. These modeling results have been organized in an excel spreadsheet according to model type and corresponding modeling phase. The matrix provides links that navigate through the modeling lexicon with hyperlinks that direct the user to the desired modeling results for each specific model type consistent with the modeling framework. The first page organizes the Phase I and Phase II models for the fixed parameters in two columns that use the *Intersection Segments Database* (including intersections) and *Non-Intersection Segments Database*.

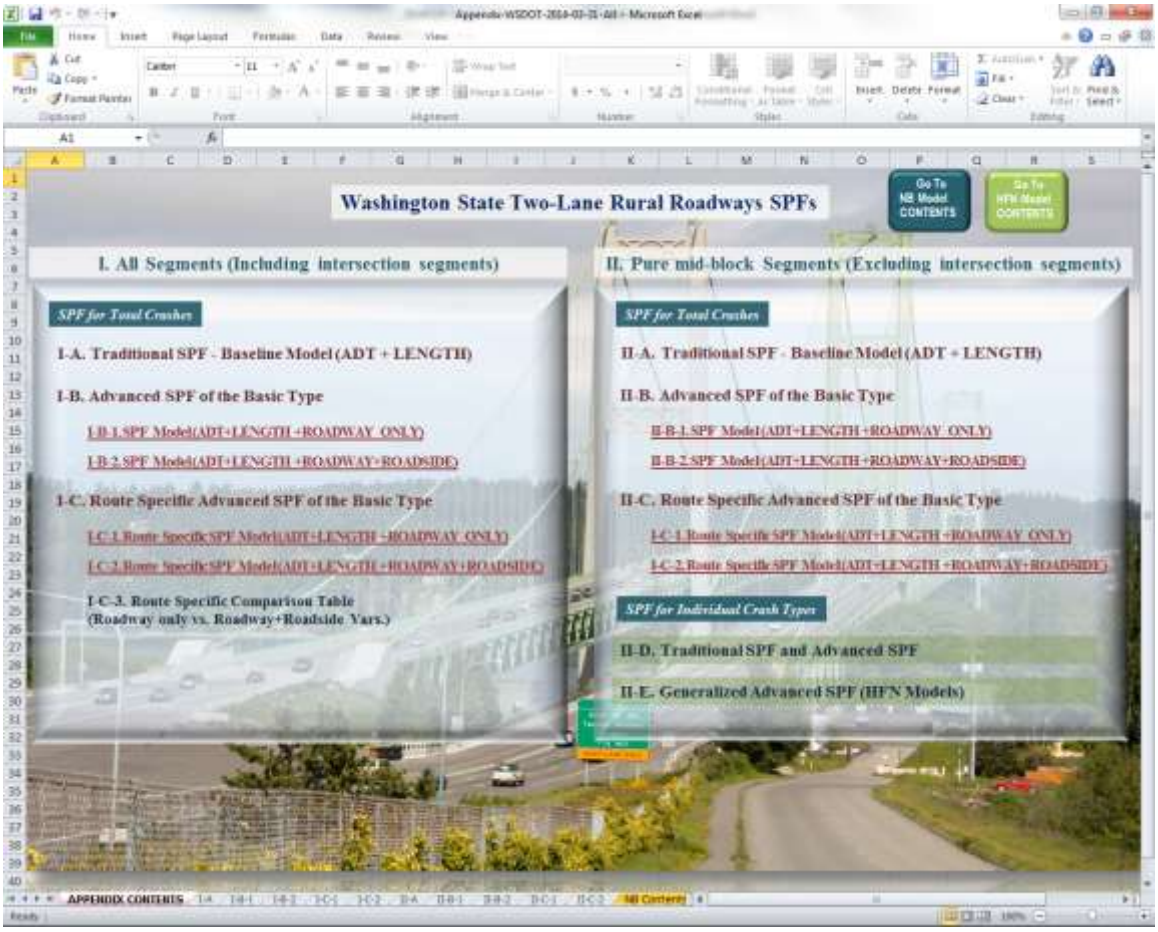

Figure 4.2: Modeling Output Matrix Main Page Links.

The Phase I modeling results are presented in order from Traditional SPFs, to Advanced SPFs, to the Route Specific SPFs for both databases. With the *Intersection Segments Database*, the last link compares the Route Specific SPFs for models that include and do not include roadside variables. For the *Non-Intersection Segments Database*, SPFs were calculated for individual crash types with Traditional and Advanced SPFs, followed by Phase II models for Generalized Advanced SPFs for the Heteroskedastic Function (HFN) models. Those links also correspond to the links in the top right-hand corner that will present the results for the Negative Binomial (NB) models and the HFN models.

The link for the NB models for Individual Crash Types shows 31 modeling results categorized by crash type, with each link associated with each model output. Additionally, links are available to redirect the user to access the main appendix page or the HFN models for Individual Crash Types. The page for the NB models for Individual Crash Types is shown in Figure 4.3.

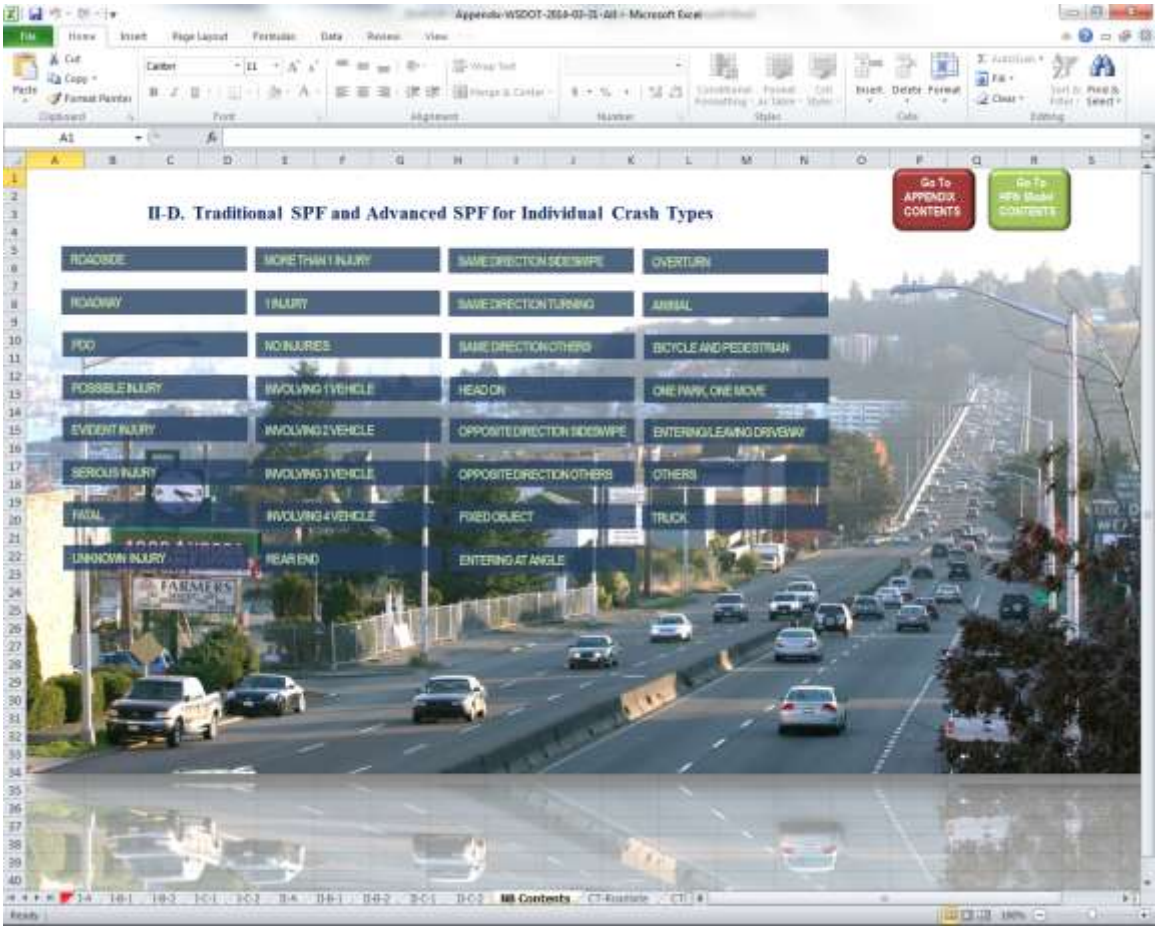

Figure 4.3: Modeling Output Matrix Phase II NB Individual Crash Types Links.

The page in the appendix for the HFN models for individual Crash Types contains the links for 30 models categorized by crash type, in addition to a summary table to compares the coefficients of the NB and HFN models, as well as the alpha and log-likelihood results. The page for the HFN models for Individual Crash Types in shown in Figure 4.4.

Figure 4.4: Modeling Output Matrix Phase II HFN Individual Crash Types Links.

5.0 Washington State Route Analysis

5.1 Baseline SPF Models

The Baseline SPF Models estimated total crashes along the segment following the progression in items 1 thru 6 of the Phase I Models as shown in Figure 5.1.

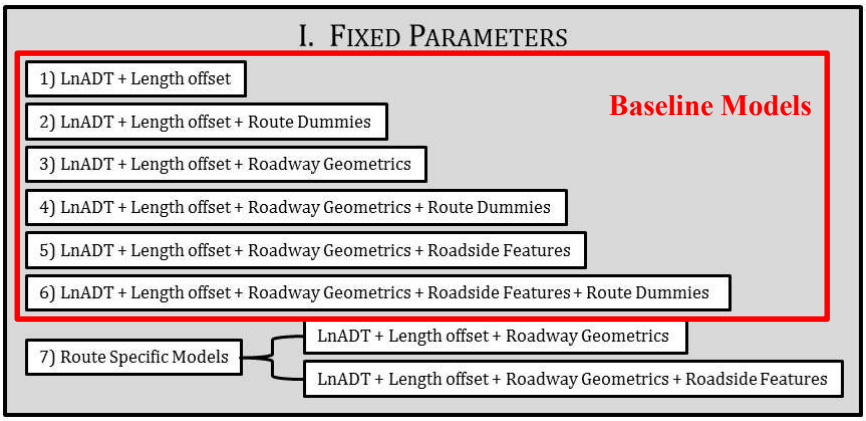

Figure 5.1: Baseline Models from Phase I.

Models 1 thru 6 were completed using both the *Intersection Segments Database* and *Non-Intersection Segments Database*. This totals 12 models that were developed for estimating total crash counts. The model results are listed in the Appendix file.

Phase I begins with the Traditional SPF models that only include ADT and Length as the independent variables. The model output improves in log-likelihood and pseudo-R^2 progressing from the Traditional SPFs to the Advanced SPF of the Basic Type. The log-likelihood values improve by approaching zero while the R^2 values slightly decrease as the models proceed from Traditional to Advanced SPFs for both the *Intersection* and *Non-Intersection Segments Databases*. Moreover, the constant in the models also improve in t-stat as well.

5.2 SPF Route Specific Models

The SPF Route Specific Models estimated total crashes as shown in item 7 of the Phase I models, illustrated in Figure 5.2.

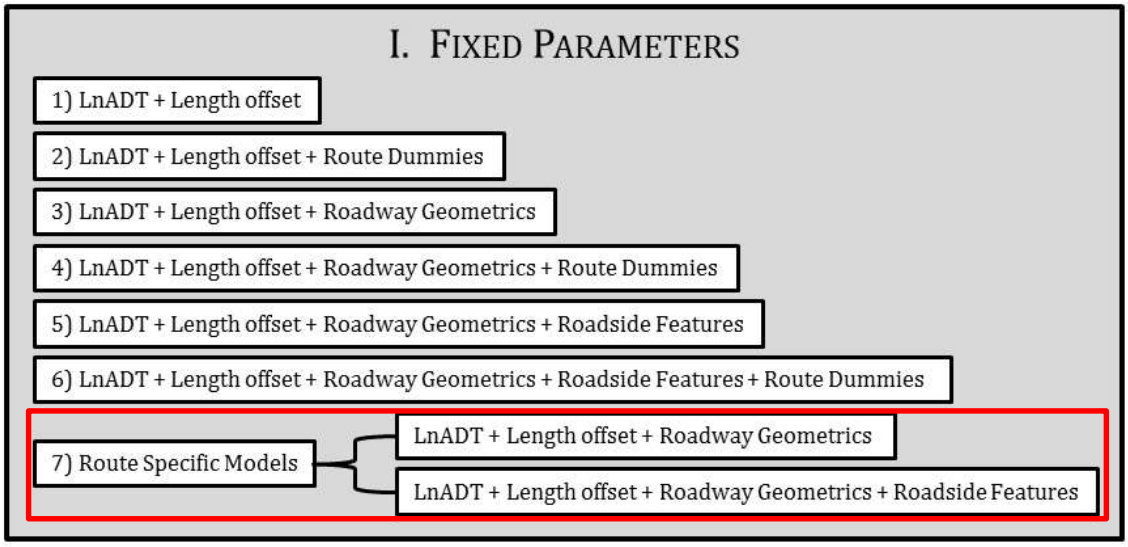

Figure 5.2: Route Specific Models from Phase I.

The total number of SPF Route Specific models is 212; this includes 106 models run using the *Intersection Segments Database* and 106 models run with the *Non-Intersection Segments Database*. Fifty-three different State Routes were captured in the Route Specific Models. The results from these models are shown in the Appendix file.

When comparing the Route Specific SPFs that include and do not include the roadside variables, the R^2 values generally tend to be greater when including the roadside variables; additionally, the log-likelihood appears to decrease slightly among the models when including the roadside variables. The increase in the R^2 values may serve as a reflection of increased variations in observations due to the inclusion of additional parameters. However, the improvement in the log-likelihood values reflects an improvement in the predictive capability of the models when incorporating roadside variables.

5.3 SPF for Individual Crash Types

The SPF for Individual Crash Types were conducted for items 1 thru 6 of the Phase I Models, as displayed in Figure 5.3. These models are conducted with the *Non-Intersection Segments Database* for the Individual Crash Type SPFs.

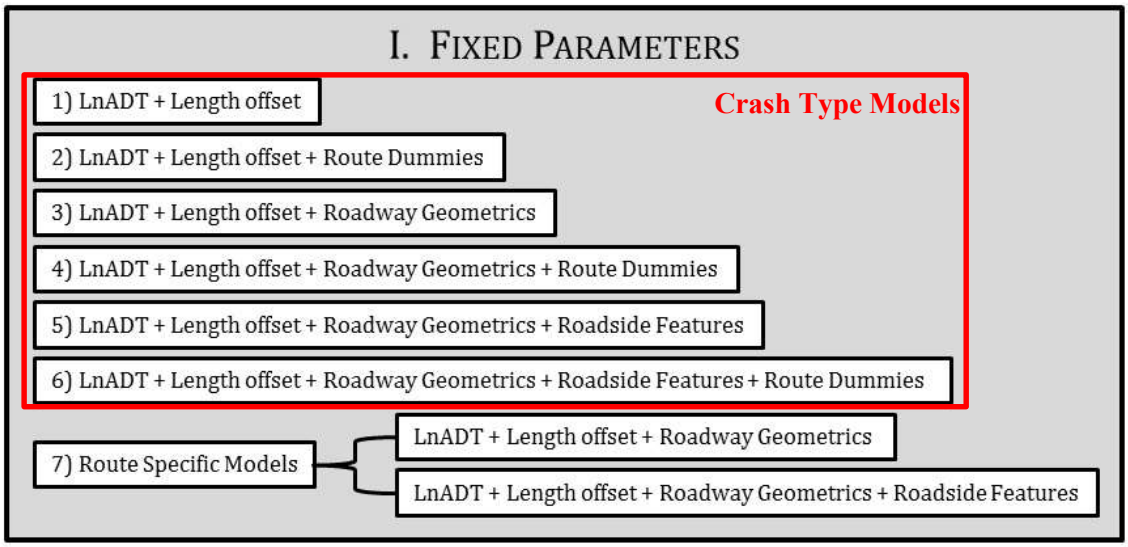

Figure 5.3: Crash Type Models from Phase I.

The dependent variables for the Phase I models are listed in Table 5.1 which describes each parameter that was estimated for the SPF Crash Type models.

A total 186 models were performed for 31 different crash types (six models for each crash type). The 31 dependent variables were modelled using the *Non-Intersection Segments Database*. The results of the SPF for Individual Crash Types models are listed in the Appendix file. The original raw crash dataset contains 41 dependent variables (crash types). Of the 41 crash types from the raw dataset, two were combined into one category (bicycle and pedestrian) because of low crash counts. Additionally, eight were omitted from the SPF for Individual Crash Type models because of low observation counts less than 200 across nine years of crash data. The eight omitted dependent variables will be revisited to be included in another set of models.

Table 5.1: Dependent Variables for Phase I Models.

Parameter	Description
rdside	count of roadside crashes in segment
rdway	count of roadway crashes in segment
pdo	count of reported Property Damage Only from crashes in segment
pinj	count of reported Possible Injury from crashes in segment
evi	count of reported Evident Injury from crashes in segment
sinj	count of reported Serious Injury from crashes in segment
fatal	count of reported Fatal from crashes in segment
unknown	count of reported Unknown Injury from crashes in segment

Table 5.1 (continued): Dependent Variables for Phase I Models.

Parameter	Description
hiinj	Dummy if injury-noninjury ratio is greater than 1
justinj	Dummy if injury-noninjury ratio is equal to 1
loinj	Dummy if injury-noninjury ratio is less than 1
veh1	count of crashes in segment involving 1 vehicle
veh2	count of crashes in segment involving 2 vehicles
veh3	count of crashes in segment involving 3 vehicles
veh4	count of crashes in segment involving 4 vehicles
rend	count of Rear End type crashes in segment
sdirsw	count of Same Direction Sideswipe type crashes in segment
sdirt	count of Same Direction Turning type crashes in segment
sdiroth	count of Same Direction Others type crashes in segment
headon	count of Head On type crashes in segment
odirsw	count of Opposite Direction Sideswipe type crashes in segment
odiroth	count of Opposite Direction Others type crashes in segment
fobj	count of Fixed Object type crashes in segment
eang	count of Entering At Angle type crashes in segment
oturn	count of Overturn type crashes in segment
animal	count of Animal type crashes in segment
bicycleped	count of Bicycle and Pedestrian type crashes in segment
onepark	count of crashes in segment involving one parked vehicle
entlvdr	count of Entering/Leaving Driveway type crashes in segment
other	count of crashes classified as Other in segment
truck	count of crashes in segment involving truck

Table 5.2: Omitted Dependent Variables from Phase I Models.

Parameter	Description
othloc	count of other location crashes in segment
veh5	count of crashes in segment involving 5 vehicles
othveh	count of crashes in segment involving more than 5 vehicles
trend	count of Turning Rear End type crashes in segment
sdirtsw	count of Same Direction Turning Sideswipe type crashes in segment
odirt	count of Opposite Direction Turning type crashes in segment
onemove	count of One Parked/One Moving type crashes in segment
nostate	count of crashes classified as Not Stated in segment

The Appendix includes results for the Two-Lane Baseline SPF models, the SPF Route Specific models, followed by the SPF for Individual Crash Type models. In total, 410 models are presented in the Appendix file.

5.4 Heteroskedastic Function (HFN) Models

Going off the previously created NB models, Phase II of this study deals with modeling different crash types using LnADT, Length, roadway geometrics and route dummies, with the over dispersion parameter (alpha) estimated using the roadside features, as shown in Figure 5.4.

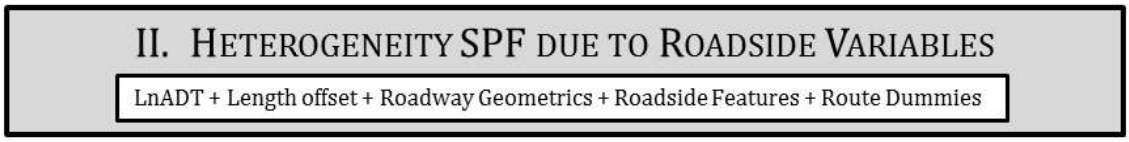

Figure 5.4: Heterogeneity SPF Models in Phase II.

A positive alpha implies that over dispersion exists in the data. This means that the observed variance in the data is higher than the expected variance. A lower alpha in the model shows that this variance is being better accounted for. In addition to alpha, the convergent log-likelihood of the model shows how good the model's predictions will be, and a value closer to zero is desirable.

The 30 crash type's dependent variables were modeled and compared to the corresponding NB models. The tables below show the coefficients, alpha, and Log-likelihood at convergence. With the exception of the variable eang (entering at angle type crash), the HFN models achieved better convergence log-likelihood and alpha. In the case of the variable eang, HFN alpha was higher than NB alpha, but the log-likelihood at convergence was lower, implying HFN produces a better fit.

5.5 Random Parameters Models

The next step in the modeling lexicon is Phase III: Random Parameters, as shown in Figure 5.5. This phase marks the last portion of analysis in the modeling process prior to out-of-sample prediction testing. The Random Parameters models will include roadside information as well as random parameter heterogeneity due to the roadside variables. The Random Parameters models were run for each of the Individual Crash Types and resulted in 32 possible models. The Phase III modeling results have been incorporated into the appendix file attached to this document. The discussion below summarizes the results from all the models developed in this study, beginning with Figure 5.5 which summarizes the overall architecture of models in this study.

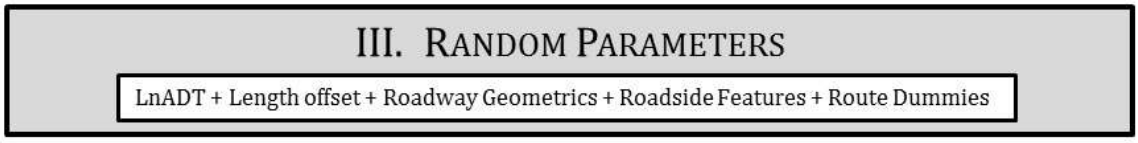

Figure 5.5: Random Parameters Model Structure in Phase III.

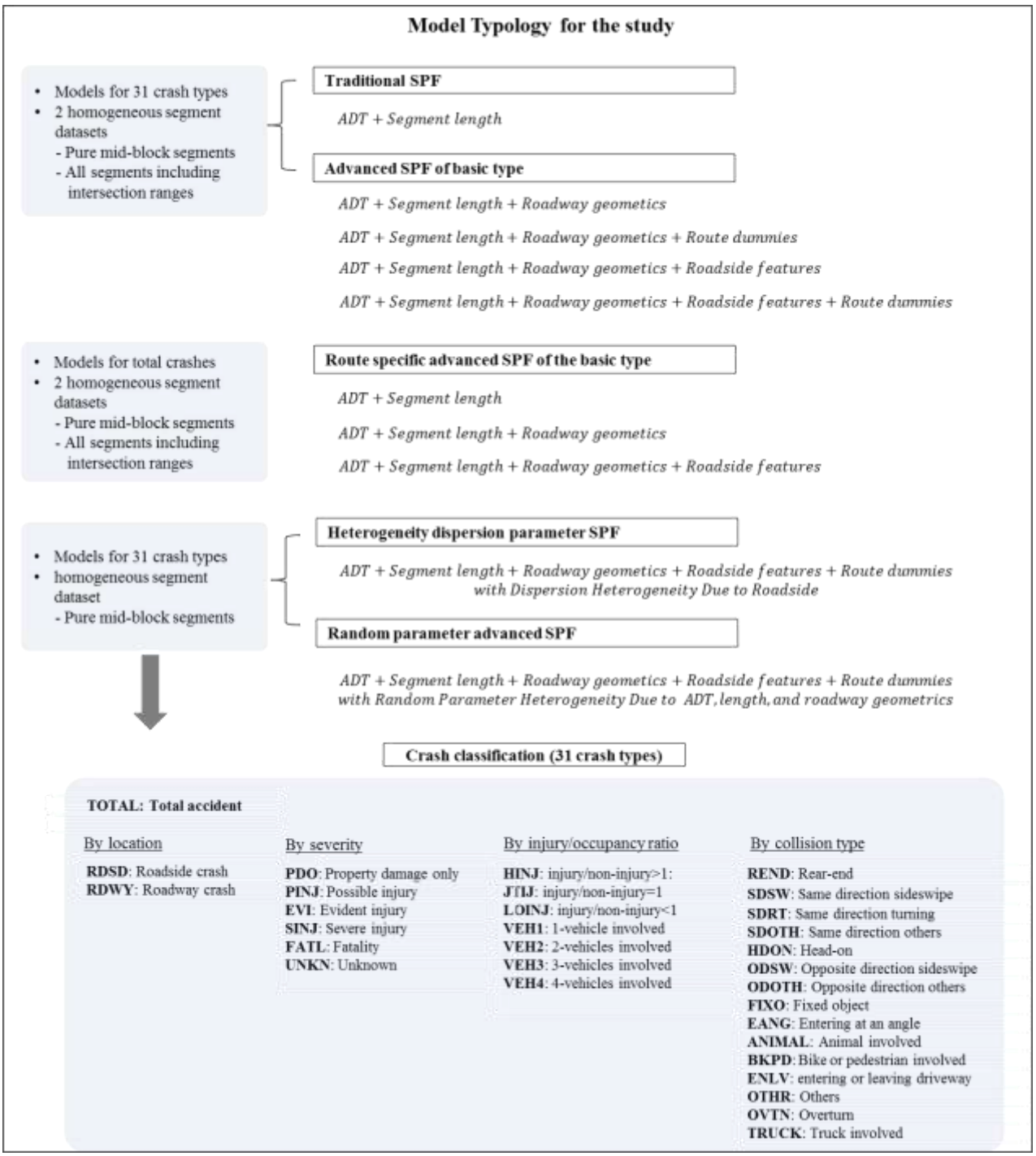

Figure 5.6: Overall Modeling Architecture.

6.0 MAJOR FINDINGS AND CONCLUSIONS

Fixed parameter models

The fixed parameter models for total crashes were developed, and compared based on the two segmentation methods (pure mid-block segments, segments including intersection ranges), the addition of roadside variables, and the effects of the route specific dummies. The impact of roadside variables on model performance was not found to be significant in predicting total crashes. The R-square of the model including the roadside variables was found to be lesser than models including only roadway variables, indicating that the roadside variables did not improve the model fit significantly, as shown in Table 6.1. That being said, as shown in Table 6.2, a key finding from the modeling exercise was that the route specific models for total crashes showed an overall improvement in R-square and log-likelihood.

Table 6.1: Comparison of NB models for Total Crash Prediction on the Impacts of Roadside Features and Specific Route Dummies.

Category	Explanatory variables in NB model	ADT effect (IRR)	Over-Dispersion	R^2
Dataset including intersection segments	ADT + Segment length	1.923	19.559	0.448
	ADT + Segment length + Roadway geometry	2.522	14.611	0.439
	ADT + Segment length + Roadway geometry + Route dummies	2.246	14.106	0.432
	ADT + Segment length + Roadway geometry + Roadside features	2.487	14.242	0.431
	ADT + Segment length + Roadway geometry + Roadside features + Route dummy	2.250	14.021	0.429
Dataset for pure mid-block Segments	ADT + Segment length	1.716	20.341	0.365
	ADT + Segment length + Roadway geometry	2.248	15.877	0.341
	ADT + Segment length + Roadway geometry + Route dummies	1.950	15.134	0.333
	ADT + Segment length + Roadway geometry +Roadside features	2.230	15.544	0.336
	ADT + Segment length + Roadway geometry + Roadside features + Route dummy	1.941	14.835	0.329

It was also noted that the addition of roadside characteristics in the model estimation lead to a reduction in the over-dispersion parameter. It was found that the model estimation made on the pure-midblock dataset had a coefficient of dispersion value of 15.544 when roadside variables were included, but an over-dispersion value of 15.877 in the absence of roadside effects. In terms of the effect of ADT on model predictions, based on the changes in the Incidence Rate Ratios (IRR), the base line models with only ADT and segment length were found to be influenced to a lesser extent by variations in ADT than the advanced models including roadway geometry or roadside variables. Table 6.1, details the behavior of the models by segmentation method, and summarizes the effect of the route dummies in the models.

Table 6.2: Comparison of Route Specific Models for Total Crash Prediction on the Impact of Roadside Features.

State Route	Without roadside variables		With roadside variables		State Route	Without roadside variables		With roadside variables	
	R^2	Log-L	R^2	Log-L		R^2	Log-L	R^2	Log-L
SR3	0.029	-5873.80	0.042	-5795.36	SR260	0.083	-461.47	0.083	-461.47
SR7	0.020	-3391.19	0.039	-3326.30	SR261	0.008	-576.59	0.017	-571.18
SR21	0.030	-1592.09	0.030	-1592.09	SR270	0.391	-44.13	0.391	-44.13
SR23	0.008	-630.36	0.010	-628.59	SR274	0.020	-21.70	0.020	-21.70
SR25	0.029	-2133.73	0.032	-2127.57	SR290	0.176	-117.23	0.176	-117.23
SR26	0.002	-4494.65	0.007	-4471.50	SR302	0.111	-633.48	0.116	-629.75
SR27	0.077	-2622.05	0.082	-2608.94	SR305	0.021	-795.87	0.021	-795.87
SR28	0.028	-3168.54	0.032	-3155.05	SR307	0.051	-297.00	0.051	-297.00
SR31	0.021	-469.14	0.032	-464.06	SR410	0.009	-3139.68	0.012	-3130.04
SR97	0.015	-12815.31	0.015	-12808.53	SR432	0.542	-28.07	0.542	-28.07
SR104	0.049	-2371.56	0.049	-2371.56	SR500	0.206	-144.09	0.206	-144.09
SR109	0.035	-2013.87	0.050	-1982.76	SR501	0.040	-448.26	0.040	-448.26
SR115	0.041	-250.58	0.102	-234.62	SR502	0.006	-622.83	0.006	-622.83
SR123	0.001	-19.66	0.001	-19.66	SR503	0.022	-3442.88	0.022	-3442.88
SR125	0.082	-302.37	0.082	-302.37	SR504	0.096	-1592.77	0.097	-1591.08
SR127	0.001	-407.15	0.006	-405.41	SR505	0.088	-739.72	0.090	-738.18
SR129	0.024	-470.53	0.024	-470.53	SR507	0.049	-4439.37	0.060	-4387.36
SR153	0.009	-783.37	0.014	-779.57	SR510	0.054	-1354.97	0.060	-1345.58
SR155	0.012	-2428.71	0.013	-2424.96	SR525	0.019	-2106.24	0.024	-2094.52
SR160	0.040	-322.24	0.040	-322.24	SR530	0.049	-2709.95	0.054	-2696.85
SR164	0.084	-1191.88	0.106	-1163.34	SR532	0.003	-1830.53	0.011	-1814.85
SR165	0.066	-371.57	0.066	-371.57	SR539	0.325	-240.09	0.341	-234.41
SR169	0.032	-1484.73	0.035	-1479.39	SR542	0.037	-4507.80	0.038	-4505.48
SR172	0.033	-225.81	0.033	-225.81	SR543	0.196	-161.05	0.222	-155.88
SR173	0.019	-635.31	0.022	-633.31	SR544	0.064	-547.23	0.067	-545.35
SR174	0.043	-780.30	0.043	-780.30	SR548	0.008	-506.74	0.023	-499.19
SR202	0.062	-2629.00	0.080	-2580.32	SR702	0.055	-531.48	0.080	-517.27
SR203	0.016	-2555.42	0.021	-2542.80	SR821	0.006	-692.02	0.006	-692.02
SR206	0.018	-730.08	0.025	-724.88	SR900	0.080	-737.75	0.083	-735.54
SR215	0.062	-804.94	0.062	-804.94	SR902	0.019	-610.51	0.042	-595.99
SR223	0.021	-423.57	0.026	-421.76	SR903	0.040	-715.20	0.040	-715.20
SR240	0.154	-473.45	0.154	-473.45	SR906	0.000	-214.21	0.000	-214.21
SR241	0.027	-1015.32	0.038	-1003.81	SR970	0.009	-589.55	0.009	-589.55

The models including intersection ranges showed less over-dispersion, higher R-square values, and larger ADT effects. Therefore, ADT effects for the models on pure mid-block segments were found to have a lesser magnitude than that of the models specified on all segments combined. It was also found that the addition of route dummies led to a reduction in the coefficient of dispersion, owing to the benefit of allowing for adjusting the estimates at a route specific level. Table 6.3 shows the route dummies that were significant in predicting the individual crash types using the traditional NB model including roadway and roadside variables.

Table 6.3: Route Effects by Crash Classification.

State Route	Total crash	Road-side	Road-way	PDO	Possible injury	Evident injury	Serious injury	Fatal	Un-known
SR3	√	√	√	√	√	-	-	-	-
SR9	-	-	-	-	-	-	-	√	-
SR11	√	√	√	√	-	-	√	-	-
SR12	√	√	√	√	-	-	-	-	-
SR17	-	√	√	-	-	√	-	-	-
SR21	√	√	√	√	√	√	√	-	-
SR22	-	√	√	-	-	√	-	-	√
SR23	√	√	√	-	√	-	-	-	-
SR24	√	-	-	√	-	-	-	-	√
SR25	√	√	-	-	√	-	√	-	-
SR26	-	√	√	√	√	√	-	-	√
SR27	-	-	√	-	-	-	-	√	-
SR31	√	√	√	√	√	-	-	-	-
SR97	√	√	√	√	√	√	√	√	-
SR104	√	√	√	-	√	√	-	-	-
SR112	√	√	√	√	-	-	-	-	-
SR123	√	√	√	√	√	√	-	-	-
SR124	√	√	√	√	-	-	-	-	-
SR129	√	√	√	√	-	-	-	-	-
SR150	√	√	-	-	-	-	√	-	-
SR153	√	-	√	-	-	√	-	-	-
SR160	√	√	-	√	-	-	-	-	-
SR165	√	-	-	√	-	-	-	-	√
SR169	-	√	-	√	√	√	-	-	-
SR172	√	√	√	√	-	-	-	-	-
SR195	-	√	√	√	-	√	-	-	-
SR206	√	-	√	√	-	-	-	-	-
SR231	√	√	-	√	-	-	-	-	-
SR241	-	√	-	√	-	-	-	-	√
SR243	-	√	-	√	-	-	-	-	√
SR260	√	√	√	-	-	√	-	-	-
SR261	√	√	-	-	-	-	√	-	-
SR272	√	√	-	-	-	√	-	-	-
SR290	√	√	√	√	√	√	-	-	-
SR395	√	√	√	√	√		-	-	-
SR504	√	-	√	√	√	√	-	-	-
SR532	√	√		√	-	-	-	-	-
SR542	√	√	√	√	√	-	-	-	-
SR702	-	√	-	-	-	-	-	√	-
SR706	√	-	√	-	-	√	-	-	-
SR906	√	√	√	√	-	-	-	-	√

*Table shows selected routes and crash classifications.

As would be expected, route effects were found to be different across the various crash types. An example being, State Routes 9, 27, 97, and 702 feature significantly in the model for fatal crashes, while State Routes 9, 27, and 702 were not found to affect the specifications for the PDO model.

Segment specific models

Following the traditional NB models, HNB and RPNB models were developed to better understand the segment specific heterogeneity in crash counts, and to account for other unobserved effects in predictions. With the aim of reducing the heterogeneity in the data due to intersection effects, these models were estimated only on the pure-midblock homogeneous segment dataset. An issue with the fixed parameter NB regression is that in addition to the parameters, it also generates a fixed value for the over-dispersion term, thereby assuming that the nature of the dispersion is the same across all roadway segments. The HNB allows for the dispersion parameter to be modeled on a segment specific roadside feature level. Thus, the HNB yields an understanding of the nature and extent to which a segment's roadside characteristics affect the dispersion heterogeneity in the data and model predictions, and would be expected to provide a better set of predictions than the traditional NBs. This statement is corroborated in table 4, given the reduction of over-dispersion parameter values across the models. For ease of comparison, Table 6.4 shows only the intercept term for the HNB alpha. As such the specification obtained can be used to compute a segment specific value. The resulting HNB models showed improvements in log-likelihood over the traditional NB models, with the exceptions of models for 3-vehicles involved, 4-vehicles involved, and rear-ends. Similarly, the values for the over-dispersion parameter alpha were found to be generally lower in the HNB models of most crash types, with only the models for 3-vehicles involved, and entering at an angle having higher values. It should also be noted that due to having very low mean observed crash frequencies (less than 0.004 crashes per segment), the models for 4-vehicles involved, same direction sideswipe, same direction turning, same direction others, entering at an angle, and bike and pedestrian, were found to have very large over-dispersion parameter values.

Following the HNB specifications, RPNB models were developed for the corresponding crash classifications. The results of the RPNB specification for total crashes are shown in table 6.5. All variables excepting the constant were found to be statistically significant at a 95% confident level. The RPNB model was found to have a convergent log-likelihood of -116,525.4, a significant improvement in comparison to the traditional NB log-likelihood of -123,326.4. Both the ADT and segment length variables were found to be highly statistically significant as dictated by the t-statistic values, with the variable for ADT being significantly random, following a normal distribution with mean 0.638, and standard deviation 0.167. Among the variables for roadway geometrics, degree of horizontal curvature, and rate of vertical curvature (K-value) were also found to be random parameters following normal distributions. The variable, degree of horizontal curvature, had a mean of 0.041 and a standard deviation of 0.045. This would imply that in 18.1% of the roadway segments, incrementing the degree of horizontal curvature led to a reduction in the total number of crashes; while 81.9% of the roadway segments would show an increase in crashes.

Table 6.4: Comparison of Log-Likelihood, R^2, and Over-Dispersion Parameters for NB and HNB Models by Crash Classification.

Crash types	Negative binomial models			Heterogeneity dispersion Negative Binomial models		
	L-L	R^2	Alpha	L-L	R^2	Alpha[2]
Total crash	-123,326	0.328	14.8	-109,378	0.349	13.7
Roadside crash	-74,728	0.201	16.3	-73,535	0.221	14.9
Roadway crash	-69,300	0.436	37.9	-68,194	0.450	35.3
Property damage only	-78,756	0.295	37.9	-77,368	0.304	19.1
Possible injury	-30,055	0.404	81.7	-27,366	0.413	19.1
Evident injury	-37,765	0.362	74.9	-32,738	0.375	64.9
Serious injury	-11,188	0.440	386.3	-11,066	0.448	333.1
Fatal	-7,384	N/A[1]	N/A	-5,380	0.510	954.7
Unknown	-5,839	0.042	53.3	-5,752	0.059	51.1
High injury (injury/non-injury>1)	-60,867	0.423	46.0	-60,111	0.434	41.7
Just injury (injury/non-injury=1)	-10,834	0.385	286.1	-8,663	0.399	220.4
Low injury (injury/non-injury<1)	-74,668	0.333	25.6	-73,411	0.349	23.5
1-vehicle involved	-91,605	0.189	12.3	-89,462	0.213	10.5
2-vehicles involved	-43,974	0.512	83.3	-43,514	0.520	76.9
3-vehicles involved	-7,177	0.679	955.7	-7,273	0.683	993.2
4-vehicles involved	-1,265	N/A	N/A	-1,295	0.760	6,880.3
Rear-end	-18,566	0.572	170.2	-18,574	0.183	169.9
Same direction sideswipe	-3,748	0.404	1,282.5	-3,738	0.569	1,231.4
Same direction turning	-3,320	N/A	N/A	-1,961	0.591	3,760.7
Same direction others	-4,527	0.562	1,282.5	-4,468	0.571	1,005.8
Head-on	-4,820	0.603	1,527.6	-4,785	0.606	1,367.4
Opposite direction sideswipe	-6,825	0.576	787.7	-6,763	0.583	750.5
Opposite direction others	-7,200	0.563	692.3	-7,139	0.569	656.5
Fixed object	-57,712	0.182	19.5	-57,012	0.198	18.8
Entering at an angle	-2,221	0.632	1,794.8	-2,219	0.638	2,320.9
Animal involved	-24,602	0.234	48.4	-23,983	0.262	41.0
Bike/Pedestrian involved	-1,821	N/A	N/A	-1,228	0.452	3,256.3
Entering/leaving driveway	-9,113	0.561	456.7	-9,053	0.570	412.6
Others	-9,755	N/A	N/A	-8,416	0.302	213.0
Overturn	-26,838	0.214	51.0	-26,326	0.234	42.2
Truck	-79,688	0.272	18.8	-78,271	0.293	17.1

[1] N/A: Not applicable

[2] Intercept term for the HNB alpha

Table 6.5: Random Parameter Negative Binomial Estimation for Total Crashes.

Variable	Fixed Parameter		Random Parameter				
	Mean	T-stat	Distri-bution	Mean	T-stat	StD.	T-stat
Constant	-0.045	-0.560	N/A	N/A	N/A	N/A	N/A
Logarithm of length of segment in miles	1.062	116.61	N/A	N/A	N/A	N/A	N/A
Logarithm of ADT	N/A	N/A	Normal	0.638	65.123	0.167	135.38
Roadway Geometrics							
Algebraic difference in gradients	0.009	2.503	N/A	N/A	N/A	N/A	N/A
Shoulder width dummy (if shoulder width right is 4-5ft and shoulder width left is 2-3ft, value=1,0 otherwise)	-0.429	-5.464	N/A	N/A	N/A	N/A	N/A
Shoulder width dummy (1 if shoulder width center is >1ft and <9ft, 0 otherwise)	-3.763	-13.15	N/A	N/A	N/A	N/A	N/A
Degree of curvature	N/A	N/A	Normal	0.041	26.824	0.045	29.434
Rate of vertical curvature/5280	N/A	N/A	Normal	-1.141	-12.46	1.173	14.212
Roadside Variables							
Fixed object dummy variable (1 if fixed object exists, 0 otherwise)	0.176	3.105	N/A	N/A	N/A	N/A	N/A
Proportion of road side slope on a segment is 90-100%	-0.107	-3.034	N/A	N/A	N/A	N/A	N/A
Fence dummy variable (1 if Fence exists, 0 otherwise)	-0.128	-2.810	N/A	N/A	N/A	N/A	N/A
Rock out cropping length on segment	-0.678	-3.162	N/A	N/A	N/A	N/A	N/A
Proportion of guard rail length on segment is 90-100%	-0.110	-2.121	N/A	N/A	N/A	N/A	N/A
State Route Dummies							
SR3 (1 if SR=3, 0 otherwise)	0.795	13.017	N/A	N/A	N/A	N/A	N/A
SR21 (1 if SR=21, 0 otherwise)	-0.793	-11.48	N/A	N/A	N/A	N/A	N/A
SR23 (1 if SR=23, 0 otherwise)	-0.572	-5.239	N/A	N/A	N/A	N/A	N/A
SR25 (1 if SR=25, 0 otherwise)	-0.319	-5.234	N/A	N/A	N/A	N/A	N/A
SR31 (1 if SR=31, 0 otherwise)	-0.518	-3.924	N/A	N/A	N/A	N/A	N/A
SR97 (1 if SR=97, 0 otherwise)	0.496	15.363	N/A	N/A	N/A	N/A	N/A
SR104 (1 if SR=104, 0 otherwise)	0.878	9.280	N/A	N/A	N/A	N/A	N/A
SR123 (1 if SR=123, 0 otherwise)	-4.205	-7.073	N/A	N/A	N/A	N/A	N/A
SR124 (1 if SR=124, 0 otherwise)	0.397	4.971	N/A	N/A	N/A	N/A	N/A
SR129 (1 if SR=129, 0 otherwise)	-0.835	-7.674	N/A	N/A	N/A	N/A	N/A

Table 6.5(continued): Random Parameter Negative Binomial Estimation for Total Crashes.

Variable	Fixed Parameter		Random Parameter				
	Mean	T-stat	Distri-bution	Mean	T-stat	StD.	T-stat
SR165 (1 if SR=165, 0 otherwise)	-0.431	-3.790	N/A	N/A	N/A	N/A	N/A
SR172 (1 if SR=172, 0 otherwise)	-0.812	-3.952	N/A	N/A	N/A	N/A	N/A
SR231 (1 if SR=231, 0 otherwise)	-0.256	-3.700	N/A	N/A	N/A	N/A	N/A
SR260 (1 if SR=260, 0 otherwise)	-0.903	-5.581	N/A	N/A	N/A	N/A	N/A
SR261 (1 if SR=261, 0 otherwise)	-0.413	-3.896	N/A	N/A	N/A	N/A	N/A
SR272 (1 if SR=272, 0 otherwise)	-0.579	-3.139	N/A	N/A	N/A	N/A	N/A
SR290 (1 if SR=290, 0 otherwise)	-2.301	-7.866	N/A	N/A	N/A	N/A	N/A
SR395 (1 if SR=395, 0 otherwise)	0.375	6.811	N/A	N/A	N/A	N/A	N/A
SR532 (1 if SR=532, 0 otherwise)	1.251	9.613	N/A	N/A	N/A	N/A	N/A
SR542 (1 if SR=542, 0 otherwise)	0.767	16.004	N/A	N/A	N/A	N/A	N/A
SR706 (1 if SR=706, 0 otherwise)	0.279	2.239	N/A	N/A	N/A	N/A	N/A
SR821 (1 if SR=821, 0 otherwise)	-0.283	-2.830	N/A	N/A	N/A	N/A	N/A
SR970 (1 if SR=970, 0 otherwise)	0.819	5.091	N/A	N/A	N/A	N/A	N/A
SR127 and SR504 (1 if SR=127 or 504, 0 otherwise)	-0.563	-8.220	N/A	N/A	N/A	N/A	N/A
SR125 and SR153 (1 if SR=125 or 153, 0 otherwise)	-0.252	-3.170	N/A	N/A	N/A	N/A	N/A
SR164 and SR503 (1 if SR=164 or 503, 0 otherwise)	0.311	5.365	N/A	N/A	N/A	N/A	N/A
SR12 and SR501 (1 if SR=12 or 501, 0 otherwise)	0.407	13.792	N/A	N/A	N/A	N/A	N/A
SR206 and SR502 (1 if SR=206 or 502, 0 otherwise)	0.569	7.172	N/A	N/A	N/A	N/A	N/A
Scale parameter for over-dispersion	0.175	108.99					
Convergent log-likelihood for fixed parameter negative binomial	-123,326.40						
Log-likelihood at random parameter negative binomial convergence	-116,525.40						
Number of observations	426,546 (47,394 segments with 9 year panel)						

The mean and standard deviation of the variable for vertical curve K-value, were found to be -1.141 and 1.173 respectively, indicating that lager K-values tended to reduce the total number of crashes. Based on the parameter distribution, the K-value would be expected to show a reducing effect on total crashes over 83.5% of the segments. All roadside variables and route dummies selected in the total crash model were statistically significant as fixed parameters. The presence of a roadside fixed object increased the number of total crashes, whereas the presence of fence, a roadside slope comprising 90% to 100% of the length of a segment, the length of a rock outcropping and a guardrail comprising 90% to100% of the length of a segment, were all found to result in a decrease in the number of total crashes. The route dummies had both positive and negative coefficients depending on the State Route, indicating that using route dummies in the model does indeed provide a route specific estimation of crashes.

Similar to the total crash model, RPNB models were also developed for each of the crash classifications. Table 5.6 shows a summary of the percentage of segments having positive density for the random parameter distributions, for each of the 31 different crash type models.

The variables, ADT, segment length, algebraic difference in gradients (%), average lane width, degree of curvature, horizontal curve central angle, number of lanes in increasing direction, number of lanes in decreasing direction, total number of lanes in both increasing and decreasing directions, and rate of vertical curvature came up as being random for certain crash types. Possible due to the high level of variation from segment to segment, ADT and segment length were found to affect a lot of crash types through random effects. The mean and standard deviation of the parameters for the respective models would indicate that they had a positive effect on almost 100% of the roadway segments, that is, growth in ADT or longer segment length would increase the number of respective crashes.

For models with a random intercept term, the constant took on a negative sign in 100% of the segments for roadway, property damage only, high injury, low injury, 2-, 3-, and 4-vehicles involved, rear-end, same direction sideswipe, others, and truck crashes, whereas in the case of roadside crashes, only 80.9% of the segments showed a positive sign.

With regard to the crash severity types, ADT had a positive effect random parameter distribution for property damage only, possible injury, and serious injury type crashes, while the random effects of the segment length variable were positive for crash types such as property damage only, possible injury, evident injury, and fatal. Random variables in the estimation of roadway crashes were the degree of horizontal curvature, total number of lanes, ADT, and segment length. The variable for average lane width showed that wider lanes uniformly decrease serious injury crash frequency in 98% of roadway segments. For fixed object crashes, the algebraic difference in gradient (%) has a positive effect on 29.7% of segments, and lager K-values lead to an increase in crash frequency on 11.7% of roadway segments.

The variable of horizontal curve central angle showed a random effect only for the model of crashes involving 2-vehicles. In 9.1% of the segments, increasing the horizontal curve angle was associated with a higher frequency of crashes involving 2-vehicles, while 90.9% of the roadway segments were expected to show a decrement in the corresponding crash frequency. The variables related to the number of lanes, number of lanes in increasing direction, number of lanes in decreasing direction, and total number of lanes in both increasing and decreasing, indicate that 100% of the segments showed a decrease in crash frequency with increasing lane numbers.

Table 6.6: Positive Sign Density of the Random Parameter Distributions for Crash Types

Crash types	Constant	Logarithm of ADT	Logarithm of length of segment in miles	Algebraic difference in gradients, percent	Average lane width	Degree of curvature	Horizontal curve central angle	Number of lanes Increasing direction	Number of lanes decreasing direction	Total number of lanes in both directions	Rate of vertical curvature/5280
TOTAL	N/A	N/A	100.0%	N/A	N/A	81.9%	N/A	N/A	N/A	N/A	16.5%
RDSD	80.9%	100.0%	N/A	N/A	N/A	N/A	N/A	0.0%	N/A	N/A	N/A
RDWY	0.0%	100.0%	99.7%	N/A	N/A	99.4%	N/A	N/A	N/A	0.0%	N/A
PDO	0.0%	100.0%	100.0%	N/A	N/A	N/A	N/A	N/A	N/A	N/A	16.8%
PINJ	N/A	100.0%	100.0%	N/A	N/A	N/A	N/A	N/A	N/A	0.0%	N/A
EVI	N/A	N/A	100.0%	N/A	N/A	86.8%	N/A	N/A	N/A	N/A	N/A
SINJ	N/A	100.0%	N/A	N/A	2.0%	N/A	N/A	N/A	N/A	N/A	N/A
FATL	N/A	N/A	100.0%	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
UNKN	N/A	100.0%	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
HINJ	0.0%	100.0%	N/A	N/A	N/A	N/A	N/A	0.0%	0.0%	N/A	15.6%
JTIJ	N/A	N/A	99.4%	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
LOINJ	0.0%	N/A	99.8%	N/A	N/A	N/A	N/A	0.0%	N/A	N/A	N/A
VEH1	N/A	100.0%	99.9%	N/A	N/A	98.5%	N/A	N/A	N/A	N/A	N/A
VEH2	0.0%	N/A	100.0%	N/A	N/A	N/A	9.1%	N/A	N/A	N/A	N/A
VEH3	0.0%	100.0%	N/A	N/A	N/A	N/A	N/A	0.0%	N/A	N/A	N/A
VEH4	0.0%	100.0%	100.0%	N/A	N/A	N/A	N/A	0.0%	N/A	N/A	N/A
REND	0.0%	100.0%	99.9%	N/A	N/A	25.0%	N/A	N/A	N/A	0.0%	N/A
SDSW	0.0%	100.0%	99.8%	N/A	N/A	N/A	N/A	N/A	N/A	0.0%	N/A
SDRT	N/A	N/A	99.8%	N/A	N/A	N/A	N/A	0.0%	N/A	N/A	N/A
SDOTH	N/A	N/A	99.8%	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
HDON	N/A	N/A	100.0%	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
ODSW	N/A	N/A	99.6%	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
ODOTH	N/A	100.0%	N/A	N/A	N/A	98.8%	N/A	N/A	N/A	N/A	N/A
FIXO	N/A	100.0%	99.7%	29.7%	N/A	N/A	N/A	N/A	N/A	N/A	11.7%
EANG	N/A	100.0%	N/A	N/A	N/A	6.3%	N/A	0.0%	N/A	N/A	N/A
ANIMAL	N/A	99.1%	N/A	N/A	N/A	3.7%	N/A	N/A	N/A	N/A	N/A
BKPD	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.0%	N/A	N/A	N/A
ENLV	N/A	99.5%	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
OTHR	0.0%	100.0%	95.5%	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
OVTN	N/A	100.0%	99.8%	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
TRUCK	0.0%	100.0%	100.0%	N/A	N/A	88.6%	N/A	N/A	N/A	N/A	16.8%

The interpretation for the variable, degree of curvature (the ratio of horizontal curve angle and horizontal curve length) was found to vary depending on crash type. In total crashes, roadway crashes, evident injury, 1-vehicle involved, other direction other crash type and truck crashes, larger degrees of curvature were expected to result in more crashes in at least 80% of the segments, but

was found to have a negative effect on crash frequency for 93.7% of the segments with respect to entering at an angle type crashes, and 96.3% for animal related incidents. Following the SPF estimations detailed in this study, the advanced fixed parameter SPF, the HNB, and RPNB models for the 31crash types were compared using the Akaike information criterion (AIC) and Bayesian information criterion (BIC) measures of fit, the results of which are provided in Table 6.7. The AICs and BICs of the RPNB models across all the crash types indicated a better fit than the NB models. The HNB models also had lower values for AIC and BIC as compared to the NB models, the only exceptions being the estimations for 3-vehicle involved, 4-vehicles involved, and rear-end crash types. This could be caused by the unavailability of statistically appropriate roadside variables for those crash types, leading to insufficient dispersion heterogeneity.

Table 6.7: AIC and BIC for NB, HNB, and RPNB Models by Crash Classifications.

Crash Types	NB		HNB		RPNB	
	AIC	BIC	AIC	BIC	AIC	BIC
Total crash	246,785	247,508	218,840	219,300	233,145	233,660
Roadside crash	149,593	150,338	147,167	147,704	142,110	142,636
Roadway crash	138,707	139,288	136,472	136,932	131,499	131,839
Property damage only	157,637	158,328	154,842	155,423	149,111	149,604
Possible injury	60,178	60,551	54,839	55,431	57,739	57,925
Evident injury	75,594	75,945	65,529	65,825	70,844	71,086
Serious injury	22,404	22,558	22,156	22,288	21,942	22,106
Fatal	14,800	14,975	10,783	10,915	10,675	10,773
Unknown	11,709	11,873	11,531	11,685	11,312	11,466
High injury (injury/non-injury>1)	121,806	122,201	120,286	120,637	119,038	119,388
Just injury (injury/non-injury=1)	21,692	21,823	17,350	17,482	17,192	17,324
Low injury (injury/non-injury<1)	149,413	149,829	146,891	147,264	142,186	142,536
1-vehicle involved	183,313	183,872	179,009	179,480	171,950	172,366
2-vehicles involved	88,014	88,376	87,090	87,429	86,485	86,693
3-vehicles involved	14,370	14,458	14,571	14,714	13,955	14,097
4-vehicles involved	2,594	2,945	2,608	2,707	2,527	2,669
Rear-end	37,169	37,378	37,196	37,459	35,424	35,665
Same direction sideswipe	7,512	7,600	7,499	7,631	7,386	7,550
Same direction turning	6,662	6,783	3,941	4,051	3,908	4,029
Same direction others	9,076	9,196	8,965	9,129	8,887	9,008
Head-on	9,657	9,744	9,594	9,726	9,551	9,660
Opposite direction sideswipe	13,681	13,845	13,558	13,734	13,450	13,593
Opposite direction others	14,431	14,606	14,309	14,473	14,244	14,375
Fixed object	115,555	116,267	114,130	114,711	115,215	115,741
Entering at an angle	4,469	4,611	4,467	4,620	4,340	4,505
Animal involved	49,321	49,968	48,055	48,548	48,081	48,454
Bike/Pedestrian involved	3,661	3,759	2,469	2,546	2,462	2,516

Table 6.7(continued): AIC and BIC for NB, HNB, and RPNB Models by Crash Classifications.

Crash Types	NB		HNB		RPNB	
	AIC	BIC	AIC	BIC	AIC	BIC
Entering/leaving driveway	18,267	18,497	18,144	18,352	17,584	17,738
Others	19,560	19,834	16,876	17,117	16,465	16,673
Overturn	53,783	54,375	52,748	53,274	51,102	51,464
Truck	159,515	160,271	156,666	157,346	151,012	151,626

The results of these comparisons indicate that given the existing data and the observed crash frequencies, the HNB and RPNB models explained the over-dispersion in the data better than the NB specifications. A comparison between the HNB models and RPNB models showed that the models of certain crash types such as total crashes, possible injury, evident injury, and fixed object could be explained better in an HNB structure incorporating heterogeneity due to roadside variables, than using an RPNB methodology. That being said, the NB, HNB, and RPNB models for total crashes had R-square values of 0.329, 0.349, and 0.434 respectively, and with the RPNB model providing a better fit in terms of R-square goodness of fit.

7.0 Conclusions and Direction of Future Research

This work summarized in this paper describes the model evolution for safety performance estimations on multiple year panels of crash frequencies for two-lane rural highways. The overall structure of the modeling process involved model development for: 1) Traditional SPFs, 2) Advanced SPFs with roadway geometrics, 3) Advanced SPFs with roadway geometrics and roadside features, 4) Route Specific Advanced SPFs of the basic type, 5) Advanced SPFs-Heterogeneity in dispersion due to roadside features, and 6) Random Parameter advanced SPF.

With the aim of finding appropriate methodological typologies and regressors, at each stage of the process, models were developed for 31 crash classifications, with comparisons drawn between specifications including combinations of roadway geometry and roadside characteristics.

It was found that models estimated on homogeneous pure mid-block segment datasets showed statistically different dispersion parameters, R-squares, and ADT effects than those that were estimated on homogeneous segment datasets containing intersection segments. Another interesting takeaway from this study is that the IRRs for ADT showed significant variation across the modeling methods, and were found to be much higher for the models specified on the dataset containing intersection segments indicating a possible correlation between the intersection segments and the ADT effects on crashes.

The primary finding of this research was that the impact of roadside information on model performance was significant on route specific NB models, even though the model for total crashes on all routes combined did not show any significant improvements when roadside characteristics were included. It was found that in providing segment specific dispersion estimates based on roadside characteristics, the HNB method fit the data much better than the NB specifications. In identifying roadside features that significantly affect certain crash classifications, the results of this study could be used to target proactive countermeasures for specific crash types, while allowing

for investments in areas that require crash mitigation strategies such as methods to prevent run-off road crashes in the case of roadside fatalities versus reducing such crashes in areas with low fatalities but high property damage.

To obtain segment specific parameters, RPNB model specification were also performed, and it was found that the parameters for ADT, segment length, the roadway geometry such as algebraic difference in gradients, average lane width, number of lanes, horizontal curve angle and degree of curvature, and rate of vertical curvature could be random under a normal distribution for certain crash types, and depending on their mean and standard deviation, could have varying effects on the predicted crash frequency.

This study concludes that the HNB and RPNB models for each crash frequency classification provided better predictive insight into the safety effects of roadway geometry and roadside characteristics for two-lane rural highways. As such, this study provides a process for large scale SPF estimation, providing guidance on the types of models that can be utilized based on data available and specific application, and roadway or roadside characteristics that need to be investigated.

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Appendix A: Traditional SPF – Baseline Models (ADT+LENGTH OFFSET)

Table A.1: Two-Lane Baseline SPF with LNADT and Length Offset Only – Including Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
Constant		-7.084	0.056	-125.512
LNADT	Log(AADT)	0.654	0.007	94.340
LENGTH	Segment Length	1.000	(Fixed Parameter)	
Dispersion parameter for count data model				
Alpha		19.559	0.138	141.282
Number of obs =563382 Chi squared =389921.5 Prob>chi2=0.0000000				
Restricted LL = -434318 Log likelihood = -3212.208				
Pseudo R^2 =				

Table A.2: Two-Lane Baseline SPF with LNADT, Length Offset and Route Dummies – Including Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
Constant		-5.326	0.074	-72.21
LNADT	Log(AADT)	0.425	0.009	47.589
LENGTH	Segment Length	1.000	(Fixed Parameter)	
SRN3	State Route dummy (if SR3,value=1, else =0)	1.004	0.077	13.015
SRN11	State Route dummy (if SR11,value=1, else =0)	-0.157	0.054	-2.934
SRN17	State Route dummy (if SR17,value=1, else =0)	0.210	0.051	4.158
SRN18	State Route dummy (if SR18,value=1, else =0)	-0.656	0.078	-8.372
SRN21	State Route dummy (if SR21,value=1, else =0)	-1.359	0.050	-26.923
SRN22	State Route dummy (if SR22,value=1, else =0)	0.366	0.094	3.913
SRN23	State Route dummy (if SR23,value=1, else =0)	-0.888	0.080	-11.119
SRN24	State Route dummy (if SR24,value=1, else =0)	0.257	0.069	3.697
SRN25	State Route dummy (if SR25,value=1, else =0)	-0.490	0.042	-11.695
SRN26	State Route dummy (if SR26,value=1, else =0)	0.896	0.075	11.966
SRN31	State Route dummy (if SR31,value=1, else =0)	-1.007	0.086	-11.678
SRN97	State Route dummy (if SR97,value=1, else =0)	0.536	0.042	12.762
SRN104	State Route dummy (if SR104,value=1, else =0)	0.954	0.096	9.951
SRN109	State Route dummy (if SR109,value=1, else =0)	0.299	0.078	3.832
SRN115	State Route dummy (if SR115,value=1, else =0)	0.904	0.323	2.801
SRN123	State Route dummy (if SR123,value=1, else =0)	-3.691	0.289	-12.787
SRN125	State Route dummy (if SR125,value=1, else =0)	-1.379	0.096	-14.378
SRN127	State Route dummy (if SR127,value=1, else =0)	-0.871	0.117	-7.449
SRN129	State Route dummy (if SR129,value=1, else =0)	-1.466	0.092	-16.01
SRN153	State Route dummy (if SR153value=1, else =0)	-0.439	0.095	-4.628
SRN160	State Route dummy (if SR160,value=1, else =0)	1.675	0.281	5.972

Table A.2 (continued): Two-Lane Baseline SPF with LNADT, Length Offset and Route Dummies – Including Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
SRN164	State Route dummy (if SR164,value=1, else =0)	0.554	0.125	4.441
SRN165	State Route dummy (if SR165,value=1, else =0)	-1.187	0.087	-13.634
SRN172	State Route dummy (if SR172,value=1, else =0)	-1.095	0.120	-9.160
SRN173	State Route dummy (if SR173,value=1, else =0)	0.518	0.172	3.019
SRN202	State Route dummy (if SR202,value=1, else =0)	0.433	0.062	6.966
SRN203	State Route dummy (if SR203,value=1, else =0)	0.403	0.083	4.877
SRN215	State Route dummy (if SR215,value=1, else =0)	1.460	0.241	6.068
SRN221	State Route dummy (if SR221,value=1, else =0)	0.302	0.119	2.547
SRN223	State Route dummy (if SR223,value=1, else =0)	0.916	0.269	3.399
SRN224	State Route dummy (if SR224,value=1, else =0)	-0.379	0.155	-2.443
SRN231	State Route dummy (if SR231,value=1, else =0)	-0.570	0.054	-10.63
SRN240	State Route dummy (if SR240,value=1, else =0)	-1.044	0.082	-12.764
SRN241	State Route dummy (if SR241,value=1, else =0)	0.508	0.114	4.460
SRN260	State Route dummy (if SR260,value=1, else =0)	-0.517	0.097	-5.311
SRN261	State Route dummy (if SR261,value=1, else =0)	-0.895	0.093	-9.602
SRN270	State Route dummy (if SR270,value=1, else =0)	-2.541	0.123	-20.619
SRN272	State Route dummy (if SR272,value=1, else =0)	-0.524	0.131	-3.983
SRN274	State Route dummy (if SR274,value=1, else =0)	-1.582	0.522	-3.031
SRN290	State Route dummy (if SR290,value=1, else =0)	-2.400	0.069	-34.806
SRN305	State Route dummy (if SR305,value=1, else =0)	0.496	0.122	4.073
SRN307	State Route dummy (if SR307,value=1, else =0)	2.369	1.056	2.244
SRN395	State Route dummy (if SR395,value=1, else =0)	0.430	0.041	10.55
SRN410	State Route dummy (if SR410,value=1, else =0)	-0.334	0.041	-8.055
SRN432	State Route dummy (if SR432,value=1, else =0)	-2.265	0.134	-16.855
SRN500	State Route dummy (if SR500,value=1, else =0)	-2.164	0.083	-26.019
SRN502	State Route dummy (if SR502,value=1, else =0)	1.075	0.186	5.781
SRN503	State Route dummy (if SR503,value=1, else =0)	0.367	0.054	6.802
SRN505	State Route dummy (if SR505,value=1, else =0)	0.696	0.163	4.259
SRN507	State Route dummy (if SR507,value=1, else =0)	1.136	0.083	13.763
SRN510	State Route dummy (if SR510,value=1, else =0)	1.212	0.118	10.248
SRN525	State Route dummy (if SR525,value=1, else =0)	0.467	0.089	5.261
SRN530	State Route dummy (if SR530,value=1, else =0)	0.240	0.061	3.939
SRN532	State Route dummy (if SR532,value=1, else =0)	1.710	0.213	8.043
SRN539	State Route dummy (if SR539,value=1, else =0)	-1.073	0.070	-15.361
SRN542	State Route dummy (if SR542,value=1, else =0)	0.407	0.043	9.380
SRN543	State Route dummy (if SR543,value=1, else =0)	0.855	0.259	3.303
SRN544	State Route dummy (if SR544,value=1, else =0)	1.725	0.515	3.352
SRN548	State Route dummy (if SR548,value=1, else =0)	1.639	0.412	3.974
SRN702	State Route dummy (if SR702,value=1, else =0)	1.437	0.300	4.783

Table A.2 (continued): Two-Lane Baseline SPF with LNADT, Length Offset and Route Dummies – Including Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
SRN821	State Route dummy (if SR821,value=1, else =0)	-0.533	0.090	-5.902
SRN900	State Route dummy (if SR900,value=1, else =0)	-1.110	0.079	-14.008
SRN902	State Route dummy (if SR902,value=1, else =0)	0.606	0.177	3.433
SRN906	State Route dummy (if SR906,value=1, else =0)	1.131	0.217	5.210
SRN970	State Route dummy (if SR970,value=1, else =0)	1.010	0.272	3.717
Alpha		17.506	0.130	134.857
Number of obs = 563382 Chi squared = 347635.2 Prob>chi2=0.000				
Restricted LL = -434318.0 , Log likelihood = -213915.1				
Pseudo R^2 =0.4482924				

Table A.3: Two-Lane Baseline SPF with LNADT and Length Offset Only – Excluding Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
Constant		-6.496	0.072	-90.397
LNADT	Log(AADT)	0.540	0.009	59.47
LENGTH	Segment Length	1.000	(Fixed Parameter)	
Dispersion parameter for count data model				
Alpha		20.341	0.2	101.52
Number of obs =426546 Chi squared = 148063.2 Prob>chi2=0.000				
Restricted LL = -209293.9 Log likelihood = -128460.7				
Pseudo R^2 = 0.3656021				

Table A.4: Two-Lane Baseline SPF with LNADT, Length Offset and Route Dummies – Excluding Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
Constant		-4.614	0.089	-51.796
LNADT	Log(AADT)	0.303	0.011	27.904
LENGTH	Segment Length	1.000	(Fixed Parameter)	
SRN3	State Route dummy (if SR3,value=1, else =0)	0.851	0.085	10.037
SRN11	State Route dummy (if SR11,value=1, else =0)	-0.411	0.079	-5.221
SRN12	State Route dummy (if SR12,value=1, else =0)	0.162	0.034	4.772
SRN21	State Route dummy (if SR21,value=1, else =0)	-1.552	0.060	-25.939
SRN23	State Route dummy (if SR23,value=1, else =0)	-1.022	0.107	-9.566
SRN24	State Route dummy (if SR24,value=1, else =0)	0.336	0.084	3.988
SRN25	State Route dummy (if SR25,value=1, else =0)	-0.633	0.061	-10.334
SRN31	State Route dummy (if SR31,value=1, else =0)	-1.159	0.128	-9.034
SRN97	State Route dummy (if SR97,value=1, else =0)	0.665	0.050	13.261
SRN104	State Route dummy (if SR104,value=1, else =0)	1.217	0.162	7.500
SRN109	State Route dummy (if SR109,value=1, else =0)	0.302	0.092	3.298
SRN112	State Route dummy (if SR112,value=1, else =0)	-0.369	0.054	-6.830
SRN123	State Route dummy (if SR123,value=1, else =0)	-4.448	0.510	-8.721
SRN124	State Route dummy (if SR124,value=1, else =0)	0.540	0.080	6.729
SRN125	State Route dummy (if SR125,value=1, else =0)	-1.078	0.111	-9.747
SRN127	State Route dummy (if SR127,value=1, else =0)	-0.952	0.128	-7.455
SRN129	State Route dummy (if SR129,value=1, else =0)	-1.237	0.099	-12.457
SRN150	State Route dummy (if SR150,value=1, else =0)	-0.281	0.121	-2.325
SRN153	State Route dummy (if SR153,value=1, else =0)	-0.339	0.108	-3.136
SRN160	State Route dummy (if SR160,value=1, else =0)	-1.954	0.666	-2.935
SRN164	State Route dummy (if SR164,value=1, else =0)	0.652	0.224	2.907
SRN165	State Route dummy (if SR165,value=1, else =0)	-1.230	0.104	-11.797
SRN172	State Route dummy (if SR172,value=1, else =0)	-1.401	0.192	-7.308
SRN174	State Route dummy (if SR174,value=1, else =0)	-0.301	0.14	-2.147
SRN206	State Route dummy (if SR206,value=1, else =0)	0.182	0.077	2.362
SRN231	State Route dummy (if SR231,value=1, else =0)	-0.668	0.071	-9.461
SRN240	State Route dummy (if SR240,value=1, else =0)	-0.741	0.094	-7.922
SRN260	State Route dummy (if SR260,value=1, else =0)	-1.008	0.158	-6.394
SRN261	State Route dummy (if SR261,value=1, else =0)	-1.014	0.108	-9.351
SRN270	State Route dummy (if SR270,value=1, else =0)	-2.093	0.169	-12.366
SRN272	State Route dummy (if SR272,value=1, else =0)	-0.967	0.169	-5.731
SRN274	State Route dummy (if SR274,value=1, else =0)	-2.055	0.608	-3.383
SRN281	State Route dummy (if SR281,value=1, else =0)	0.809	0.359	2.255
SRN290	State Route dummy (if SR290,value=1, else =0)	-1.975	0.120	-16.48
SRN291	State Route dummy (if SR291,value=1, else =0)	0.420	0.174	2.417
SRN305	State Route dummy (if SR305,value=1, else =0)	0.589	0.153	3.853

Table A.4 (continued): Two-Lane Baseline SPF with LNADT, Length Offset and Route Dummies – Excluding Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
SRN395	State Route dummy (if SR395,value=1, else =0)	0.132	0.046	2.865
SRN410	State Route dummy (if SR410,value=1, else =0)	-0.186	0.048	-3.885
SRN501	State Route dummy (if SR501,value=1, else =0)	0.472	0.167	2.825
SRN502	State Route dummy (if SR502,value=1, else =0)	0.832	0.321	2.594
SRN503	State Route dummy (if SR503,value=1, else =0)	0.182	0.067	2.727
SRN504	State Route dummy (if SR504,value=1, else =0)	-0.639	0.072	-8.825
SRN507	State Route dummy (if SR507,value=1, else =0)	0.689	0.116	5.948
SRN530	State Route dummy (if SR530,value=1, else =0)	0.179	0.071	2.518
SRN532	State Route dummy (if SR532,value=1, else =0)	1.635	0.298	5.483
SRN539	State Route dummy (if SR539,value=1, else =0)	-1.328	0.103	-12.944
SRN542	State Route dummy (if SR542,value=1, else =0)	0.368	0.050	7.285
SRN543	State Route dummy (if SR543,value=1, else =0)	1.411	0.295	4.790
SRN706	State Route dummy (if SR706,value=1, else =0)	0.261	0.081	3.216
SRN821	State Route dummy (if SR821,value=1, else =0)	-0.426	0.097	-4.396
SRN906	State Route dummy (if SR906,value=1, else =0)	0.877	0.263	3.328
SRN970	State Route dummy (if SR970,value=1, else =0)	1.192	0.334	3.564
Dispersion parameter for count data model				
Alpha		18.63417	0.1889943	98.596
Number of obs =426546 Chi squared = 137811.7 Prob>chi2=0.000				
Restricted LL = -209293.9 Log likelihood = -127211.5				
Pseudo R^2 = 0.3513502				

Appendix B1: Advanced SPF of the Basic Type (ADT+LENGTH+ROADWAY GEOMETRICS)

Table B1.1: Two-Lane Baseline SPF with LNADT, Length Offset and Roadway Geometrics – Including Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
Constant		-3.731	0.057	-65.86
LNADT	Log(AADT)	0.925	0.010	123.026
LENGTH	Segment Length	1.000	(Fixed Parameter)	
NLANEI	Number of lanes Increasing	-2.545	0.040	-67.024
NLANED	Number of lanes Decreasing	-3.031	0.050	-66.224
A1	Algebraic difference in gradients	-0.046	0.000	-16.344
K1	Rate of vertical curvature	-0.4D-04	0.5D-05	-7.793
DGC1	Degree of Curvature	0.005	0.000	5.207
RLNW	Average Lane width	0.021	0.000	7.007
SWR2367	Shoulder width dummy (if shoulder width right is 2-3ft and shoulder width left is 6-7ft, value=1,else=0)	-0.520	0.137	-3.795
SWR4523	Shoulder width dummy (if shoulder width right is 4-5ft and shoulder width left is 2-3ft, value=1,else=0)	-0.283	0.057	-4.932
SWR1001	Shoulder width dummy (if shoulder width right is >10ft and shoulder width left is 0-1ft, value=1,else=0)	-1.527	0.231	-6.606
SWR1023	Shoulder width dummy (if shoulder width right is >10ft and shoulder width left is 2-3ft, value=1,else=0)	-0.94	0.204	-4.598
SWC19	Shoulder width dummy (if shoulder width center is >1ft and <9ft, value=1,else=0)	-3.126	0.156	-20.034
Alpha		14.611	0.107	136.441
Number of obs = 563382 Chi squared = 326057.3 Prob>chi2=0.000				
Restricted LL = -434318.0 , Log likelihood = -208175.3				
Pseudo R^2=0.4391889				

Table B1.2: Two-Lane Baseline SPF with LNADT, Length Offset, Roadway Geometrics and Route Dummies – Including Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
Constant		-2.878	0.068	-42.053
LNADT	Log(AADT)	0.809	0.008	95.824
LENGTH	Segment Length	1.000	(Fixed Parameter)	
NLANEI	Number of lanes Increasing	-2.377	0.035	-68.224
NLANED	Number of lanes Decreasing	-2.928	0.045	-65.791
A1	Algebraic difference in gradients	-0.045	0.003	-15.984
K1	Rate of vertical curvature	-0.4D-04	0.4D-05	-10.828
DGC1	Degree of Curvature	0.006	0.001	6.048

Table B1.2 (continued): Two-Lane Baseline SPF with LNADT, Length Offset, Roadway Geometrics and Route Dummies – Including Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
SWR2367	Shoulder width dummy (if shoulder width right is 2-3ft and shoulder width left is 6-7ft, value=1,else=0)	-0.526	0.131	-4.008
SWR4523	Shoulder width dummy (if shoulder width right is 4-5ft and shoulder width left is 2-3ft, value=1,else=0)	-0.333	0.057	-5.858
SWR1001	Shoulder width dummy (if shoulder width right is >10ft and shoulder width left is 0-1ft, value=1,else=0)	-1.267	0.227	-5.594
SWR1023	Shoulder width dummy (if shoulder width right is >10ft and shoulder width left is 2-3ft, value=1,else=0)	-0.939	0.197	-4.770
SWC19	Shoulder width dummy (if shoulder width center is >1ft and <9ft, value=1,else=0)	-3.158	0.184	-17.178
SRN3	State Route dummy (if SR3,value=1, else =0)	0.58	0.084	6.92
SRN11	State Route dummy (if SR11,value=1, else =0)	-0.306	0.048	-6.373
SRN21	State Route dummy (if SR21,value=1, else =0)	-0.815	0.049	-16.802
SRN23	State Route dummy (if SR23,value=1, else =0)	-0.404	0.074	-5.472
SRN24	State Route dummy (if SR24,value=1, else =0)	0.210	0.062	3.396
SRN25	State Route dummy (if SR25,value=1, else =0)	-0.173	0.041	-4.235
SRN31	State Route dummy (if SR31,value=1, else =0)	-0.668	0.081	-8.234
SRN97	State Route dummy (if SR97,value=1, else =0)	0.305	0.034	8.875
SRN104	State Route dummy (if SR104,value=1, else =0)	0.712	0.106	6.738
SRN112	State Route dummy (if SR112,value=1, else =0)	-0.272	0.044	-6.232
SRN123	State Route dummy (if SR123,value=1, else =0)	-3.352	0.291	-11.53
SRN124	State Route dummy (if SR124,value=1, else =0)	0.446	0.062	7.171
SRN129	State Route dummy (if SR129,value=1, else =0)	-1.130	0.087	-13.041
SRN150	State Route dummy (if SR150value=1, else =0)	-0.604	0.082	-7.412
SRN160	State Route dummy (if SR160,value=1, else =0)	1.246	0.233	5.342
SRN165	State Route dummy (if SR165,value=1, else =0)	-0.972	0.081	-11.956
SRN172	State Route dummy (if SR172,value=1, else =0)	-0.392	0.113	-3.480
SRN231	State Route dummy (if SR231,value=1, else =0)	-0.284	0.048	-5.962
SRN260	State Route dummy (if SR260,value=1, else =0)	-0.263	0.099	-2.663
SRN261	State Route dummy (if SR261,value=1, else =0)	-0.324	0.087	-3.728
SRN274	State Route dummy (if SR274,value=1, else =0)	-1.359	0.493	-2.757
SRN281	State Route dummy (if SR281,value=1, else =0)	0.790	0.302	2.615
SRN290	State Route dummy (if SR290,value=1, else =0)	-1.494	0.128	-11.629
SRN395	State Route dummy (if SR395,value=1, else =0)	0.717	0.056	12.807
SRN507	State Route dummy (if SR507,value=1, else =0)	0.519	0.072	7.217
SRN532	State Route dummy (if SR532,value=1, else =0)	0.950	0.178	5.329
SRN542	State Route dummy (if SR542,value=1, else =0)	0.349	0.039	9.020
SRN821	State Route dummy (if SR543,value=1, else =0)	-0.430	0.081	-5.298
SRN906	State Route dummy (if SR906,value=1, else =0)	1.578	0.188	8.391

Table B1.2 (continued): Two-Lane Baseline SPF with LNADT, Length Offset, Roadway Geometrics and Route Dummies – Including Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
SRN970	State Route dummy (if SR970,value=1, else =0)	0.725	0.221	3.28
SR127504	State Route dummy (if SR127 or R504,value=1, else =0)	-0.424	0.051	-8.255
SR125153	State Route dummy (if SR125 or R153,value=1, else =0)	-0.382	0.067	-5.699
SR164503	State Route dummy (if SR164 or R503,value=1, else =0)	0.237	0.043	5.465
SR12501	State Route dummy (if SR12 or SR501,value=1, else =0)	0.244	0.027	9.125
SR206502	State Route dummy (if SR206 or R502,value=1, else =0)	0.478	0.069	6.98
Alpha		14.106	0.105	134.69
Number of obs = 563382 Chi squared = 315175.1 Prob>chi2=0.000				
Restricted LL = -434318.0 , Log likelihood = -207269.8				
Pseudo R^2 =0.4319155				

Table B1.3: Two-Lane Baseline SPF with LNADT, Length Offset and Roadway Geometrics – Excluding Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
Constant		-3.996	0.076	-52.279
LNADT	Log(AADT)	0.810	0.010	79.431
LENGTH	Segment Length	1.000	(Fixed Parameter)	
NLANEI	Number of lanes Increasing	-1.930	0.064	-30.279
NLANED	Number of lanes Decreasing	-2.864	0.071	-40.621
A1	Algebraic difference in gradients	-0.026	0.004	-7.139
K1	Rate of vertical curvature	-0.6D-04	0.1D-04	-5.709
DGC1	Degree of Curvature	0.015	0.001	11.132
RLNW	Average Lane width	0.026	0.006	4.356
SWR2367	Shoulder width dummy (if shoulder width right is 2-3ft and shoulder width left is 6-7ft, value=1,else=0)	-0.492	0.174	-2.832
SWR4523	Shoulder width dummy (if shoulder width right is 4-5ft and shoulder width left is 2-3ft, value=1,else=0)	-0.202	0.062	-3.238
SWR1001	Shoulder width dummy (if shoulder width right is >10ft and shoulder width left is 0-1ft, value=1,else=0)	-1.996	0.638	-3.13
SWR1023	Shoulder width dummy (if shoulder width right is >10ft and shoulder width left is 2-3ft, value=1,else=0)	-0.872	0.249	-3.499
SWC19	Shoulder width dummy (if shoulder width center is >1ft and <9ft, value=1,else=0)	-2.763	0.159	-17.352
Dispersion parameter for count data model				
Alpha		15.877	0.159	100.009
Number of obs =426546 Chi squared = 128632.1 Prob>chi2=0.000				
Restricted LL = -209293.9 Log likelihood = -124331.7				
Pseudo R^2 = 0.3409319				

Table B1.4: Two-Lane Baseline SPF with LNADT, Length Offset, Roadway Geometrics and Route Dummies – Excluding Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
Constant		-2.961	0.084	-35.365
LNADT	Log(AADT)	0.668	0.011	59.319
LENGTH	Segment Length	1.000	(Fixed Parameter)	
NLANEI	Number of lanes Increasing	-1.708	0.058	-29.705
NLANED	Number of lanes Decreasing	-2.761	0.072	-38.34
A1	Algebraic difference in gradients	-0.021	0.004	-5.818
K1	Rate of vertical curvature	-0.7D-04	0.9D-05	-8.228
DGC1	Degree of Curvature	0.017	0.001	12.498
SWR2367	Shoulder width dummy (if shoulder width right is 2-3ft and shoulder width left is 6-7ft, value=1,else=0)	-0.494	0.168	-2.939
SWR4523	Shoulder width dummy (if shoulder width right is 4-5ft and shoulder width left is 2-3ft, value=1,else=0)	-0.250	0.063	-3.989
SWR1001	Shoulder width dummy (if shoulder width right is >10ft and shoulder width left is 0-1ft, value=1,else=0)	-1.711	0.615	-2.785
SWR1023	Shoulder width dummy (if shoulder width right is >10ft and shoulder width left is 2-3ft, value=1,else=0)	-0.838	0.241	-3.483
SWC19	Shoulder width dummy (if shoulder width center is >1ft and <9ft, value=1,else=0)	-2.825	0.202	-13.966
SRN3	State Route dummy (if SR3,value=1, else =0)	0.640	0.101	6.348
SRN11	State Route dummy (if SR11,value=1, else =0)	-0.526	0.070	-7.487
SRN21	State Route dummy (if SR21,value=1, else =0)	-0.958	0.058	-16.653
SRN23	State Route dummy (if SR23,value=1, else =0)	-0.477	0.100	-4.759
SRN24	State Route dummy (if SR24,value=1, else =0)	0.395	0.076	5.176
SRN25	State Route dummy (if SR25,value=1, else =0)	-0.256	0.057	-4.510
SRN31	State Route dummy (if SR31,value=1, else =0)	-0.802	0.124	-6.459
SRN97	State Route dummy (if SR97,value=1, else =0)	0.497	0.044	11.304
SRN104	State Route dummy (if SR104,value=1, else =0)	0.974	0.157	6.215
SRN109	State Route dummy (if SR109,value=1, else =0)	0.171	0.081	2.101
SRN112	State Route dummy (if SR112,value=1, else =0)	-0.269	0.048	-5.613
SRN123	State Route dummy (if SR123,value=1, else =0)	-4.078	0.509	-8.011
SRN124	State Route dummy (if SR124,value=1, else =0)	0.638	0.068	9.322
SRN129	State Route dummy (if SR129,value=1, else =0)	-0.885	0.095	-9.295
SRN150	State Route dummy (if SR150value=1, else =0)	-0.719	0.108	-6.684
SRN160	State Route dummy (if SR160,value=1, else =0)	-2.526	0.589	-4.292
SRN165	State Route dummy (if SR165,value=1, else =0)	-0.897	0.097	-9.246
SRN172	State Route dummy (if SR172,value=1, else =0)	-0.646	0.184	-3.504
SRN231	State Route dummy (if SR231,value=1, else =0)	-0.340	0.065	-5.220
SRN260	State Route dummy (if SR260,value=1, else =0)	-0.610	0.150	-4.074

Table B1.4 (continued): Two-Lane Baseline SPF with LNADT, Length Offset, Roadway Geometrics and Route Dummies – Excluding Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
SRN261	State Route dummy (if SR261,value=1, else =0)	-0.425	0.102	-4.149
SRN272	State Route dummy (if SR272,value=1, else =0)	-0.545	0.166	-3.277
SRN274	State Route dummy (if SR274,value=1, else =0)	-1.827	0.585	-3.123
SRN281	State Route dummy (if SR281,value=1, else =0)	0.612	0.301	2.032
SRN290	State Route dummy (if SR290,value=1, else =0)	-1.402	0.170	-8.256
SRN395	State Route dummy (if SR395,value=1, else =0)	0.592	0.067	8.848
SRN507	State Route dummy (if SR507,value=1, else =0)	0.240	0.104	2.306
SRN532	State Route dummy (if SR532,value=1, else =0)	0.949	0.245	3.866
SRN542	State Route dummy (if SR542,value=1, else =0)	0.377	0.044	8.619
SRN543	State Route dummy (if SR543,value=1, else =0)	0.702	0.32	2.193
SRN706	State Route dummy (if SR706,value=1, else =0)	0.215	0.075	2.874
SRN821	State Route dummy (if SR821,value=1, else =0)	-0.285	0.088	-3.250
SRN906	State Route dummy (if SR906,value=1, else =0)	1.361	0.250	5.445
SRN970	State Route dummy (if SR970,value=1, else =0)	0.992	0.278	3.566
SR127504	State Route dummy (if SR127 or SR504,value=1, else =0)	-0.588	0.060	-9.788
SR125153	State Route dummy (if SR125 or SR153,value=1, else =0)	-0.223	0.076	-2.936
SR164503	State Route dummy (if SR164 or SR503,value=1, else =0)	0.137	0.062	2.197
SR12501	State Route dummy (if SR12 or SR501,value=1, else =0)	0.321	0.034	9.465
SR206502	State Route dummy (if SR206 or SR502,value=1, else =0)	0.434	0.069	6.279
Dispersion parameter for count data model				
Alpha		15.134	0.155	97.839
Number of obs =426546	Chi squared = 123215.7	Prob>chi2=0.000		
Restricted LL = -209293.9	Log likelihood = -123603.8			
Pseudo R^2 = 0.3326348				

Appendix B2: Advanced SPF of the Basic Type (ADT+LENGTH+ROADWAY GEOMETRICS+ROADSIDE)

Table B2.1: Two-Lane Baseline SPF with LNADT, Length Offset, Roadway Geometrics and Roadside Features – Including Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
Constant		-3.717	0.057	-65.66
LNADT	Log(AADT)	0.911	0.010	122.46
LENGTH	Segment Length	1.000	(Fixed Parameter)	
NLANEI	Number of lanes Increasing	-2.528	0.040	-67.489
NLANED	Number of lanes Decreasing	-2.998	0.050	-65.997
A1	Algebraic difference in gradients, percent	-0.042	0.000	-15.167
K1	Rate of vertical curvature	-0.4D-04	0.5D-05	-7.182
DGC1	Degree of Curvature	0.007	0.000	7.362
RLNW	Average Lane width	0.023	0.000	7.840
SWR2367	Shoulder width dummy (if shoulder width right is 2-3ft and shoulder width left is 6-7ft, value=1,else=0)	-0.505	0.130	-3.753
SWR4523	Shoulder width dummy (if shoulder width right is 4-5ft and shoulder width left is 2-3ft, value=1,else=0)	-0.284	0.060	-4.848
SWR1001	Shoulder width dummy (if shoulder width right is >10ft and shoulder width left is 0-1ft, value=1,else=0)	-1.516	0.220	-6.743
SWR1023	Shoulder width dummy (if shoulder width right is >10ft and shoulder width left is 2-3ft, value=1,else=0)	-0.944	0.210	-4.512
SWC19	Shoulder width dummy (if shoulder width center is >1ft and <9ft, value=1,else=0)	-3.099	0.160	-19.988
DCLVERT	Culvert Dummy variable (1 if culvert exists, 0 otherwise)	0.713	0.100	7.195
DDITCH	Ditch Dummy variable (1 if Ditch exists, 0 otherwise)	0.345	0.040	9.090
DFENCE	Fence Dummy variable (1 if Fence exists, 0 otherwise)	-0.036	0.04	-0.890
DGRDRAL	Guardrail Dummy variable (1 if Guardrail exists, 0 otherwise)	0.292	0.050	6.101
DMFXOBJ	Fixed Object Dummy variable (1 if Fixed Object exists, 0 otherwise)	0.383	0.050	7.310
LRCHCRP	Proportion of Rock out cropping length 90-100% on a segment	-0.907	0.200	-4.495
LGRDRL00	Proportion of Guardrail length 90-100% on a segment	-0.725	0.062	-11.650
LBRDRL90	Proportion of bridge rail length 80-90% on a segment	-1.464	0.595	-2.460
LBRDRL00	Proportion of bridge rail length 90-100% on a segment	-0.708	0.092	-7.660
LRDSLP00	Proportion of Roadside slope length 90-100% on a segment	-0.415	0.034	-12.200
LFENCE30	Proportion of fence length 20-30% on a segment	1.474	0.686	2.150

Table B2.1 (continued): Two-Lane Baseline SPF with LNADT, Length Offset, Roadway Geometrics and Roadside Features – Including Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
LCLVRT20	Proportion of culvert length 10-20% on a segment	-4.516	1.06	-4.253
LCLVRT30	Proportion of culvert length 20-30%on a segment	-2.401	0.678	-3.544
LCLVRT40	Proportion of culvert length 30-40%on a segment	-3.505	0.520	-6.800
LCLVRT50	Proportion of culvert length 40-50%on a segment	-2.213	0.600	-3.666
LCLVRT60	Proportion of culvert length 50-60%on a segment	-4.053	0.720	-5.595
LCLVRT00	Proportion of culvert length 90-100%on a segment	-0.359	0.18	-1.948
LTREG00	Proportion of Tree group length 90-100%on a segment	-0.370	0.059	-6.144
LDITCH00	Proportion of ditch length 90-100%on a segment	-0.596	0.050	-11.064
Alpha		14.242	0.104	136.586
Number of obs = 563382 Chi squared = 314295.6 Prob>chi2=0.000				
Restricted LL = -434318.0 , Log likelihood = -207565.1				
Pseudo R^2=0.4308808				

Table B2.2: Two-Lane Baseline SPF with LNADT, Length Offset, Roadway Geometrics, Roadside Features and Route Dummies – Including Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
Constant		-2.905	0.068	-42.912
LNADT	Log(AADT)	0.811	0.008	98.902
LENGTH	Segment Length	1.000	(Fixed Parameter)	
NLANEI	Number of lanes Increasing	-2.381	0.034	-69.081
NLANED	Number of lanes Decreasing	-2.922	0.044	-66.124
A1	Algebraic difference in gradients, percent	-0.043	0.003	-15.397
K1	Rate of vertical curvature	-0.4D-04	0.4D-05	-10.522
DGC1	Degree of Curvature	0.008	0.001	7.750
SWR2367	Shoulder width dummy (if shoulder width right is 2-3ft and shoulder width left is 6-7ft, value=1,else=0)	-0.520	0.129	-4.018
SWR4523	Shoulder width dummy (if shoulder width right is 4-5ft and shoulder width left is 2-3ft, value=1,else=0)	-0.337	0.058	-5.794
SWR1001	Shoulder width dummy (if shoulder width right is >10ft and shoulder width left is 0-1ft, value=1,else=0)	-1.271	0.223	-5.697
SWR1023	Shoulder width dummy (if shoulder width right is >10ft and shoulder width left is 2-3ft, value=1,else=0)	-0.953	0.203	-4.691
SWC19	Shoulder width dummy (if shoulder width center is >1ft and <9ft, value=1,else=0)	-3.153	0.183	-17.244
DCLVERT	Culvert Dummy variable (1 if culvert exists, 0 otherwise)	0.570	0.069	8.254
DDITCH	Ditch Dummy variable (1 if Ditch exists, 0 otherwise)	0.152	0.028	5.514
DGRDRAL	Guardrail Dummy variable (1 if Guardrail exists, 0 otherwise)	0.327	0.047	6.934
DMFXOBJ	Fixed Object Dummy variable (1 if Fixed Object exists, 0 otherwise)	0.478	0.052	9.201

Table B2.2 (continued): Two-Lane Baseline SPF with LNADT, Length Offset, Roadway Geometrics, Roadside Features and Route Dummies – Including Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
LRCHCRP	Proportion of Rock out cropping length 90-100% on a segment	-1.178	0.21	-5.602
LGRDRL00	Proportion of Guardrail length 90-100% on a segment	-0.758	0.061	-12.411
LRDSLP00	Proportion of Roadside slope length 90-100% on a segment	-0.598	0.031	-19.580
LCLVRT30	Proportion of Culvert length 20-30% on a segment	-1.957	0.635	-3.083
LCLVRT40	Proportion of Culvert length 30-40% on a segment	-2.760	0.452	-6.101
LCLVRT50	Proportion of Culvert length 40-50% on a segment	-1.510	0.544	-2.773
LCLVRT60	Proportion of Culvert length 50-60% on a segment	-3.736	0.693	-5.394
SRN3	State Route dummy (if SR3,value=1, else =0)	0.540	0.078	6.939
SRN11	State Route dummy (if SR11,value=1, else =0)	-0.318	0.047	-6.704
SRN21	State Route dummy (if SR21,value=1, else =0)	-0.808	0.048	-16.736
SRN23	State Route dummy (if SR23,value=1, else =0)	-0.410	0.075	-5.450
SRN24	State Route dummy (if SR24,value=1, else =0)	0.202	0.055	3.644
SRN25	State Route dummy (if SR25,value=1, else =0)	-0.176	0.041	-4.319
SRN31	State Route dummy (if SR31,value=1, else =0)	-0.625	0.081	-7.669
SRN97	State Route dummy (if SR97,value=1, else =0)	0.339	0.034	10.043
SRN104	State Route dummy (if SR104,value=1, else =0)	0.717	0.104	6.865
SRN112	State Route dummy (if SR112,value=1, else =0)	-0.276	0.043	-6.389
SRN123	State Route dummy (if SR123,value=1, else =0)	-3.362	0.291	-11.549
SRN124	State Route dummy (if SR124,value=1, else =0)	0.454	0.062	7.376
SRN129	State Route dummy (if SR129,value=1, else =0)	-1.062	0.089	-11.963
SRN150	State Route dummy (if SR150,value=1, else =0)	-0.606	0.08	-7.541
SRN160	State Route dummy (if SR160,value=1, else =0)	1.129	0.222	5.091
SRN165	State Route dummy (if SR165,value=1, else =0)	-0.974	0.081	-12.047
SRN172	State Route dummy (if SR172,value=1, else =0)	-0.379	0.112	-3.381
SRN231	State Route dummy (if SR231,value=1, else =0)	-0.298	0.048	-6.259
SRN260	State Route dummy (if SR260,value=1, else =0)	-0.254	0.098	-2.593
SRN261	State Route dummy (if SR261,value=1, else =0)	-0.313	0.087	-3.615
SRN274	State Route dummy (if SR274,value=1, else =0)	-1.270	0.462	-2.746
SRN281	State Route dummy (if SR281,value=1, else =0)	0.797	0.297	2.680
SRN290	State Route dummy (if SR290,value=1, else =0)	-1.516	0.128	-11.826
SRN395	State Route dummy (if SR395,value=1, else =0)	0.691	0.055	12.493
SRN532	State Route dummy (if SR532,value=1, else =0)	0.901	0.171	5.267
SRN542	State Route dummy (if SR542,value=1, else =0)	0.326	0.039	8.406
SRN821	State Route dummy (if SR821,value=1, else =0)	-0.426	0.08	-5.299
SRN906	State Route dummy (if SR906,value=1, else =0)	1.575	0.185	8.507
SRN970	State Route dummy (if SR970,value=1, else =0)	0.722	0.218	3.314
SR127504	State Route dummy (if SR127 or R504,value=1, else =0)	-0.418	0.051	-8.227

Table B2.2 (continued): Two-Lane Baseline SPF with LNADT, Length Offset, Roadway Geometrics, Roadside Features and Route Dummies – Including Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
SR125153	State Route dummy (if SR125 or R153,value=1, else =0)	-0.369	0.067	-5.518
SR164503	State Route dummy (if SR164 or SR503,value=1, else =0)	0.227	0.043	5.341
SR12501	State Route dummy (if SR12 or SR501,value=1, else =0)	0.250	0.027	9.396
SR206502	State Route dummy (if SR206 or R502,value=1, else =0)	0.475	0.069	6.865
Alpha				
Number of obs = 563382 Chi squared = 307976.1 Prob>chi2=0.000				
Restricted LL = -434318.0 , Log likelihood = -206815.7				
Pseudo R^2 =0.4267917				

Table B2.3: Two-Lane Baseline SPF with LNADT, Length Offset, Roadway Geometrics and Roadside Features – Excluding Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
Constant		-4.015	0.077	-52.35
LNADT	Log(AADT)	0.802	0.010	78.697
LENGTH	Segment Length	1.000	(Fixed Parameter)	
NLANEI	Number of lanes Increasing	-1.922	0.063	-30.555
NLANED	Number of lanes Decreasing	-2.841	0.070	-40.737
A1	Algebraic difference in gradients, percent	-0.024	0.004	-6.64
K1	Rate of vertical curvature	-0.5D-04	0.1D-04	-5.364
DGC1	Degree of Curvature	0.016	0.001	12.46
RLNW	Average Lane width	0.030	0.006	5.014
SWR2367	Shoulder width dummy (if shoulder width right is 2-3ft and shoulder width left is 6-7ft, value=1,else=0)	-0.471	0.171	-2.761
SWR4523	Shoulder width dummy (if shoulder width right is 4-5ft and shoulder width left is 2-3ft, value=1,else=0)	-0.230	0.065	-3.565
SWR1001	Shoulder width dummy (if shoulder width right is >10ft and shoulder width left is 0-1ft, value=1,else=0)	-2.084	0.665	-3.136
SWR1023	Shoulder width dummy (if shoulder width right is >10ft and shoulder width left is 2-3ft, value=1,else=0)	-0.843	0.249	-3.381
SWC19	Shoulder width dummy (if shoulder width center is >1ft and <9ft, value=1,else=0)	-2.754	0.158	-17.415
DCLVERT	Culvert Dummy variable (1 if culvert exists, 0 otherwise)	0.611	0.137	4.453
DDITCH	Ditch Dummy variable (1 if Ditch exists, 0 otherwise)	0.380	0.050	7.652
DFENCE	Fence Dummy variable (1 if Fence exists, 0 otherwise)	-0.225	0.056	-4.047
DGRDRAL	Guardrail Dummy variable (1 if Guardrail exists, 0 otherwise)	0.333	0.059	5.678
DMFXOBJ	Fixed Object Dummy variable (1 if Fixed Object exists, 0 otherwise)	0.434	0.073	5.903

Table B2.3 (continued): Two-Lane Baseline SPF with LNADT, Length Offset, Roadway Geometrics and Roadside Features – Excluding Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
LRCHCRP	Proportion of Rock out cropping length 90-100% on a segment	-0.766	0.207	-3.695
LGRDRL00	Proportion of Guardrail length 90-100% on a segment	-0.703	0.076	-9.263
LBRDRL90	Proportion of bridge rail length 80-90% on a segment	-1.647	0.694	-2.374
LBRDRL00	Proportion of bridge rail length 90-100% on a segment	-0.332	0.107	-3.117
LRDSLP00	Proportion of Roadside slope length 90-100% on a segment	-0.240	0.042	-5.719
LFENCE30	Proportion of fence length 20-30% on a segment	1.717	0.789	2.176
LCLVRT20	Proportion of culvert length 10-20% on a segment	-3.530	1.561	-2.261
LCLVRT30	Proportion of culvert length 20-30%on a segment	-3.987	1.090	-3.659
LCLVRT40	Proportion of culvert length 30-40%on a segment	-2.438	0.633	-3.853
LCLVRT50	Proportion of culvert length 40-50%on a segment	-2.780	0.924	-3.009
LCLVRT60	Proportion of culvert length 50-60%on a segment	-2.651	0.894	-2.964
LCLVRT00	Proportion of culvert length 90-100%on a segment	-0.826	0.223	-3.709
LTRGRP00	Proportion of tree group length 90-100%on a segment	-0.328	0.072	-4.561
LDITCH00	Proportion of ditch length 90-100%on a segment	-0.583	0.067	-8.751
Dispersion parameter for count data model				
Alpha			0.156	99.835
Number of obs =426546 Chi squared = 125732.4 Prob>chi2=0.000				
Restricted LL = -209293.9 Log likelihood = -124039.7				
Pseudo R^2 = 0.3363521				

Table B2.4: Two-Lane Baseline SPF with LNADT, Length Offset, Roadway Geometrics, Roadside Features and Route Dummies – Excluding Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
Constant		-2.947	0.083	-35.375
LNADT	Log(AADT)	0.663	0.011	59.768
LENGTH	Segment Length	1.000	(Fixed Parameter)	
NLANEI	Number of lanes Increasing	-1.703	0.057	-30.011
NLANED	Number of lanes Decreasing	-2.747	0.071	-38.457
A1	Algebraic difference in gradients, percent	-0.020	0.004	-5.480
K1	Rate of vertical curvature	-0.7D-04	0.9D-05	-7.868
DGC1	Degree of Curvature	0.019	0.001	13.609
SWR2367	Shoulder width dummy (if shoulder width right is 2-3ft and shoulder width left is 6-7ft, value=1,else=0)	-0.477	0.164	-2.901
SWR4523	Shoulder width dummy (if shoulder width right is 4-5ft and shoulder width left is 2-3ft, value=1,else=0)	-0.277	0.066	-4.188
SWR1001	Shoulder width dummy (if shoulder width right is >10ft and shoulder width left is 0-1ft, value=1,else=0)	-1.782	0.641	-2.779

Table B2.4 (continued): Two-Lane Baseline SPF with LNADT, Length Offset, Roadway Geometrics, Roadside Features and Route Dummies – Excluding Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
SWR1023	Shoulder width dummy (if shoulder width right is >10ft and shoulder width left is 2-3ft, value=1,else=0)	-0.816	0.241	-3.385
SWC19	Shoulder width dummy (if shoulder width center is >1ft and <9ft, value=1,else=0)	-2.820	0.201	-14.047
DCLVERT	Culvert Dummy variable (1 if culvert exists, 0 otherwise)	0.417	0.106	3.933
DDITCH	Ditch Dummy variable (1 if Ditch exists, 0 otherwise)	0.383	0.050	7.630
DFENCE	Fence Dummy variable (1 if Fence exists, 0 otherwise)	-0.208	0.057	-3.668
DGRDRAL	Guardrail Dummy variable (1 if Guardrail exists, 0 otherwise)	0.347	0.058	5.943
DMFXOBJ	Fixed Object Dummy variable (1 if Fixed Object exists, 0 otherwise)	0.388	0.074	5.240
LRCHCRP	Proportion of Rock out cropping length 90-100% on a segment	-0.925	0.216	-4.285
LGRDRL00	Proportion of Guardrail length 90-100% on a segment	-0.718	0.075	-9.547
LRDSLP00	Proportion of Road slope length 90-100% on a segment	-0.287	0.042	-6.770
LFENCE30	Proportion of Fence length 20-30% on a segment	1.814	0.769	2.359
LCLVRT30	Proportion of Culvert length 20-30% on a segment	-3.134	0.994	-3.153
LCLVRT40	Proportion of Culvert length 30-40% on a segment	-1.987	0.564	-3.524
LCLVRT50	Proportion of Culvert length 40-50% on a segment	-2.070	0.812	-2.548
LCLVRT60	Proportion of Culvert length 50-60% on a segment	-2.372	0.809	-2.931
LCLVRT00	Proportion of Culvert length 90-100% on a seg.	-0.795	0.218	-3.646
LTRGRP00	Proportion of Tree group length 90-100% on a segment	-0.289	0.072	-4.023
LDITCH00	Proportion of Ditch length 90-100% on a segment	-0.551	0.067	-8.260
SRN3	State Route dummy (if SR3,value=1, else =0)	0.611	0.100	6.083
SRN11	State Route dummy (if SR11,value=1, else =0)	-0.518	0.070	-7.444
SRN21	State Route dummy (if SR21,value=1, else =0)	-0.969	0.057	-16.911
SRN23	State Route dummy (if SR23,value=1, else =0)	-0.504	0.105	-4.804
SRN24	State Route dummy (if SR24,value=1, else =0)	0.363	0.075	4.863
SRN25	State Route dummy (if SR25,value=1, else =0)	-0.262	0.057	-4.602
SRN31	State Route dummy (if SR31,value=1, else =0)	-0.739	0.125	-5.892
SRN97	State Route dummy (if SR97,value=1, else =0)	0.499	0.043	11.525
SRN104	State Route dummy (if SR104,value=1, else =0)	0.982	0.155	6.354
SRN112	State Route dummy (if SR112,value=1, else =0)	-0.282	0.047	-5.960
SRN123	State Route dummy (if SR123,value=1, else =0)	-4.095	0.509	-8.046
SRN124	State Route dummy (if SR124,value=1, else =0)	0.637	0.068	9.426
SRN129	State Route dummy (if SR129,value=1, else =0)	-0.819	0.098	-8.352
SRN150	State Route dummy (if SR150,value=1, else =0)	-0.721	0.106	-6.784
SRN160	State Route dummy (if SR160,value=1, else =0)	-2.565	0.583	-4.399

Table B2.4 (continued): Two-Lane Baseline SPF with LNADT, Length Offset, Roadway Geometrics, Roadside Features and Route Dummies – Excluding Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
SRN165	State Route dummy (if SR165,value=1, else =0)	-0.911	0.096	-9.443
SRN172	State Route dummy (if SR172,value=1, else =0)	-0.654	0.184	-3.566
SRN231	State Route dummy (if SR231,value=1, else =0)	-0.339	0.065	-5.220
SRN260	State Route dummy (if SR260,value=1, else =0)	-0.615	0.149	-4.140
SRN261	State Route dummy (if SR261,value=1, else =0)	-0.428	0.104	-4.115
SRN272	State Route dummy (if SR272,value=1, else =0)	-0.562	0.166	-3.392
SRN274	State Route dummy (if SR274,value=1, else =0)	-1.662	0.546	-3.046
SRN281	State Route dummy (if SR281,value=1, else =0)	0.617	0.297	2.079
SRN290	State Route dummy (if SR290,value=1, else =0)	-1.415	0.167	-8.457
SRN395	State Route dummy (if SR395,value=1, else =0)	0.581	0.065	8.884
SRN532	State Route dummy (if SR532,value=1, else =0)	0.920	0.241	3.825
SRN542	State Route dummy (if SR542,value=1, else =0)	0.371	0.044	8.368
SRN543	State Route dummy (if SR543,value=1, else =0)	0.714	0.314	2.273
SRN706	State Route dummy (if SR706,value=1, else =0)	0.211	0.073	2.869
SRN821	State Route dummy (if SR821,value=1, else =0)	-0.291	0.087	-3.341
SRN906	State Route dummy (if SR906,value=1, else =0)	1.364	0.247	5.533
SRN970	State Route dummy (if SR970,value=1, else =0)	0.994	0.273	3.637
SR127504	State Route dummy (if SR127 or R504,value=1, else =0)	-0.590	0.060	-9.891
SR125153	State Route dummy (if SR125 or R153,value=1, else =0)	-0.227	0.076	-2.981
SR164503	State Route dummy (if SR164 or R503,value=1, else =0)	0.126	0.061	2.058
SR12501	State Route dummy (if SR12 or SR501,value=1, else =0)	0.324	0.034	9.542
SR206502	State Route dummy (if SR206 or R502,value=1, else =0)	0.439	0.071	6.220
Dispersion parameter for count data model				
Alpha		14.835	0.152	97.745
Number of obs =426546 Chi squared = 120717.7 Prob>chi2=0.000				
Restricted LL = -209293.9 Log likelihood = -123326.4				
Pseudo R^2 = 0.3285992				

Appendix C1: Route Specific Advanced SPF of the Basic Type (ADT+LENGTH+ROADWAY GEOMETRICS)

Table C1.1: Route 3 – Including Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
Constant		14.286	1.680	8.506
LNADT	Log(AADT)	-1.498	0.173	-8.639
LENGTH	Segment Length	1.000	(Fixed Parameter)	
A1	Algebraic difference in gradients	-0.144	0.017	-8.536
K1	Rate of vertical curvature	-0.0003	0.000	-3.184
DGC1	Degree of Curvature	-0.073	0.017	-4.231
Alpha		9.035	0.358	25.252
Number of obs = 6525 Chi squared = 10909.52 Prob>chi2=0.000				
Restricted LL = -13861.27, Log likelihood = -5957.691				
Pseudo R2 =0.4779656				

Table C1.2: Route 7 – Including Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
Constant		6.206	1.325	4.683
LNADT	Log(AADT)	-0.621	0.102	-6.109
LENGTH	Segment Length	1.000	(Fixed Parameter)	
HCANG1	Horizontal Curve Central angle	-0.026	0.009	-3.061
A1	Algebraic difference in gradients	-0.109	0.033	-3.281
DGC1	Degree of Curvature	0.0485	0.015	3.279
RLNW	Average Lane width	-0.235	0.057	-4.143
SWR2367	Shoulder width dummy (if shoulder width right is 2-3ft and shoulder width left is 6-7ft, value=1,else=0)	-1.582	0.508	-3.112
Alpha		22.523	1.346	16.730
Number of obs = 10215 Chi squared = 4602.488 Prob>chi2=0.000				
Restricted LL = -6595.544, Log likelihood = -3440.179				
Pseudo R2 =0.4008142				

Table C1.3: Route 9 – Including Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
Constant		3.441	0.805	4.272
LNADT	Log(AADT)	-0.607	0.093	-6.527
LENGTH	Segment Length	1.000	(Fixed Parameter)	
A1	Algebraic difference in gradients	-0.196	0.026	-7.456
Alpha		17.163	0.867	19.796
Number of obs = 11979 Chi squared = 5775.846 Prob>chi2=0.000				
Restricted LL = -8178.575 Log likelihood = -4661.581				
Pseudo R2 =0.3825315				

Table C1.4: Route 11 – Including Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
Constant		0.060	1.793	0.033
LNADT	Log(AADT)	-0.211	0.219	-0.964
LENGTH	Segment Length	1.000	(Fixed Parameter)	
HCANG1	Horizontal Curve Central angle	-0.101	0.024	-4.233
A1	Algebraic difference in gradients	-0.192	0.052	-3.707
DGC1	Degree of Curvature	0.041	0.019	2.111
K1	Rate of vertical curvature	-0.004	0.001	-7.597
Alpha		26.172	2.429	10.775
Number of obs = 4770 Chi squared = 1905.921 Prob>chi2=0.000				
Restricted LL = -2732.3682, Log likelihood = -1266.422				
Pseudo R2 =0.4293810				

Table C1.5: Route 17 – Including Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
Constant		-6.510	0.599	-10.869
LNADT	Log(AADT)	0.738	0.067	10.988
LENGTH	Segment Length	1.000	(Fixed Parameter)	
HCANG1	Horizontal Curve Central angle	-0.002	0.001	-2.227
RLNW	Average Lane width	-0.085	0.032	-2.624
Alpha		15.485	0.814	19.030
Number of obs = 9621 Chi squared = 4837.201 Prob>chi2=0.000				
Restricted LL = -7384.208, Log likelihood = -3988.475				
Pseudo R2 = 0.3774890				

Table C1.6: Route 18 – Including Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
Constant		44.571	12.953	3.441
LNADT	Log(AADT)	-4.081	1.276	-3.197
LENGTH	Segment Length	1.000	(Fixed Parameter)	
NLANED	Number of lanes Decreasing	-3.969	0.344	-11.554
K1	Rate of vertical curvature	-0.003	0.001	-3.689
Alpha		3.421	0.395	8.661
Number of obs = 3564 Chi squared = 590.3279 Prob>chi2=0.000				
Restricted LL = -2454.402, Log likelihood = -891.4316				
Pseudo R2 =0.2487486				

Table C1.7: Route 21 – Including Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
Constant		-10.836	0.731	-14.830
LNADT	Log(AADT)	1.117	0.121	9.224
LENGTH	Segment Length	1.000	(Fixed Parameter)	
A1	Algebraic difference in gradients	-0.126	0.031	-4.094
Alpha		39.589	4.232	9.355
Number of obs = 21456 Chi squared = 818.3816 Prob>chi2=0.000				
Restricted LL = -2323.493 Log likelihood = -1627.246				
Pseudo R2 =0.2009347				

Table C1.8: Route 22 – Including Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
Constant		-6.540	1.300	-5.030
LNADT	Log(AADT)	0.972	0.202	4.809
LENGTH	Segment Length	1.000	(Fixed Parameter)	
RLNW	Average Lane width	-0.224	0.063	-3.544
Alpha		18.277	1.884	9.701
Number of obs = 2754 Chi squared = 1624.179 Prob>chi2=0.000				
Restricted LL = -2449.313 Log likelihood = -1154.679				
Pseudo R2 =0.4129056				

Table C1.9: Route 23 – Including Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
Poisson/NB/Gamma regression model				
Constant		-3.014	0.373	-8.079
LNADT	Log(AADT)	0.276	0.059	4.680
LENGTH	Segment Length	1.000	(Fixed Parameter)	
DGC1	Degree of Curvature	0.037	0.008	4.524
Zero inflation model				
Tau		-2.312	0.207	-11.164
Number of obs = 5247				
Restricted LL = -838.3338 Log likelihood = -680.08735				

Table C1.10: Route 24 – Including Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
Poisson/NB/Gamma regression model				
Constant		-2.283	0.115	-19.906
LNADT	Log(AADT)	0.193	0.015	12.520
LENGTH	Segment Length	1.000	(Fixed Parameter)	
HCANG1	Horizontal Curve Central angle	0.003	0.001	3.289
A1	Algebraic difference in gradients	0.028	0.007	3.791
K1	Rate of vertical curvature	0.5D-04	0.1D-04	4.405
Zero inflation model				
Tau		-2.461	0.113	-21.723
Number of obs = 4500				
Restricted LL = -3353.111 Log likelihood = -2787.77178				

Table C1.11: Route 25 – Including Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
Constant		-9.452	1.770	-5.340
LNADT	Log(AADT)	1.795	0.154	11.674
LENGTH	Segment Length	1.000	(Fixed Parameter)	
K1	Rate of vertical curvature	-0.003	0.001	-4.905
DGC1	Degree of Curvature	0.058	0.015	3.958
RLNW	Average Lane width	-0.504	0.177	-2.846
Alpha		24.509	2.119	11.565
Number of obs = 12483 Chi squared = 1413.921 Prob>chi2=0.000				
Restricted LL = -3413.453 Log likelihood = -2165.247				
Pseudo R2 =0.246138				

Table C1.12: Route 26 – Including Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
Poisson/NB/Gamma regression model				
Constant		-2.824	0.197	-14.369
LNADT	Log(AADT)	0.454	0.025	18.146
LENGTH	Segment Length	1.000	(Fixed Parameter)	
Zero inflation model				
Tau		1.686	0.043	39.287
Number of obs = 6732				
Restricted LL = -7242.775 Log likelihood = -5135.51426				

Table C1.13: Route 27 – Including Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
Constant		-5.546	0.376	-14.747
LNADT	Log(AADT)	1.095	0.065	16.729
LENGTH	Segment Length	1.000	(Fixed Parameter)	
NLANED	Number of lanes Decreasing	-5.102	0.267	-19.077
HCANG1	Horizontal Curve Central angle	0.005	0.002	2.296
K1	Rate of vertical curvature	-0.001	0.000	-5.049
Alpha		16.812	1.138	14.775
Number of obs = 10593 Chi squared = 2846.230 Prob>chi2=0.000				
Restricted LL = -5183.351 Log likelihood = -2667.113				
Pseudo R2 =0.3479305				

Table C1.14: Route 28 – Including Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
Constant		-3.743	1.566	-2.391
LNADT	Log(AADT)	0.623	0.056	11.110
LENGTH	Segment Length	1.000	(Fixed Parameter)	
NLANED	Number of lanes Decreasing	-2.988	1.527	-1.956
DGC1	Degree of Curvature	-0.174	0.048	-3.629
Alpha		18.088	1.202	15.046
Number of obs = 8739 Chi squared = 4454.249 Prob>chi2=0.000				
Restricted LL = -6006.081 Log likelihood = -3216.220				
Pseudo R2 =0.4091464				

Table C1.15: Route 31 – Including Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
Constant		-9.601	1.487	-6.458
LNADT	Log(AADT)	0.623	0.056	11.110
LENGTH	Segment Length	1.000	(Fixed Parameter)	
Alpha		31.566	5.196	6.075
Number of obs = 4086 Chi squared = 222.4129 Prob>chi2=0.000				
Restricted LL = -645.8698 Log likelihood = -478.5448				
Pseudo R2 =0.1885650				

Table C1.16: Route 97 – Including Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
Constant		-4.924	1.262	-3.902
LNADT	Log(AADT)	0.990	0.103	9.628
LENGTH	Segment Length	1.000	(Fixed Parameter)	
NLANEI	Number of lanes Increasing	-1.349	0.134	-10.032
NLANED	Number of lanes Decreasing	-3.072	0.927	-3.313
HCANG1	Horizontal Curve Central angle	-0.001	0.000	-3.215
K1	Rate of vertical curvature	0.000	0.3D-04	-7.882
SWR2367	Shoulder width dummy (if shoulder width right is 2-.ft and shoulder width left is 6-7ft, value=1,else=0)	-1.351	0.319	-4.240
Alpha		9.696	0.299	32.421
Number of obs = 21600 Chi squared = 12019.79 Prob>chi2=0.000				
Restricted LL = -20768.86 Log likelihood = -13047.60				
Pseudo R2 =0.3153561				

Table C1.17: Route 104 – Including Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
Poisson/NB/Gamma regression model				
Constant		-3.583	0.263	-13.646
LNADT	Log(AADT)	1.019	0.030	33.759
LENGTH	Segment Length	1.000	(Fixed Parameter)	
NLANED	Number of lanes Decreasing	-4.394	0.056	-78.853
DGC1	Degree of Curvature	-0.116	0.007	-16.468
Zero inflation model				
Tau		0.745	0.033	22.297
Number of obs = 3141				
Restricted LL = -6499.117 Log likelihood = -3032.22376				

Table C1.18: Route 106 – Including Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
Constant		-11.051	1.492	-7.405
LNADT	Log(AADT)	1.159	0.192	6.020
LENGTH	Segment Length	1.000	(Fixed Parameter)	
Alpha		12.551	1.327	9.458
Number of obs = 3798 Chi squared = 876.9523 Prob>chi2=0.000				
Restricted LL = -2002.269 Log likelihood = -1418.700				
Pseudo R2 =0.2360983				

Table C1.19: Route 108 – Including Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
Poisson/NB/Gamma regression model				
Constant		-0.573	0.171	-3.347
LNADT	Log(AADT)	0.047	0.021	2.293
LENGTH	Segment Length	1.000	(Fixed Parameter)	
Zero inflation model				
Tau		-13.513	2.044	-6.611
Number of obs = 1530				
Restricted LL = -1030.917 Log likelihood = -771.51339				

Table C1.20: Route 109 – Including Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
Constant		-8.921	0.973	-9.170
LNADT	Log(AADT)	0.919	0.124	7.438
LENGTH	Segment Length	1.000	(Fixed Parameter)	
HCANG1	Horizontal Curve Central angle	-0.026	0.008	-3.391
DGC1	Degree of Curvature	0.040	0.014	2.914
Alpha		13.060	1.031	12.673
Number of obs = 4788 Chi squared = 2013.286 Prob>chi2=0.000				
Restricted LL = -3554.868 Log likelihood = -2057.009				
Pseudo R2 =0.3285761				

Table C1.21: Route 115 – Including Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
Poisson/NB/Gamma regression model				
Constant		22.692	7.492	3.029
LNADT	Log(AADT)	-2.436	0.842	-2.893
LENGTH	Segment Length	1.000	(Fixed Parameter)	
K1	Rate of vertical curvature	0.004	0.001	7.547
Zero inflation model				
Tau		1.212	0.124	9.776
Number of obs = 342				
Restricted LL = -523.2961 Log likelihood = -282.95071				

Table C1.22: Route 125 – Including Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
Poisson/NB/Gamma regression model				
Constant		1.717	0.582	2.949
LENGTH	Segment Length	1.000	(Fixed Parameter)	
DGC1	Degree of Curvature	0.019	0.008	2.487
RLNW	Average Lane width	-0.233	0.065	-3.584
Zero inflation model				
Tau		-5.336	1.238	-4.312
Number of obs = 3159				
Restricted LL = -440.1051 Log likelihood = -314.40690				

Table C1.23: Route 129 – Including Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
Constant		-0.533	3.238	-0.165
LNADT	Log(AADT)	-0.555	0.515	-1.079
LENGTH	Segment Length	1.000	(Fixed Parameter)	
HCANG1	Horizontal Curve Central angle	0.029	0.012	2.381
K1	Rate of vertical curvature	-0.004	0.002	-2.138
Alpha		39.364	8.973	4.387
Number of obs = 5886 Chi squared = 182.9682 Prob>chi2=0.000				
Restricted LL = -598.7637 Log likelihood = -477.2590				
Pseudo R2 =0.1608531				

Table C1.24: Route 150 – Including Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
Constant		-9.090	2.249	-4.041
LNADT	Log(AADT)	0.836	0.259	3.229
LENGTH	Segment Length	1.000	(Fixed Parameter)	
Alpha		21.864	2.603	8.399
Number of obs = 2763 Chi squared = 1168.094 Prob>chi2=0.000				
Restricted LL = -1752.942 Log likelihood = -1033.575				
Pseudo R2 =0.3610527				

Table C1.25: Route 153 – Including Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
Constant		-15.531	4.490	-3.459
LNADT	Log(AADT)	1.755	0.606	2.895
LENGTH	Segment Length	1.000	(Fixed Parameter)	
A1	Algebraic difference in gradients	-0.100	0.040	-2.516
Alpha		19.722	3.024	6.522
Number of obs = 3366 Chi squared = 471.9979 Prob>chi2=0.000				
Restricted LL = -1111.408 Log likelihood = -801.7066				
Pseudo R2 =0.2274238				

Table C1.26: Route 155 – Including Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
Poisson/NB/Gamma regression model				
Constant		-1.490	0.112	-13.347
LNADT	Log(AADT)	0.127	0.016	8.054
LENGTH	Segment Length	1.000	(Fixed Parameter)	
RLNW	Average Lane width	0.012	0.003	4.104
Zero inflation model				
Tau		-7.263	0.431	-16.871
Number of obs = 7938				
Restricted LL = -3818.624 Log likelihood = -2690.50692				

Table C1.27: Route 164 – Including Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
Constant		34.693	5.179	6.698
LNADT	Log(AADT)	-2.877	0.541	-5.315
LENGTH	Segment Length	1.000	(Fixed Parameter)	
A1	Algebraic difference in gradients	-0.490	0.117	-4.184
RLNW	Average Lane width	-0.682	0.272	-2.504
Alpha		8.849	0.844	10.485
Number of obs = 1944 Chi squared = 1849.78 Prob>chi2=0.000				
Restricted LL = -2621.836 Log likelihood = -1204.947				
Pseudo R2 =0.4342545				

Table C1.28: Route 165 – Including Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
Constant		-2.979	1.588	-1.875
LNADT	Log(AADT)	-0.169	0.252	-0.671
LENGTH	Segment Length	1.000	(Fixed Parameter)	
HCANG1	Horizontal Curve Central angle	0.132	0.040	3.264
DGC1	Degree of Curvature	-0.071	0.023	-3.136
Alpha		62.173	16.036	3.877
Number of obs = 4302 Chi squared = 330.6221 Prob>chi2=0.000				
Restricted LL = -587.5710 Log likelihood = -393.0592				
Pseudo R2 =0.2960600				

Table C1.29: Route 169 – Including Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
Poisson/NB/Gamma regression model				
Constant		34.599	0.511	67.656
LENGTH	Segment Length	1.000	(Fixed Parameter)	
RLNW	Average Lane width	-3.036	0.046	-65.910
K1	Rate of vertical curvature	0.000	0.7D-04	7.033
Zero inflation model				
Tau		1.315	0.052	25.484
Number of obs = 3690				
Restricted LL = -3602.921 Log likelihood = -1803.99704				

Table C1.30: Route 172 – Including Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
Constant		-5.440	3.772	-1.442
LNADT	Log(AADT)	0.323	0.678	0.476
LENGTH	Segment Length	1.000	(Fixed Parameter)	
A1	Algebraic difference in gradients	-0.572	0.173	-3.313
Alpha		37.038	11.783	3.143
Number of obs = 2682 Chi squared = 116.6729 Prob>chi2=0.000				
Restricted LL = -305.0220 Log likelihood = -226.9816				
Pseudo R2 = 0.2044612				

Table C1.31: Route 173 – Including Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
Poisson/NB/Gamma regression model				
Constant		-1.349	0.315	-4.284
LNADT	Log(AADT)	0.146	0.040	3.652
LENGTH	Segment Length	1.000	(Fixed Parameter)	
Zero inflation model				
Tau		-11.396	1.448	-7.873
Number of obs = 1260 Chi squared = Prob>chi2=0.000				
Restricted LL = -997.3612 Log likelihood = -679.21865				
Pseudo R2 =				

Table C1.32: Route 174 – Including Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
Constant		-11.158	1.248	-8.944
LNADT	Log(AADT)	1.271	0.179	7.095
LENGTH	Segment Length	1.000	(Fixed Parameter)	
DGC1	Degree of Curvature	-0.170	0.063	-2.693
K1	Rate of vertical curvature	-0.001	0.000	-2.420
Alpha		10.948	1.661	6.593
Number of obs = 2673 Chi squared = 390.5420 Prob>chi2=0.000				
Restricted LL = -1110.891 Log likelihood = -792.3372				
Pseudo R2 =0.1977211				

Table C1.33: Route 202 – Including Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
Constant		34.693	5.179	6.698
LNADT	Log(AADT)	-4.145	0.396	-10.454
LENGTH	Segment Length	1.000	(Fixed Parameter)	
HCANG1	Horizontal Curve Central angle	0.023	0.007	3.301
K1	Rate of vertical curvature	-0.002	0.000	-5.473
RLNW	Average Lane width	0.175	0.016	10.770
Alpha		13.185	0.792	16.647
Number of obs = 5058 Chi squared = 4959.445 Prob>chi2=0.000				
Restricted LL = -6285.917 Log likelihood = -2675.365				
Pseudo R2 =0.4810244				

Table C1.34: Route 203 – Including Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
Constant		3.112	2.926	0.003
LNADT	Log(AADT)	-0.819	0.329	-2.490
LENGTH	Segment Length	1.000	(Fixed Parameter)	
NLANEI	Number of lanes Increasing	-2.822	0.619	-4.558
HCANG1	Horizontal Curve Central angle	0.064	0.010	6.684
A1	Algebraic difference in gradients	-0.080	0.035	-2.266
DGC1	Degree of Curvature	-0.059	0.016	-3.642
Alpha		11.127	0.735	15.144
Number of obs = 4203 Chi squared = 3041.536 Prob>chi2=0.000				
Restricted LL = -4784.953 Log likelihood = -2617.963				
Pseudo R2 =0.3674479				

Table C1.35: Route 206 – Including Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
Constant		-4.516	1.465	-3.084
LNADT	Log(AADT)	-0.213	0.201	-1.060
LENGTH	Segment Length	1.000	(Fixed Parameter)	
RLNW	Average Lane width	0.334	0.088	3.781
Alpha		27.306	4.473	6.105
Number of obs = 2601 Chi squared = 859.3678 Prob>chi2=0.000				
Restricted LL = -1560.795 Log likelihood = -740.6092				
Pseudo R2 =0.3671592				

Table C1.36: Route 223 – Including Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
Constant		-14.947	6.045	-2.473
LNADT	Log(AADT)	1.686	0.718	2.350
LENGTH	Segment Length	1.000	(Fixed Parameter)	
A1	Algebraic difference in gradients	-0.599	0.226	-2.649
Alpha		9.349	1.772	5.276
Number of obs = 585 Chi squared = 462.1224 Prob>chi2=0.000				
Restricted LL = -772.6303 Log likelihood = -432.6707				
Pseudo R2 =0.3481243				

Table C1.37: Route 231 – Including Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
Poisson/NB/Gamma regression model				
Constant		-2.843	0.177	-16.041
LNADT	Log(AADT)	0.298	0.026	11.283
LENGTH	Segment Length	1.000	(Fixed Parameter)	
K1	Rate of vertical curvature	-0.001	0.000	-3.236
Zero inflation model				
Tau		-3.251	0.141	-23.108
Number of obs = 8208				
Restricted LL = -1994.215 Log likelihood = -1485.12828				

Table C1.38: Route 241 – Including Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
Constant		7.199	0.625	-11.523
LNADT	Log(AADT)	0.749	0.080	9.333
LENGTH	Segment Length	1.000	(Fixed Parameter)	
HCANG1	Horizontal Curve Central angle	0.067	0.009	7.611
K1	Rate of vertical curvature	-0.005	0.001	-6.396
DGC1	Degree of Curvature	-0.217	0.028	-7.768
SWR4523	Shoulder width dummy (if shoulder width right is 4-5ft and shoulder width left is 2-3ft, value=1,else=0)	-0.960	0.183	-5.259
Alpha		1.036	0.113	9.188
Number of obs = 2124 Chi squared = 646.6680 Prob>chi2=0.000				
Restricted LL = -2801.582 Log likelihood = -1251.785				
Pseudo R2 =0.2052760				

Table C1.39: Route 261 – Including Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
Poisson/NB/Gamma regression model				
Constant		0.937	0.779	1.203
LNADT	Log(AADT)	-0.525	0.130	-4.036
LENGTH	Segment Length	1.000	(Fixed Parameter)	
HCANG1	Horizontal Curve Central angle	0.012	0.002	5.433
Zero inflation model				
Tau		-0.884	0.086	-10.318
Number of obs = 5166 Chi squared = Prob>chi2=0.000				
Restricted LL = -713.7194 Log likelihood = -643.24171				

Table C1.40: Route 302 – Including Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
Constant		21.016	8.432	2.490
LNADT	Log(AADT)	-2.678	1.000	-2.679
LENGTH	Segment Length	1.000	(Fixed Parameter)	
Alpha		12.847	1.495	8.591
Number of obs = 1980 Chi squared = 752.7826 Prob>chi2=0.000				
Restricted LL = -1544.820 Log likelihood = -670.8716				
Pseudo R2 =0.3594048				

Table C1.41: Route 395 – Including Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
Constant		-6.880	0.634	-10.858
LNADT	Log(AADT)	1.766	0.074	23.961
LENGTH	Segment Length	1.000	(Fixed Parameter)	
NLANEI	Number of lanes Increasing	-8.856	0.357	-24.804
HCANG1	Horizontal Curve Central angle	-0.001	0.000	-1.938
K1	Rate of vertical curvature	-0.0004	0.9D-04	-4.545
DGC1	Degree of Curvature	0.098	0.023	4.304
RLNW	Average Lane width	0.041	0.018	2.307
Alpha		7.345	0.300	24.488
Number of obs = 13590 Chi squared = 8924.366 Prob>chi2=0.000				
Restricted LL = -13311.88 Log likelihood = -5731.208				
Pseudo R2 =0.4377525				

Table C1.42: Route 410 – Including Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
Poisson/NB/Gamma regression model				
Constant		-0.162	0.058	-2.767
LNADT	Log(AADT)	-0.017	0.008	-2.225
LENGTH	Segment Length	1.000	(Fixed Parameter)	
SWR4523	Shoulder width dummy (if shoulder width right is 4-5ft and shoulder width left is 2-3ft, value=1,else=0)	0.080	0.018	4.350
Zero inflation model				
Tau		-12.995	0.619	-20.979
Number of obs = 13734				
Restricted LL = -5270.852 Log likelihood = -3287.60744				

Table C1.43: Route 411 – Including Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
Poisson/NB/Gamma regression model				
Constant		2.301	0.309	7.452
LNADT	Log(AADT)	-0.290	0.036	-7.988
LENGTH	Segment Length	1.000	(Fixed Parameter)	
Zero inflation model				
Tau		-11.855	1.387	-8.547
Number of obs = 1728				
Restricted LL = -1475.581 Log likelihood = -963.12897				

Table C1.44: Route 501 – Including Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
Poisson/NB/Gamma regression model				
Constant		-11.782	0.414	-28.434
LNADT	Log(AADT)	1.484	0.048	31.018
LENGTH	Segment Length	1.000	(Fixed Parameter)	
SWR4501	Shoulder width dummy (if shoulder width right is 4-5ft and shoulder width left is 0-1ft, value=1,else=0)	-4.567	0.508	-8.983
Zero inflation model				
Tau		1.629	0.104	15.731
Number of obs = 1008				
Restricted LL = -973.2261 Log likelihood = -575.07235				

Table C1.45: Route 503 – Including Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
Constant		-4.280	0.341	-12.556
LNADT	Log(AADT)	0.618	0.056	11.023
LENGTH	Segment Length	1.000	(Fixed Parameter)	
RLNW	Average Lane width	-0.196	0.018	-10.841
Alpha		17.630	1.008	17.485
Number of obs = 7470 Chi squared = 5222.921 Prob>chi2=0.000				
Restricted LL = -7765.977 Log likelihood = -3480.014				
Pseudo R2 =0.4287074				

Table C1.46: Route 505 – Including Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
Poisson/NB/Gamma regression model				
Constant		-11.993	0.495	-24.206
LNADT	Log(AADT)	1.548	0.061	25.585
LENGTH	Segment Length	1.000	(Fixed Parameter)	
A1	Algebraic difference in gradients	0.141	0.019	7.523
K1	Rate of vertical curvature	-0.010	0.001	-14.031
DGC1	Degree of Curvature	-0.111	0.014	-8.016
Zero inflation model				
Tau		0.050	0.100	0.504
Number of obs = 1485				
Restricted LL = -1610.158 Log likelihood = -851.38374				

Table C1.47: Route 507 – Including Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
Constant		-13.505	0.663	-20.383
LNADT	Log(AADT)	1.472	0.075	19.507
LENGTH	Segment Length	1.000	(Fixed Parameter)	
K1	Rate of vertical curvature	-0.0028	0.000	-9.569
Alpha		8.272	0.404	20.465
Number of obs = 5229 Chi squared = 8622.980 Prob>chi2=0.000				
Restricted LL = -11676.49 Log likelihood = -4513.612				
Pseudo R2 =0.4885485				

Table C1.48: Route 510 – Including Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
Poisson/NB/Gamma regression model				
Constant		0.597	0.267	2.238
LNADT	Log(AADT)	0.146	0.028	5.271
LENGTH	Segment Length	1.000	(Fixed Parameter)	
A1	Algebraic difference in gradients	-0.819	0.038	-21.543
K1	Rate of vertical curvature	-0.010	0.000	-20.758
Zero inflation model				
Tau		0.555	0.034	16.210
Number of obs = 1773				
Restricted LL = -5698.683 Log likelihood = -2074.15248				

Table C1.49: Route 525 – Including Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
Constant		12.559	4.404	2.852
LNADT	Log(AADT)	-1.487	0.475	-3.131
LENGTH	Segment Length	1.000	(Fixed Parameter)	
HCANG1	Horizontal Curve Central angle	0.024	0.011	2.246
A1	Algebraic difference in gradients	0.134	0.036	3.675
K1	Rate of vertical curvature	-0.0028	0.000	-9.569
Alpha		-0.001	0.000	-2.991
Number of obs = 3465 Chi squared = 3705.179 Prob>chi2=0.000				
Restricted LL = -4360.512 Log likelihood = -2129.737				
Pseudo R2 =0.4652028				

Table C1.50: Route 530 – Including Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
Constant		-8.802	0.592	-14.870
LNADT	Log(AADT)	1.076	0.060	17.784
LENGTH	Segment Length	1.000	(Fixed Parameter)	
K1	Rate of vertical curvature	-0.0003	0.0001	-3.217
RLNW	Average Lane width	-0.149	0.029	-5.088
Alpha		13.109	0.893	14.679
Number of obs = 6219 Chi squared = 3885.591 Prob>chi2=0.000				
Restricted LL = -6064.491 Log likelihood = -2763.301				
Pseudo R2 =0.4128253				

Table C1.51: Route 539 – Including Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
Poisson/NB/Gamma regression model				
Constant		6.685	0.982	6.807
LNADT	Log(AADT)	0.283	0.095	2.963
LENGTH	Segment Length	1.000	(Fixed Parameter)	
A1	Algebraic difference in gradients	-1.892	0.760	-2.489
K1	Rate of vertical curvature	-0.0003	0.96D-04	-3.441
NLANEI	Number of lanes Increasing	-7.912	0.508	-15.562
Zero inflation model				
Tau		0.439	0.119	3.691
Number of obs = 2223				
Restricted LL = -1045.566 Log likelihood = -262.10706				

Table C1.52: Route 542 – Including Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
Poisson/NB/Gamma regression model				
Constant		-10.742	0.143	-74.952
LNADT	Log(AADT)	1.388	0.012	119.205
LENGTH	Segment Length	1.000	(Fixed Parameter)	
A1	Algebraic difference in gradients	-0.101	0.007	-15.536
DGC1	Degree of Curvature	0.015	0.001	12.024
RLNW	Average Lane width	-0.056	0.012	-4.665
SWR4523	Shoulder width dummy (if shoulder width right is 4-5ft and shoulder width left is 2-3ft, value=1,else=0)	-2.360	0.502	-4.698
Zero inflation model				
Tau		0.874	0.040	21.595
Number of obs = 11340				
Restricted LL = -9242.943 Log likelihood = -6285.04138				

Table C1.53: Route 543 – Including Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
Constant		-46.512	9.748	-4.771
LNADT	Log(AADT)	4.576	0.952	4.805
LENGTH	Segment Length	1.000	(Fixed Parameter)	
K1	Rate of vertical curvature	-0.026	0.006	-4.781
Alpha		7.613	1.764	4.316
Number of obs = 270 Chi squared = 498.3874 Prob>chi2=0.000				
Restricted LL = -764.2611 Log likelihood = -172.6342				
Pseudo R2 =0.5907473				

Table C1.54: Route 544 – Including Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
Poisson/NB/Gamma regression model				
Constant		-4.381	1.204	-3.638
LNADT	Log(AADT)	0.609	0.138	4.400
LENGTH	Segment Length	1.000	(Fixed Parameter)	
A1	Algebraic difference in gradients	-1.312	0.160	-8.195
DGC1	Degree of Curvature	0.060	0.020	2.944
Zero inflation model				
Tau		-0.226	0.099	-2.287
Number of obs = 396				
Restricted LL = -1136.128 Log likelihood = -626.72554				

Table C1.55: Route 548 – Including Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
Poisson/NB/Gamma regression model				
Constant		12.696	0.366	34.677
LNADT	Log(AADT)	-1.480	0.042	-35.023
LENGTH	Segment Length	1.000	(Fixed Parameter)	
RLNW	Average Lane width	-0.042	0.010	-4.145
Zero inflation model				
ZIP Tau		-0.414	0.162	-2.564
Number of obs = 387 Chi squared = Prob>chi2=0.000				
Restricted LL = -1162.828 Log likelihood = -812.49303				
Pseudo R2 =				

Table C1.56: Route 702 – Including Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
Constant		-5.801	5.822	-0.996
LNADT	Log(AADT)	0.707	0.694	1.019
LENGTH	Segment Length	1.000	(Fixed Parameter)	
A1	Algebraic difference in gradients	-0.168	0.051	-3.276
K1	Rate of vertical curvature	-0.011	0.002	-5.020
Alpha		4.415	0.641	6.880
Number of obs = 504 Chi squared = 552.0719 Prob>chi2=0.000				
Restricted LL = -1603.147 Log likelihood = -538.2600				
Pseudo R2 =0.3389873				

Table C1.57: Route 900 – Including Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
Poisson/NB/Gamma regression model				
Constant		0.888	0.435	2.040
LNADT	Log(AADT)	-0.113	0.046	-2.470
LENGTH	Segment Length	1.000	(Fixed Parameter)	
SWR4523	Shoulder width dummy (if shoulder width right is 4-5ft and shoulder width left is 2-3ft, value=1,else=0)	0.108	0.015	7.135
Zero inflation model				
Tau		-18.260	2.751	-6.639
Number of obs = 3321				
Restricted LL = -1339.140 Log likelihood = -827.34612				

Table C1.58: Route 902 – Including Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
Constant		-15.492	3.532	-4.386
LNADT	Log(AADT)	1.693	0.417	4.058
LENGTH	Segment Length	1.000	(Fixed Parameter)	
Alpha		11.071	1.530	7.236
Number of obs = 981 Chi squared = 817.7077 Prob>chi2=0.000				
Restricted LL = -1237.440 Log likelihood = -612.3856				
Pseudo R2 =0.4003507				

Table C1.59: Route 903 – Including Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
Poisson/NB/Gamma regression model				
Constant		-0.830	0.141	-5.881
LNADT	Log(AADT)	0.080	0.016	4.987
LENGTH	Segment Length	1.000	(Fixed Parameter)	
Zero inflation model				
Tau		-13.645	1.887	-7.230
Number of obs = 1638				
Restricted LL = -1271.954 Log likelihood = -828.54424				

Table C1.60: Route 970 – Including Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
Poisson/NB/Gamma regression model				
Constant		19.467	1.913	10.178
LNADT	Log(AADT)	-1.551	0.217	-7.153
LENGTH	Segment Length	1.000	(Fixed Parameter)	
HCANG1	Horizontal Curve Central angle	-0.046	0.015	-3.170
A1	Algebraic difference in gradients	0.044	0.020	2.186
K1	Rate of vertical curvature	-0.0003	0.9D-04	-3.371
DGC1	Degree of Curvature	0.079	0.038	2.097
RLNW	Average Lane width	-0.469	0.057	-8.280
Zero inflation model				
Tau		0.937	0.082	11.473
Number of obs = 693				
Restricted LL = -1197.144 Log likelihood = -678.45817				

Table C1.61: All Other Routes – Including Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
Constant		-5.311	0.077	-69.100
LNADT	Log(AADT)	0.889	0.012	72.887
LENGTH	Segment Length	1.000	(Fixed Parameter)	
NLANEI	Number of lanes Increasing	-4.244	0.056	-75.407
HCANG1	Horizontal Curve Central angle	-0.0004	0.0001	-3.892
A1	Algebraic difference in gradients	-0.036	0.004	-8.944
K1	Rate of vertical curvature	-0.0002	0.1D-04	-15.404
DGC1	Degree of Curvature	0.009	0.002	4.567
RLNW	Average Lane width	0.059	0.005	12.774
SWR4501	Shoulder width dummy (if shoulder width right is 4-5ft and shoulder width left is 0-1ft, value=1,else=0)	-0.433	0.208	-2.081
SWR4523	Shoulder width dummy (if shoulder width right is 4-5ft and shoulder width left is 2-3ft, value=1,else=0)	-0.529	0.069	-7.633
SWR1001	Shoulder width dummy (if shoulder width right is >10ft and shoulder width left is 0-1ft, value=1,else=0)	-2.152	0.415	-5.181
SWR1045	Shoulder width dummy (if shoulder width right is >10ft and shoulder width left is 4-5ft, value=1,else=0)	0.548	0.204	2.690
SWC19	Shoulder width dummy (if shoulder width center is >1ft and <9ft, value=1,else=0)	-3.013	0.158	-19.012
Alpha		14.810	0.161	91.951
Number of obs = 263349 Chi squared = 132718.6 Prob>chi2=0.000				
Restricted LL = -195600.4 Log likelihood = -96527.01				
Pseudo R2 =0.4073965				

Table C1.62: Route 3 – Excluding Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
Constant		12.659	1.921	6.591
LNADT	Log(AADT)	-1.400	0.199	-7.053
LENGTH	Segment Length	1.000	(Fixed Parameter)	
K1	Rate of vertical curvature	-0.002	0.000	-5.441
SWR4523	Shoulder width dummy (if shoulder width right is 4-5ft and shoulder width left is 2-3ft, value=1,else=0)	1.465	0.586	2.502
Dispersion parameter for count data model				
Alpha		9.456	0.513	18.440
Number of obs =4860 Chi squared =4259.567 Prob>chi2=0.000				
Restricted LL = -6100.709 Log likelihood = -3244.492				
Pseudo R^2 = 0.3962922				

Table C1.63: Route 7 – Excluding Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
Constant		5.608	0.854	6.569
LNADT	Log(AADT)	-0.982	0.103	-9.496
LENGTH	Segment Length	1.000	(Fixed Parameter)	
DGC1	Degree of Curvature	0.022	0.009	2.539
Dispersion parameter for count data model				
Alpha		15.925	1.369	11.630
Number of obs = 7128 Chi squared = 1475.842 Prob>chi2= 0.000				
Restricted LL = -3202.048 Log likelihood = -2114.137				
Pseudo R^2 = 0.2587328				

Table C1.64: Route 9 – Excluding Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
Poisson/NB/Gamma regression model				
Constant		-4.317	0.406	-10.643
LNADT	Log(AADT)	0.570	0.049	11.521
LENGTH	Segment Length	1.000	(Fixed Parameter)	
DGC1	Degree of Curvature	0.007	0.003	2.288
Zero inflation model				
Constant		-3.367	0.788	-4.274
LNADT	Log(AADT)	0.766	0.095	8.042
LENGTH	Segment Length	-5.769	0.593	-9.726
DGC1	Degree of Curvature	-0.021	0.006	-3.285
Number of obs = 8181				
Restricted LL =-3608.701 Log likelihood = -2372.76898				

Table C1.65: Route 12 – Excluding Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
Constant		-3.020	0.233	-12.936
LNADT	Log(AADT)	0.564	0.031	18.064
LENGTH	Segment Length	1.000	(Fixed Parameter)	
NLANEI	Number of lanes Increasing	-2.797	0.078	-35.667
K1	Rate of vertical curvature	-0.0005	0.2D-04	-19.920
DGC1	Degree of Curvature	0.058	0.004	12.989
RLNW	Average Lane width	-0.060	0.015	-3.968
SWR8910	Shoulder width dummy (if shoulder width right is 8-9ft and shoulder width left is >10ft, value=1,else=0)	0.601	0.233	2.586
Dispersion parameter for count data model				
Alpha		5.191	0.198	26.233
Number of obs = 25884 Chi squared = 2683.110 Prob>chi2= 0.000				
Restricted LL = -14237.28 Log likelihood = -9552.176				
Pseudo R^2 = 0.2592757				

Table C1.66: Route 17 – Excluding Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
Constant		-4.287	0.635	-6.752
LNADT	Log(AADT)	1.014	0.059	17.312
LENGTH	Segment Length	1.000	(Fixed Parameter)	
NLANED	Number of lanes Decreasing	-5.304	0.528	-10.056
Dispersion parameter for count data model				
Alpha		12.163	0.674	18.049
Number of obs = 9621 Chi squared = 4226.962 Prob>chi2= 0.000				
Restricted LL = -7384.208 Log likelihood = -3863.263				
Pseudo R^2 = 0.2219				

Table C1.67: Route 18 – Excluding Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
Constant		100.861	17.390	5.800
LNADT	Log(AADT)	-9.937	1.721	-5.774
LENGTH	Segment Length	1.000	(Fixed Parameter)	
K1	Rate of vertical curvature	-0.004	0.001	-5.566
RLNW	Average Lane width	-0.225	0.040	-5.555
Dispersion parameter for count data model				
Alpha		6.646	0.696	9.554
Number of obs = 3528 Chi squared = 936.8235 Prob>chi2= 0.0000				
Restricted LL = -2398.584 Log likelihood = -982.3384				
Pseudo R^2 = 0.3228				

Table C1.68: Route 22 – Excluding Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
Constant		-6.998	1.246	-5.618
LNADT	Log(AADT)	1.090	0.180	6.039
LENGTH	Segment Length	1.000	(Fixed Parameter)	
HCANG1	Horizontal Curve Central angle	0.060	0.024	2.514
RLNW	Average Lane width	-0.260	0.061	-4.240
Dispersion parameter for count data model				
Alpha		20.248	2.412	8.395
Number of obs = 2754 Chi squared = 1589.78 Prob>chi2= 0.000				
Restricted LL = -2449.313 Log likelihood = -1167.963				
Pseudo R^2 = 0.2262				

Table C1.69: Route 23 – Excluding Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
Constant		-4.026	0.160	-25.092
LENGTH	Segment Length	1.000	(Fixed Parameter)	
DGC1	Degree of Curvature	0.155	0.054	2.860
Dispersion parameter for count data model				
Alpha		32.378	8.457	3.828
Number of obs = 4140 Chi squared = 157.9753 Prob>chi2= 0.000				
Restricted LL = -838.3338 Log likelihood = -432.3388				
Pseudo R^2 = 0.1544759				

Table C1.70: Route 24 – Excluding Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
Poisson/NB/Gamma regression model				
Constant		-10.606	0.803	-13.202
LNADT	Log(AADT)	1.414	0.101	13.986
LENGTH	Segment Length	1.000	(Fixed Parameter)	
DGC1	Degree of Curvature	-0.133	0.028	-4.808
Zero inflation model				
Constant		-1.369	1.576	-0.868
LNADT	Log(AADT)	0.539	0.200	2.693
LENGTH	Segment Length	-3.502	0.397	-8.825
DGC1	Degree of Curvature	-0.216	0.051	-4.241
Number of obs = 4500				
Restricted LL = -3353.111 Log likelihood = -1480.33366				

Table C1.71: Route 25 – Excluding Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
Constant		-5.629	2.371	-2.374
LNADT	Log(AADT)	1.091	0.215	5.087
LENGTH	Segment Length	1.000	(Fixed Parameter)	
K1	Rate of vertical curvature	-0.002	0.001	-2.966
DGC1	Degree of Curvature	0.094	0.020	4.761
RLNW	Average Lane width	-0.449	0.205	-2.188
Dispersion parameter for count data model				
Alpha		23.076	2.775	8.317
Number of obs = 10764 Chi squared = 662.7648 Prob>chi2= 0.000				
Restricted LL = -2118.884 Log likelihood = -1642.489				
Pseudo R^2 = 0.1678845				

Table C1.72: Route 26 – Excluding Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
Constant		-2.068	0.831	-2.488
LNADT	Log(AADT)	0.325	0.098	3.316
LENGTH	Segment Length	1.000	(Fixed Parameter)	
RLNW	Average Lane width	-0.136	0.047	-2.906
Dispersion parameter for count data model				
Alpha		8.749	0.418	20.917
Number of obs = 6732 Chi squared = 4627.843 Prob>chi2= 0.000				
Restricted LL = -7242.775 Log likelihood = -4543.869				
Pseudo R^2 = 0.0650				

Table C1.73: Route 27 – Excluding Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
Constant		-8.496	0.438	-19.381
LNADT	Log(AADT)	0.977	0.073	13.378
LENGTH	Segment Length	1.000	(Fixed Parameter)	
NLANEI	Number of lanes Increasing	-1.870	0.243	-7.690
HCANG1	Horizontal Curve Central angle	0.006	0.002	2.382
K1	Rate of vertical curvature	-0.001	0.000	-3.954
RLNW	Average Lane width	0.050	0.022	2.296
Dispersion parameter for count data model				
Alpha		21.187	1.463	14.479
Number of obs = 10593 Chi squared = 3170.772 Prob>chi2= 0.000				
Restricted LL = -5183.351 Log likelihood = -2740.022				
Pseudo R^2 = 0.189				

Table C1.74: Route 28 – Excluding Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
Constant		-6.343	0.395	-16.044
LNADT	Log(AADT)	0.572	0.050	11.500
LENGTH	Segment Length	1.000	(Fixed Parameter)	
K1	Rate of vertical curvature	0.000	0.000	-2.130
DGC1	Degree of Curvature	-0.114	0.039	-2.951
Dispersion parameter for count data model				
Alpha		18.857	1.122	16.806
Number of obs = 8739 Chi squared = 4501.626 Prob>chi2= 0.000				
Restricted LL = -6006.081 Log likelihood = -3240.359				
Pseudo R^2 = 0.099				

Table C1.75: Route 97 – Excluding Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
Constant		-1.175	1.398	-0.841
LNADT	Log(AADT)	0.806	0.133	6.036
LENGTH	Segment Length	1.000	(Fixed Parameter)	
NLANEI	Number of lanes Increasing	-5.161	0.720	-7.170
K1	Rate of vertical curvature	-0.0002	0.3D-04	-6.101
RLNW	Average Lane width	-0.142	0.056	-2.552
Dispersion parameter for count data model				
Alpha		9.720	0.363	26.776
Number of obs = 16659 Chi squared = 6888.155 Prob>chi2= 0.000				
Restricted LL = -13738.65 Log likelihood = -9085.296				
Pseudo R^2 = 0.2748802				

Table C1.76: Route 101 – Excluding Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
Constant		-1.876	1.036	-1.811
LNADT	Log(AADT)	0.826	0.039	21.116
LENGTH	Segment Length	1.000	(Fixed Parameter)	
NLANEI	Number of lanes Increasing	-6.869	1.012	-6.788
DGC1	Degree of Curvature	0.017	0.006	2.975
SWR8901	Shoulder width dummy (if shoulder width right is 8-9ft and shoulder width left is 0-1ft, value=1,else=0)	1.225	0.578	2.118
SWC19	Shoulder width dummy (if shoulder width center is >1ft and <9ft, value=1,else=0)	-1.844	0.611	-3.018
Dispersion parameter for count data model				
Alpha		14.249	0.493	28.929
Number of obs = 37719 Chi squared = 8155.719 Prob>chi2= 0.000				
Restricted LL = -18907.09 Log likelihood = -12014.64				
Pseudo R^2 = 0.2534013				

Table C1.77: Route 106 – Excluding Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
Poisson/NB/Gamma regression model				
Constant		-0.853	0.110	-7.729
LNADT	Log(AADT)	0.085	0.013	6.697
LENGTH	Segment Length	1.000	(Fixed Parameter)	
DGC1	Degree of Curvature	0.002	0.001	2.965
Dispersion parameter				
Alpha		0.929	0.509	1.824
Zero inflation model				
Tau		-13.983	1.562	-8.952
Number of obs = 3222				
Restricted LL = -1467.044 Log likelihood = -1049.29836				

Table C1.78: Route 108 – Excluding Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
Poisson/NB/Gamma regression model				
Constant		-0.445	0.229	-1.943
LNADT	Log(AADT)	0.106	0.026	4.061
LENGTH	Segment Length	1.000	(Fixed Parameter)	
HCANG1	Horizontal Curve Central angle	0.006	0.002	3.593
RLNW	Average Lane width	-0.055	0.016	-3.354
Dispersion parameter				
Alpha		1.186	0.668	1.774
Zero inflation model				
Tau		-16.426	2.547	-6.449
Number of obs = 1071				
Restricted LL = -592.5316 Log likelihood = -423.61257				

Table C1.79: Route 109 – Excluding Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
Constant		-11.208	1.027	-10.907
LNADT	Log(AADT)	1.151	0.133	8.636
LENGTH	Segment Length	1.000	(Fixed Parameter)	
DGC1	Degree of Curvature	0.047	0.012	3.876
Dispersion parameter for count data model				
Alpha		13.503	1.410	9.574
Number of obs = 3627 Chi squared = 1060.084 Prob>chi2= 0.000				
Restricted LL = -2120.519 Log likelihood = -1286.257				
Pseudo R^2 = 0.29182				

Table C1.80: Route 115 – Excluding Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
Poisson/NB/Gamma regression model				
Constant		-1.814	0.523	-3.472
LENGTH	Segment Length	1.000	(Fixed Parameter)	
K1	Rate of vertical curvature	0.015	0.006	2.495
Dispersion parameter				
Alpha		7.828	2.585	3.028
Zero inflation model				
Tau		1.448	0.714	2.027
Number of obs = 261 Chi squared = 200.4847 Prob>chi2= 0.000				
Restricted LL = -208.9451 Log likelihood = -105.9312				
Pseudo R^2 = 0.4862038				

Table C1.81: Route 125 – Excluding Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
Constant		10.963	3.087	3.551
LENGTH	Segment Length	1.000	(Fixed Parameter)	
RLNW	Average Lane width	-1.414	0.302	-4.680
Dispersion parameter for count data model				
Alpha		34.175	9.111	3.751
Number of obs = 261 Chi squared = 200.4847 Prob>chi2= 0.000				
Restricted LL = -208.9451 Log likelihood = -105.9312				
Pseudo R^2 = 0.4862038				

Table C1.82: Route 127 – Excluding Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
Constant		-20.276	9.275	-2.186
LNADT	Log(AADT)	2.524	1.387	1.820
LENGTH	Segment Length	1.000	(Fixed Parameter)	
K1	Rate of vertical curvature	-0.003	0.002	-1.777
Dispersion parameter for count data model				
Alpha		25.687	6.797	3.779
Number of obs = 2547 Chi squared = 115.5241 Prob>chi2= 0.000				
Restricted LL = -383.5740 Log likelihood = -312.3930				
Pseudo R^2 = 0.0418				

Table C1.83: Route 129 – Excluding Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
Constant		-6.145	3.447	-1.783
LNADT	Log(AADT)	-0.646	0.862	-0.749
LENGTH	Segment Length	1.000	(Fixed Parameter)	
K1	Rate of vertical curvature	-0.005	0.002	-2.426
RLNW	Average Lane width	0.633	0.290	2.183
Dispersion parameter for count data model				
Alpha		39.604	9.048	4.377
Number of obs = 5031 Chi squared = 190.2901 Prob>chi2= 0.000				
Restricted LL = -554.0470 Log likelihood = -433.5504				
Pseudo R^2 = 0.179961				

Table C1.84: Route 153 – Excluding Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
Poisson/NB/Gamma regression model				
Constant		-1.086	0.346	-3.137
LNADT	Log(AADT)	0.102	0.046	2.212
LENGTH	Segment Length	1.000	(Fixed Parameter)	
DGC1	Degree of Curvature	0.009	0.003	3.212
Dispersion parameter				
Alpha		1.083	0.720	1.504
Zero inflation model				
Tau		-10.488	1.107	-9.477
Number of obs = 2844				
Restricted LL = -855.1925 Log likelihood = -596.30975				

Table C1.85: Route 164 – Excluding Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
Constant		23.159	7.713	3.003
LNADT	Log(AADT)	-2.531	0.799	-3.166
LENGTH	Segment Length	1.000	(Fixed Parameter)	
A1	Algebraic difference in gradients	-0.398	0.168	-2.371
Dispersion parameter for count data model				
Alpha		8.757	1.398	6.263
Number of obs = 909 Chi squared = 432.6832 Prob>chi2= 0.000				
Restricted LL = -916.4945 Log likelihood = -558.6362				
Pseudo R^2 = 0.27915				

Table C1.86: Route 169 – Excluding Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
Constant		5.789	1.904	3.040
LENGTH	Segment Length	1.000	(Fixed Parameter)	
RLNW	Average Lane width	-0.678	0.170	-3.992
Dispersion parameter for count data model				
Alpha		20.471	2.488	8.227
Number of obs = 2142 Chi squared = 820.4602 Prob>chi2= 0.000				
Restricted LL = -1374.784 Log likelihood = -778.1870				
Pseudo R^2 = 0.3451903				

Table C1.87: Route 172 – Excluding Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
Poisson/NB/Gamma regression model				
Constant		-0.636	0.066	-9.676
LENGTH	Segment Length	1.000	(Fixed Parameter)	
DGC1	Degree of Curvature	0.045	0.015	3.105
Zero inflation model				
Tau		-8.158	1.400	-5.826
Number of obs = 1827				
Restricted LL = -156.4878 Log likelihood = -106.56227				

Table C1.88: Route 173 – Excluding Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
Constant		-16.286	6.029	-2.701
LNADT	Log(AADT)	1.871	0.784	2.387
LENGTH	Segment Length	1.000	(Fixed Parameter)	
A1	Algebraic difference in gradients	-0.379	0.131	-2.893
Dispersion parameter for count data model				
Alpha		10.934	2.917	3.748
Number of obs = 738 Chi squared = 139.8875 Prob>chi2= 0.000				
Restricted LL = -371.1885 Log likelihood = -261.5188				
Pseudo R^2 = 0.211015				

Table C1.89: Route 174 – Excluding Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
Poisson/NB/Gamma regression model				
Constant		-0.668	0.389	-1.716
LNADT	Log(AADT)	0.190	0.042	4.491
LENGTH	Segment Length	1.000	(Fixed Parameter)	
RLNW	Average Lane width	-0.106	0.032	-3.314
Zero inflation model				
Tau		-6.121	0.980	-6.245
Number of obs = 2061				
Restricted LL = -596.5897 Log likelihood = -447.58474				

Table C1.90: Route 202 – Excluding Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
Constant		33.653	5.488	6.132
LNADT	Log(AADT)	-3.864	0.598	-6.464
LENGTH	Segment Length	1.000	(Fixed Parameter)	
K1	Rate of vertical curvature	-0.001	0.000	-3.245
DGC1	Degree of Curvature	0.030	0.012	2.466
Dispersion parameter for count data model				
Alpha		10.801	1.201	8.997
Number of obs = 2790 Chi squared = 778.7934 Prob>chi2= 0.000				
Restricted LL = -1672.983 Log likelihood = -1044.311				
Pseudo R^2 = 0.2716011				

Table C1.91: Route 203 – Excluding Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
Constant		-9.341	3.432	-2.722
LNADT	Log(AADT)	1.160	0.390	2.973
LENGTH	Segment Length	1.000	(Fixed Parameter)	
DGC1	Degree of Curvature	0.086	0.032	2.661
RLNW	Average Lane width	-0.278	0.052	-5.331
Dispersion parameter for count data model				
Alpha		8.570	0.888	9.654
Number of obs = 2997 Chi squared = 650.1961 Prob>chi2= 0.000				
Restricted LL = -1987.892 Log likelihood = -1445.750				
Pseudo R^2 = 0.18358				

Table C1.92: Route 206 – Excluding Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
Constant		-3.856	1.986	-1.942
LNADT	Log(AADT)	-0.650	0.309	-2.106
LENGTH	Segment Length	1.000	(Fixed Parameter)	
RLNW	Average Lane width	0.528	0.120	4.384
Dispersion parameter for count data model				
Alpha		26.560	5.657	4.695
Number of obs = 2025 Chi squared = 477.9128 Prob>chi2= 0.000				
Restricted LL = -1097.187 Log likelihood = -463.0389				
Pseudo R^2 = 0.3403960				

Table C1.93: Route 221 – Excluding Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
Poisson/NB/Gamma regression model				
Constant		-5.265	1.441	-3.653
LNADT	Log(AADT)	0.629	0.185	3.391
LENGTH	Segment Length	1.000	(Fixed Parameter)	
A1	Algebraic difference in gradients	0.017	0.006	2.774
Dispersion parameter				
Alpha		2.639	1.111	2.376
Zero inflation model				
Tau		-5.697	0.804	-7.089
Number of obs = 1422				
Restricted LL = -681.9931 Log likelihood = -449.32453				

Table C1.94: Route 231 – Excluding Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
Constant		-10.433	1.191	-8.762
LNADT	Log(AADT)	1.076	0.183	5.886
LENGTH	Segment Length	1.000	(Fixed Parameter)	
K1	Rate of vertical curvature	-0.002	0.001	-2.748
Dispersion parameter for count data model				
Alpha		35.062	5.208	6.733
Number of obs = 6615 Chi squared = 625.7117 Prob>chi2= 0.000				
Restricted LL = -1307.344 Log likelihood = -1231.079				
Pseudo R^2 = 0.2541313				

Table C1.95: Route 240 – Excluding Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
Constant		14.852	3.810	3.899
LNADT	Log(AADT)	-2.143	0.476	-4.505
LENGTH	Segment Length	1.000	(Fixed Parameter)	
A1	Algebraic difference in gradients	-0.323	0.150	-2.157
K1	Rate of vertical curvature	0.002	0.000	4.211
Dispersion parameter for count data model				
Alpha		8.140	1.549	5.254
Number of obs = 2232 Chi squared = 269.0907 Prob>chi2= 0.000				
Restricted LL = -894.8439 Log likelihood = -411.4414				
Pseudo R^2 = 0.2464261				

Table C1.96: Route 241 – Excluding Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
Constant		7.251	3.594	2.018
LNADT	Log(AADT)	-1.225	0.482	-2.540
LENGTH	Segment Length	1.000	(Fixed Parameter)	
K1	Rate of vertical curvature	-0.006	0.001	-4.051
Dispersion parameter for count data model				
Alpha		11.208	1.859	6.028
Number of obs = 1737 Chi squared = 307.5992 Prob>chi2= 0.000				
Restricted LL = -848.4214 Log likelihood = -603.4641				
Pseudo R^2 = 0.2030992				

Table C1.97: Route 260 – Excluding Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
Constant		-9.907	3.234	-3.063
LNADT	Log(AADT)	0.897	0.468	1.916
LENGTH	Segment Length	1.000	(Fixed Parameter)	
DGC1	Degree of Curvature	0.286	0.112	2.544
Dispersion parameter for count data model				
Alpha		18.119	6.483	2.795
Number of obs = 1881 Chi squared = 57.07629 Prob>chi2= 0.000				
Restricted LL = -282.4208 Log likelihood = -234.8568				
Pseudo R^2 = 0.1083474				

Table C1.98: Route 261 – Excluding Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
Constant		-3.682	0.149	-24.764
LENGTH	Segment Length	1.000	(Fixed Parameter)	
A1	Algebraic difference in gradients	-0.403	0.177	-2.276
Dispersion parameter for count data model				
Alpha		35.017	8.951	3.912
Number of obs = 4365 Chi squared = 163.1420 Prob>chi2= 0.000				
Restricted LL = -523.5946 Log likelihood = -429.2462				
Pseudo R^2 = 0.1596873				

Table C1.99: Route 270 – Excluding Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
Constant		90.071	37.840	2.380
LNADT	Log(AADT)	-10.707	4.433	-2.415
LENGTH	Segment Length	1.000	(Fixed Parameter)	
Dispersion parameter for count data model				
Alpha		9.889	5.841	1.693
Number of obs = 855 Chi squared = 29.72501 Prob>chi2= 0.000				
Restricted LL = -99.73535 Log likelihood = -29.13044				
Pseudo R^2 =0.6121				

Table C1.100: Route 272 – Excluding Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
Constant		-3.470	4.370	-0.794
LNADT	Log(AADT)	1.786	0.539	3.313
LENGTH	Segment Length	1.000	(Fixed Parameter)	
RLNW	Average Lane width	-1.028	0.331	-3.106
Dispersion parameter for count data model				
Alpha		20.772	8.732	2.379
Number of obs = 1638 Chi squared = 43.75859 Prob>chi2= 0				
Restricted LL = -219.7555 Log likelihood = -166.1088				
Pseudo R^2 = 0.1705				

Table C1.101: Route 281 – Excluding Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
Constant		-0.927	0.322	-2.881
LENGTH	Segment Length	1.000	(Fixed Parameter)	
K1	Rate of vertical curvature	-0.003	0.001	-2.433
Dispersion parameter for count data model				
Alpha		14.745	4.118	3.581
Number of obs = 261 Chi squared = 182.2046 Prob>chi2= 0.000				
Restricted LL = -266.9661 Log likelihood = -135.5698				
Pseudo R^2 = 0.1754				

Table C1.102: Route 290 – Excluding Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
Constant		74.154	22.338	3.320
LNADT	Log(AADT)	-8.337	2.419	-3.447
LENGTH	Segment Length	1.000	(Fixed Parameter)	
K1	Rate of vertical curvature	-0.003	0.002	-1.649
Dispersion parameter for count data model				
Alpha		26.747	12.968	2.063
Number of obs = 981 Chi squared = 78.19967 Prob>chi2= 0.000				
Restricted LL = -142.4590 Log likelihood = -56.41805				
Pseudo R^2 = 0.3622				

Table C1.103: Route 291 – Excluding Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
Constant		-1.621	0.149	-10.884
LENGTH	Segment Length	1.000	(Fixed Parameter)	
K1	Rate of vertical curvature	-0.004	0.001	-3.982
DGC1	Degree of Curvature	0.072	0.023	3.164
Dispersion parameter for count data model				
Alpha		10.469	1.420	7.373
Number of obs = 1278 Chi squared = 509.5508 Prob>chi2= 0.000				
Restricted LL = -954.8201 Log likelihood = -627.8606				
Pseudo R^2 = 0.2886528				

Table C1.104: Route 302 – Excluding Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
Constant		20.672	7.792	2.653
LNADT	Log(AADT)	-2.691	0.938	-2.870
LENGTH	Segment Length	1.000	(Fixed Parameter)	
K1	Rate of vertical curvature	-0.009	0.003	-3.381
Dispersion parameter for count data model				
Alpha		7.948	1.656	4.798
Number of obs = 1368 Chi squared = 135.5998 Prob>chi2= 0.000				
Restricted LL = -559.5725 Log likelihood = -384.9628				
Pseudo R^2 = 0.1497471				

Table C1.105: Route 305 – Excluding Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
Poisson/NB/Gamma regression model				
Constant		-147.933	10.763	-13.744
LNADT	Log(AADT)	9.468	1.169	8.100
LENGTH	Segment Length	1.000	(Fixed Parameter)	
A1	Algebraic difference in gradients	0.415	0.024	17.253
RLNW	Average Lane width	4.262	0.124	34.438
Zero inflation model				
Tau		0.133	0.106	1.252
Number of obs = 711				
Restricted LL = -952.9417 Log likelihood = -291.09241				

Table C1.106: Route 395 – Excluding Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
Constant		-3.648	0.483	-7.558
LENGTH	Segment Length	1.000	(Fixed Parameter)	
K1	Rate of vertical curvature	-0.0008	0.0001	-7.838
RLNW	Average Lane width	0.152	0.039	3.820
Dispersion parameter for count data model				
Alpha		22.765	1.449	15.707
Number of obs = 10215 Chi squared = 5023.388 Prob>chi2= 0.000				
Restricted LL = -6173.213 Log likelihood = -3387.127				
Pseudo R^2 = 0.4257959				

Table C1.107: Route 410 – Excluding Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
Constant		-2.610	1.143	-2.284
LNADT	Log(AADT)	0.321	0.099	3.239
LENGTH	Segment Length	1.000	(Fixed Parameter)	
A1	Algebraic difference in gradients	-0.194	0.044	-4.443
RLNW	Average Lane width	-0.199	0.083	-2.417
SWR4523	Shoulder width dummy (if shoulder width right is 4-5ft and shoulder width left is 2-3ft, value=1,else=0)	1.249	0.407	3.071
Dispersion parameter for count data model				
Alpha		26.250	1.888	13.902
Number of obs = 11646 Chi squared = 1992.372 Prob>chi2= 0.000				
Restricted LL = -4199.056 Log likelihood = -2653.221				
Pseudo R^2 = 0.1526				

Table C1.108: Route 411 – Excluding Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
Constant		27.734	6.739	4.115
LNADT	Log(AADT)	-3.533	0.794	-4.452
LENGTH	Segment Length	1.000	(Fixed Parameter)	
DGC1	Degree of Curvature	0.117	0.043	2.708
Dispersion parameter for count data model				
Alpha		10.632	2.328	4.567
Number of obs = 918 Chi squared = 162.9732 Prob>chi2= 0.000				
Restricted LL = -408.0429 Log likelihood = -283.7164				
Pseudo R^2 = 0.1281				

Table C1.109: Route 501 – Excluding Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
Poisson/NB/Gamma regression model				
Constant		-25.724	1.980	-12.992
LNADT	Log(AADT)	4.560	0.269	16.957
LENGTH	Segment Length	1.000	(Fixed Parameter)	
NLANED	Number of lanes Decreasing	-4.256	1.162	-3.664
HCANG1	Horizontal Curve Central angle	0.173	0.017	10.349
RLNW	Average Lane width	-0.808	0.138	-5.875
Zero inflation model				
Tau		0.995	0.176	5.646
Number of obs = 585				
Restricted LL = -505.8335 Log likelihood = -302.19299				

Table C1.110: Route 503 – Excluding Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
Constant		-5.300	0.658	-8.050
LNADT	Log(AADT)	0.680	0.118	5.756
LENGTH	Segment Length	1.000	(Fixed Parameter)	
K1	Rate of vertical curvature	-0.001	0.000	-1.989
RLNW	Average Lane width	-0.183	0.039	-4.706
Dispersion parameter for count data model				
Alpha		24.209	2.284	10.601
Number of obs = 5436 Chi squared = 2155.935 Prob>chi2= 0.000				
Restricted LL = -3073.644 Log likelihood = -1707.161				
Pseudo R^2 = 0.3870441				

Table C1.111: Route 504 – Excluding Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
Constant		-12.920	1.851	-6.980
LNADT	Log(AADT)	1.431	0.255	5.610
LENGTH	Segment Length	1.000	(Fixed Parameter)	
A1	Algebraic difference in gradients	0.133	0.051	2.598
Dispersion parameter for count data model				
Alpha		14.352	3.719	3.859
Number of obs = 5589 Chi squared = 563.7643 Prob>chi2= 0.000				
Restricted LL = -1390.335 Log likelihood = -860.7983				
Pseudo R^2 = 0.2466850				

Table C1.112: Route 505 – Excluding Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
Constant		-12.920	2.225	-5.807
LNADT	Log(AADT)	1.431	0.311	4.601
LENGTH	Segment Length	1.000	(Fixed Parameter)	
A1	Algebraic difference in gradients	0.133	0.058	2.301
Dispersion parameter for count data model				
Alpha		14.352	4.606	3.116
Number of obs = 909 Chi squared = 159.2072 Prob>chi2= 0.000				
Restricted LL = -345.5305 Log likelihood = -213.2048				
Pseudo R^2 = 0.2718624				

Table C1.113: Route 507 – Excluding Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
Constant		-9.856	0.850	-11.589
LNADT	Log(AADT)	0.996	0.097	10.266
LENGTH	Segment Length	1.000	(Fixed Parameter)	
A1	Algebraic difference in gradients	-0.151	0.048	-3.142
K1	Rate of vertical curvature	-0.002	0.000	-4.531
Dispersion parameter for count data model				
Alpha		7.919	0.688	11.510
Number of obs = 2943 Chi squared = 1461.330 Prob>chi2= 0.000				
Restricted LL = -2948.827 Log likelihood = -1728.522				
Pseudo R^2 = 0.2971165				

Table C1.114: Route 510 – Excluding Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
Constant		7.466	3.570	2.091
LNADT	Log(AADT)	-1.075	0.377	-2.851
LENGTH	Segment Length	1.000	(Fixed Parameter)	
A1	Algebraic difference in gradients	-0.347	0.091	-3.796
HCANG1	Horizontal Curve Central angle	0.244	0.069	3.530
Dispersion parameter for count data model				
Alpha		14.839	3.334	4.451
Number of obs = 1035 Chi squared = 255.7910 Prob>chi2= 0.000				
Restricted LL = -675.5688 Log likelihood = -326.3523				
Pseudo R^2 = 0.2815544				

Table C1.115: Route 525 – Excluding Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
Constant		10.640	4.698	2.265
LNADT	Log(AADT)	-1.366	0.513	-2.665
LENGTH	Segment Length	1.000	(Fixed Parameter)	
DGC1	Degree of Curvature	-0.569	0.133	-4.269
HCANG1	Horizontal Curve Central angle	0.062	0.027	2.298
Dispersion parameter for count data model				
Alpha		12.774	2.052	6.224
Number of obs = 1818 Chi squared = 354.9878 Prob>chi2= 0.000				
Restricted LL = -909.6662 Log likelihood = -596.7502				
Pseudo R^2 = 0.2292480				

Table C1.116: Route 530 – Excluding Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
Constant		-6.717	0.809	-8.300
LNADT	Log(AADT)	1.014	0.095	10.658
LENGTH	Segment Length	1.000	(Fixed Parameter)	
A1	Algebraic difference in gradients	0.097	0.044	2.192
RLNW	Average Lane width	-0.331	0.062	-5.337
Dispersion parameter for count data model				
Alpha		13.424	1.321	10.165
Number of obs = 4716 Chi squared = 1499.987 Prob>chi2= 0.000				
Restricted LL = -3079.240 Log likelihood = -1640.593				
Pseudo R^2 = 0.3137277				

Table C1.117: Route 539 – Excluding Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
Constant		122.178	0.155	790.283
LNADT	Log(AADT)	-10.902	0.014	-779.961
LENGTH	Segment Length	1.000	(Fixed Parameter)	
A1	Algebraic difference in gradients	-97.690	1.096	-89.144
K1	Rate of vertical curvature	-0.017	0.000	-168.503
Dispersion parameter for count data model				
Alpha		0.070	0.000	526.025
Number of obs = 1431 Chi squared = 348.9301 Prob>chi2= 0.000				
Restricted LL = -383.0291 Log likelihood = -208.5640				
Pseudo R^2 = 0.4554877				

Table C1.118: Route 542 – Excluding Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
Constant		-3.769	0.471	-8.005
LNADT	Log(AADT)	0.587	0.064	9.177
LENGTH	Segment Length	1.000	(Fixed Parameter)	
A1	Algebraic difference in gradients	-0.055	0.018	-3.124
K1	Rate of vertical curvature	-0.002	0.000	-6.891
RLNW	Average Lane width	-0.216	0.026	-8.206
SWR4523	Shoulder width dummy (if shoulder width right is 4-5ft and shoulder width left is 2-3ft, value=1,else=0)	-2.344	0.575	-4.078
Dispersion parameter for count data model				
Alpha		16.156	0.978	16.516
Number of obs = 9153 Chi squared = 2871.281 Prob>chi2= 0.000				
Restricted LL = -5299.893 Log likelihood = -3063.566				
Pseudo R^2 = 0.3190875				

Table C1.119: Route 706 – Excluding Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
Constant		-12.050	3.456	-3.486
LNADT	Log(AADT)	1.334	0.432	3.085
LENGTH	Segment Length	1.000	(Fixed Parameter)	
HCANG1	Horizontal Curve Central angle	-0.179	0.040	-4.503
Dispersion parameter for count data model				
Alpha		23.116	3.654	6.326
Number of obs = 1377 Chi squared = 703.0776 Prob>chi2= 0.000				
Restricted LL = -944.3003 Log likelihood = -401.3642				
Pseudo R^2 = 0.4669111				

Table C1.120: Route 821 – Excluding Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
Constant		-2.654	0.127	-20.853
LENGTH	Segment Length	1.000	(Fixed Parameter)	
K1	Rate of vertical curvature	-0.002	0.001	-2.939
Dispersion parameter for count data model				
Alpha		23.157	3.806	6.085
Number of obs = 3195 Chi squared = 334.0414 Prob>chi2= 0.000				
Restricted LL = -859.1473 Log likelihood = -630.1908				
Pseudo R^2 = 0.2095061				

Table C1.121: Route 900 – Excluding Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
Constant		31.320	17.126	1.829
LNADT	Log(AADT)	-3.445	1.782	-1.933
LENGTH	Segment Length	1.000	(Fixed Parameter)	
SWR4523	Shoulder width dummy (if shoulder width right is 4-5ft and shoulder width left is 2-3ft, value=1,else=0)	0.789	0.407	1.941
Dispersion parameter for count data model				
Alpha		14.913	2.446	6.097
Number of obs = 1710 Chi squared = 530.2203 Prob>chi2= 0.000				
Restricted LL = -1011.378 Log likelihood = -643.0903				
Pseudo R^2 = 0.2919071				

Table C1.122: Route 902 – Excluding Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
Constant		-20.330	4.828	-4.211
LNADT	Log(AADT)	2.099	0.555	3.780
LENGTH	Segment Length	1.000	(Fixed Parameter)	
DGC1	Degree of Curvature	0.113	0.056	2.012
Dispersion parameter for count data model				
Alpha		7.706	2.220	3.472
Number of obs = 513 Chi squared = 40.38952 Prob>chi2= 0.000				
Restricted LL = -272.5440 Log likelihood = -190.7666				
Pseudo R^2 = 0.2782				

Table C1.123: All Other Routes – Excluding Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
Constant		-1.331	2.962	-0.449
LNADT	Log(AADT)	0.843	0.018	46.268
LENGTH	Segment Length	1.000	(Fixed Parameter)	
NLANEI	Number of lanes Increasing	-7.817	2.957	-2.644
A1	Algebraic difference in gradients	-0.043	0.006	-6.717
DGC1	Degree of Curvature	0.015	0.002	6.071
HCANG1	Horizontal Curve Central angle	0.000	0.000	2.523
RLNW	Average Lane width	0.023	0.011	2.000
SWR4523	Shoulder width dummy (if shoulder width right is 4-5ft and shoulder width left is 2-3ft, value=1,else=0)	-0.535	0.085	-6.311
SWC19	Shoulder width dummy (if shoulder width center is >1ft and <9ft, value=1,else=0)	-1.093	0.348	-3.145
Dispersion parameter for count data model				
Alpha		17.780	0.323	55.128
Number of obs = 151362 Chi squared = 37817.40 Prob>chi2= 0.000				
Restricted LL = -64969.81 Log likelihood = -38302.12				
Pseudo R^2 = 0.3305092				

Appendix C2: Route Specific Advanced SPF of the Basic Type (ADT+LENGTH+ROADWAY GEOMETRICS+ROADSIDE)

Table C2.1: Route 3 – Including Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
Constant		15.026	1.574	9.549
LNADT	Log(AADT)	-1.535	0.160	-9.603
LENGTH	Segment Length	1.000	(Fixed Parameter)	
A1	Algebraic difference in gradients	-0.116	0.017	-6.805
K1	Rate of vertical curvature	-0.0004	0.000	-3.717
RLNW	Average Lane width	-0.045	0.012	-3.714
SWR4501	Shoulder width dummy (if shoulder width right is 4-5ft and shoulder width left is 0-1ft, value=1,else=0)	1.274	0.604	2.110
DCLVERT	Culvert Dummy variable (1 if Culvert exists, 0 otherwise)	0.981	0.319	3.072
LCURB00	Curb length variable if Curb covers more than 90% of the segment.	-1.398	0.492	-2.841
DDITCH	Ditch Dummy variable (1 if Ditch exists, 0 otherwise)	0.561	0.202	2.779
LDITCH00	Ditch length variable if Ditch covers more than 90% of the segment.	-1.183	0.246	-4.807
DGYWIRE	Guywire Dummy variable (1 if Guywire exists, 0 otherwise)	2.121	0.867	2.446
DPDSTAL	Pedestal Dummy variable (1 if Pedestal exists, 0 otherwise)	0.584	0.236	2.474
DRDSLP	Road side slope Dummy variable (1 if Road side slope exists, 0 otherwise)	-0.587	0.142	-4.131
LWHZD00	Water hazard length variable if hazard covers more than 90% of the segment.	-2.800	0.705	-3.973
LTREG50	Tree group length variable if between 40-50% of the segment.	-2.664	1.329	-2.004
LTREG60	Tree group length variable if between 50-60% of the segment.	-1.534	0.754	-2.034
Alpha		8.059	0.324	24.895
Number of obs = 6525 Chi squared = 9961.035 Prob>chi2=0.000				
Restricted LL = -13861.27, Log likelihood = -5859.388				
Pseudo R2 =.4594613				

Table C2.2: Route 7 – Including Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
Constant		5.920	1.257	4.710
LNADT	Log(AADT)	-0.723	0.093	-7.797
LENGTH	Segment Length	1.000	(Fixed Parameter)	
HCANG1	Horizontal Curve Central angle	-0.020	0.008	-2.656
A1	Algebraic difference in gradients	-0.092	0.031	-2.971
DGC1	Degree of Curvature	0.045	0.013	3.370
RLNW	Average Lane width	-0.150	0.059	-2.551
SWR2367	Shoulder width dummy (if shoulder width right is 2-3ft and shoulder width left is 6-7ft, value=1,else=0)	-1.571	0.476	-3.296
DCLVERT	Culvert Dummy variable (1 if Culvert exists, 0 otherwise)	3.731	0.694	5.373
DCLVEND	Culvert end Dummy variable (1 if Culvert end exists, 0 otherwise)	-2.925	1.330	-2.199
DPDSTAL	Pedestal Dummy variable (1 if Pedestal exists, 0 otherwise)	-4.131	1.213	-3.406
DSUPRT	Support Dummy variable (1 if Support exists, 0 otherwise)	-1.114	0.415	-2.685
Alpha		19.588	1.199	16.342
Number of obs = 10215 Chi squared = 4330.386 Prob>chi2=0.000				
Restricted LL = -6595.544, Log likelihood = -3377.339				
Pseudo R2 =0.3906505				

Table C2.3: Route 9 – Including Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
Constant		3.363	0.806	4.175
LNADT	Log(AADT)	-0.608	0.094	-6.497
LENGTH	Segment Length	1.000	(Fixed Parameter)	
DCLVERT	Culvert Dummy variable (1 if Culvert exists, 0 otherwise)	0.566	0.242	2.341
LCLVERT30	Culvert length variable if between 20-30% of the segment.	-7.490	2.953	-2.537
DDRGLET	Drainage inlet Dummy variable (1 if Drainage inlet exists, 0 otherwise)	-1.262	0.248	-5.088
LGRDRL00	Guard rail length variable if greater than 90% of the segment.	-0.680	0.225	-3.028
Alpha		17.137	0.874	19.619
Number of obs = 11979 Chi squared = 5684.556 Prob>chi2=0.000				
Restricted LL = -8178.575 Log likelihood = -4658.981				
Pseudo R2 =0.3789068				

Table C2.4: Route 11 – Including Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
Constant		0.858	1.718	0.499
LNADT	Log(AADT)	-0.337	0.214	-1.577
LENGTH	Segment Length	1.000	(Fixed Parameter)	
HCANG1	Horizontal Curve Central angle	-0.095	0.022	-4.274
A1	Algebraic difference in gradients	-0.197	0.050	-3.956
K1	Rate of vertical curvature	-0.004	0.001	-6.649
DGC1	Degree of Curvature	0.043	0.019	2.286
DDRGLET	Drainage inlet Dummy variable (1 if Drainage inlet exists, 0 otherwise)	1.445	0.360	4.020
Alpha		24.263	2.349	10.330
Number of obs = 4770 Chi squared = 1752.972 Prob>chi2=0.000				
Restricted LL = -2732.3682, Log likelihood = -1254.152				
Pseudo R2 =0.4113726				

Table C2.5: Route 18 – Including Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
Constant		46.645	12.616	3.697
LNADT	Log(AADT)	-4.307	1.245	-3.460
LENGTH	Segment Length	1.000	(Fixed Parameter)	
NLANED	Number of lanes Decreasing	-3.898	0.333	-11.706
K1	Rate of vertical curvature	-0.003	0.001	-3.628
LGRDRL30	Guard rail length variable if between 20-30% of the segment.	3.398	1.650	2.060
Alpha		3.288	0.388	8.473
Number of obs = 3564 Chi squared = 576.8216 Prob>chi2=0.000				
Restricted LL = -2454.402, Log likelihood = -887.0985				
Pseudo R2 =0.2453497				

Table C2.6: Route 22 – Including Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
Constant		-6.932	1.259	-5.508
LNADT	Log(AADT)	1.010	0.196	5.143
LENGTH	Segment Length	1.000	(Fixed Parameter)	
RLNW	Average Lane width	-0.223	0.062	-3.610
DFENCE	Fence Dummy variable (1 if Fence exists, 0 otherwise)	0.767	0.358	2.141
DGRDRAL	Guardrail Dummy variable (1 if Guardrail exists, 0 otherwise)	-1.529	0.722	-2.119
Alpha		17.485	1.819	9.612
Number of obs = 2754 Chi squared = 1589.640 Prob>chi2=0.000				
Restricted LL = -2449.313 Log likelihood = -1148.071				
Pseudo R2 =0.4090913				

Table C2.7: Route 23 – Including Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
Poisson/NB/Gamma regression model				
Constant		-2.972	0.378	-7.857
LNADT	Log(AADT)	0.270	0.059	4.571
LENGTH	Segment Length	1.000	(Fixed Parameter)	
DGC1	Degree of Curvature	0.036	0.009	4.062
DGRDRAL	Guardrail Dummy variable (1 if Guardrail exists, 0 otherwise)	-0.437	0.151	-2.893
DDITCH	Ditch Dummy variable (1 if Guardrail exists, 0 otherwise)	0.132	0.059	2.240
LGRDRL40	Guard rail length variable if between 30-40% of the segment.	2.449	1.129	2.170
Zero inflation model				
Tau		-2.435	0.220	-11.054
Number of obs = 5247				
Restricted LL = -838.3338 Log likelihood = -675.79236				

Table C2.8: Route 24 – Including Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
Poisson/NB/Gamma regression model				
Constant		-2.489	0.122	-20.467
LNADT	Log(AADT)	0.209	0.016	12.823
LENGTH	Segment Length	1.000	(Fixed Parameter)	
HCANG1	Horizontal Curve Central angle	0.003	0.001	3.221
A1	Algebraic difference in gradients	0.029	0.008	3.511
K1	Rate of vertical curvature	0.5D-04	0.1D-04	4.371
DCLVEND	Culvert end Dummy variable (1 if culvert end exists, 0 otherwise)	-0.346	0.097	-3.572
LDITCH40	Ditch length variable if between 30-40% of the segment.	1.669	0.197	8.472
DFENCE	Fence Dummy variable (1 if Fence exists, 0 otherwise)	0.304	0.047	6.402
LRDSLP90	Roadside slope length on a segment between 80-90%	-0.443	0.194	-2.278
LRDSLP00	Roadside slope length on a segment greater than 90%	-0.197	0.053	-3.750
Zero inflation model				
Tau		-2.199	0.110	-20.048
Number of obs = 4500				
Restricted LL = -3353.111 Log likelihood = -2756.82651				

Table C2.9: Route 25 – Including Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
Constant		-10.296	1.794	-5.741
LNADT	Log(AADT)	1.830	0.156	11.719
LENGTH	Segment Length	1.000	(Fixed Parameter)	
K1	Rate of vertical curvature	-0.003	0.001	-4.862
DGC1	Degree of Curvature	0.057	0.016	3.454
RLNW	Average Lane width	-0.455	0.176	-2.590
DDITCH	Ditch Dummy variable (1 if Ditch exists, 0 otherwise)	0.389	0.189	2.061
Alpha		24.213	2.106	11.499
Number of obs = 12483 Chi squared = 1415.82 Prob>chi2=0.000				
Restricted LL = -3413.453 Log likelihood = -2162.715				
Pseudo R2 =0.2466059				

Table C2.10: Route 26 – Including Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
Poisson/NB/Gamma regression model				
Constant		-0.735	0.108	-6.806
LNADT	Log(AADT)	0.051	0.014	3.616
LENGTH	Segment Length	1.000	(Fixed Parameter)	
LDITCH40	Ditch length on a segment between 30-40%	0.994	0.089	11.191
LDITCH00	Ditch length on a segment greater than 90%	0.125	0.041	3.030
LRDSLP60	Roadside slope length on a segment between 50-60%	-0.574	0.105	-5.467
LRDSLP80	Roadside slope length on a segment between 70-80%	-0.263	0.094	-2.812
LRDSLP00	Roadside slope length on a segment greater than 90%	-0.185	0.034	-5.479
Zero inflation model				
Tau		-4.461	0.237	-18.833
Number of obs = 6732				
Restricted LL = -7242.775 Log likelihood = -5430.51289				

Table C2.11: Route 27 – Including Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
Constant		-5.609	0.413	-13.583
LNADT	Log(AADT)	1.106	0.072	15.393
LENGTH	Segment Length	1.000	(Fixed Parameter)	
NLANED	Number of lanes Decreasing	-5.107	0.275	-18.544
K1	Rate of vertical curvature	-0.002	0.000	-5.599
DCLVEND	Culvert end Dummy variable (1 if culvert end exists, 0 otherwise)	0.784	0.161	4.867
LDITCH40	Ditch length on a segment between 30-40%	4.142	1.157	3.579
LRDSLP00	Roadside slope length on a segment greater than 90%	-0.694	0.147	-4.730
Alpha		15.913	1.151	13.823
Number of obs = 10593 Chi squared = 2760.478 Prob>chi2=0.000				
Restricted LL = -5183.351 Log likelihood = -2648.23				
Pseudo R2 =0.342621				

Table C2.12: Route 28 – Including Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
Constant		-3.709	1.547	-2.397
LNADT	Log(AADT)	0.631	0.057	11.066
LENGTH	Segment Length	1.000	(Fixed Parameter)	
NLANED	Number of lanes Decreasing	-3.023	1.507	-2.006
DGC1	Degree of Curvature	-0.175	0.049	-3.581
LRDSLP00	Roadside slope length on a segment greater than 90%	-0.635	0.206	-3.079
Alpha		17.950	1.189	15.095
Number of obs = 8739 Chi squared = 4451.225 Prob>chi2=0.000				
Restricted LL = -6006.081 Log likelihood = -3210.530				
Pseudo R2 =0.4094103				

Table C2.13: Route 31 – Including Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
Constant		-10.295	1.701	-6.053
LNADT	Log(AADT)	1.014	0.250	4.061
LENGTH	Segment Length	1.000	(Fixed Parameter)	
LTREG00	Tree group length on a segment greater than 90%	0.841	0.396	2.124
LRDSLP00	Roadside slope length on a segment greater than 90%	-0.733	0.401	-1.830
Alpha		29.969	5.084	5.895
Number of obs = 4086 Chi squared = 219.6512 Prob>chi2=0.000				
Restricted LL = -645.8698 Log likelihood = -475.2027				
Pseudo R2 =0.1877270				

Table C2.14: Route 97 – Including Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
Constant		-4.895	1.244	-3.937
LNADT	Log(AADT)	0.985	0.102	9.628
LENGTH	Segment Length	1.000	(Fixed Parameter)	
NLANEI	Number of lanes Increasing	-1.368	0.133	-10.299
NLANED	Number of lanes Decreasing	-3.031	0.908	-3.339
HCANG1	Horizontal Curve Central angle	-0.001	0.000	-3.137
K1	Rate of vertical curvature	0.000	0.3D-04	-7.263
SWR2367	Shoulder width dummy (if shoulder width right is 2-.ft and shoulder width left is 6-7ft, value=1,else=0)	-1.334	0.318	-4.199
LTREG00	Tree group length on a segment greater than 90%	-0.916	0.280	-3.270
DDITCH	Ditch Dummy variable (1 if Ditch exists, 0 otherwise)	0.495	0.139	3.567
LDITCH70	Ditch length on a segment between 60-70%	-1.051	0.475	-2.213
LDITCH80	Ditch length on a segment between70-80%	-1.303	0.554	-2.350
LDITCH00	Ditch length on a segment greater than 90%	-0.663	0.209	-3.177
LGRDRL70	Guard rail length on a segment between 60-70%	1.314	0.562	2.340
LRDSLP00	Roadside slope length on a segment greater than 90%	-0.370	0.089	-4.159
Alpha		9.480	0.294	32.254
Number of obs = 21600 Chi squared = 11924.23 Prob>chi2=0.000				
Restricted LL = -20768.86 Log likelihood = -13010.38				
Pseudo R2 =0.3142505				

Table C2.15: Route 106 – Including Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
Constant		-10.964	1.469	-7.466
LNADT	Log(AADT)	1.151	0.189	6.087
LENGTH	Segment Length	1.000	(Fixed Parameter)	
LTREG50	Tree group length on a segment between 40-50%	2.444	1.206	2.026
LRDSLP00	Roadside slope length on a segment greater than 90%	-0.814	0.382	-2.132
Alpha		12.385	1.313	9.430
Number of obs = 3798 Chi squared = 878.3439 Prob>chi2=0.000				
Restricted LL = -2002.269 Log likelihood = -1415.030				
Pseudo R2 =0.2368523				

Table C2.16: Route 108 – Including Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
Poisson/NB/Gamma regression model				
Constant		-0.683	0.175	-3.902
LNADT	Log(AADT)	0.060	0.021	2.885
LENGTH	Segment Length	1.000	(Fixed Parameter)	
LCLVRT30	Culvert length on a segment between 20-30%	0.696	0.269	2.586
LTREG90	Tree group length on a segment between 80-90%	0.113	0.055	2.049
LGRDRL30	Guard rail length on a segment between 20-30%	-0.674	0.319	-2.109
LRDSLP80	Roadside slope length on a segment between 70-80%	0.163	0.055	2.952
Zero inflation model				
Tau		-14.100	2.120	-6.651
Number of obs = 1530				
Restricted LL = -1030.917 Log likelihood = -759.34011				

Table C2.17: Route 109 – Including Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
Constant		-9.654	0.981	-9.845
LNADT	Log(AADT)	1.016	0.125	8.112
LENGTH	Segment Length	1.000	(Fixed Parameter)	
HCANG1	Horizontal Curve Central angle	-0.021	0.008	-2.667
DGC1	Degree of Curvature	0.037	0.014	2.755
DCLVERT	Culvert Dummy variable (1 if Culvert exists, 0 otherwise)	1.282	0.537	2.387
LDITCH00	Ditch length on a segment greater than 90%	-0.626	0.264	-2.372
LRDSLP60	Roadside slope length on a segment between 50-60%	-3.712	1.470	-2.525
LRDSLP00	Roadside slope length on a segment greater than 90%	-0.695	0.230	-3.026
Alpha		12.069	0.961	12.556
Number of obs = 4788 Chi squared = 1980.785 Prob>chi2=0.000				
Restricted LL = -3554.868 Log likelihood = -2034.566				
Pseudo R2 =0.3274070				

Table C2.18: Route 115 – Including Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
Poisson/NB/Gamma regression model				
Constant		29.138	7.430	3.922
LNADT	Log(AADT)	-3.168	0.835	-3.792
LENGTH	Segment Length	1.000	(Fixed Parameter)	
K1	Rate of vertical curvature	0.004	0.001	6.496
DDWGYNC	Downguy Dummy variable (1 if Downguy exists, 0 otherwise)	0.628	0.145	4.339
Zero inflation model				
Tau		1.227	0.125	9.834
Number of obs = 342				
Restricted LL = -523.2961 Log likelihood = -278.47909				

Table C2.19: Route 125 – Including Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
Poisson/NB/Gamma regression model				
Constant		1.789	0.590	3.034
LENGTH	Segment Length	1.000	(Fixed Parameter)	
DGC1	Degree of Curvature	0.021	0.008	2.562
RLNW	Average Lane width	-0.242	0.066	-3.661
LDITCH60	Ditch length on a segment between 50-60%	0.519	0.232	2.232
LRDSLP80	Roadside slope length on a segment between 70-80%	0.366	0.147	2.497
Zero inflation model				
Tau		-5.351	1.241	-4.313
Number of obs = 3159				
Restricted LL = -440.1051 Log likelihood = -309.58046				

Table C2.20: Route 129 – Including Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
Constant		0.030	3.298	0.009
LNADT	Log(AADT)	-0.615	0.522	-1.177
LENGTH	Segment Length	1.000	(Fixed Parameter)	
HCANG1	Horizontal Curve Central angle	0.033	0.013	2.551
K1	Rate of vertical curvature	-0.004	0.002	-2.093
LRDSLP00	Roadside slope length on a segment between 90-100%	-1.104	0.406	-2.722
Alpha		36.031	8.510	4.234
Number of obs = 5886 Chi squared = 179.0242 Prob>chi2=0.000				
Restricted LL = -598.7637 Log likelihood = -471.8548				
Pseudo R2 =0.1594538				

Table C2.21: Route 153 – Including Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
Constant		-14.549	4.233	-3.437
LNADT	Log(AADT)	1.607	0.572	2.810
LENGTH	Segment Length	1.000	(Fixed Parameter)	
A1	Algebraic difference in gradients	-0.099	0.037	-2.650
DGRDRAL	Guardrail Dummy variable (1 if Guardrail exists, 0 otherwise)	1.304	0.543	2.401
LGRDRL00	Guard rail length on a segment between 90-100%	-1.269	0.640	-1.984
Alpha		18.139	2.838	6.392
Number of obs = 3366 Chi squared = 444.5552 Prob>chi2=0.000				
Restricted LL = -1111.408 Log likelihood = -795.2350				
Pseudo R2 =0.2184520				

Table C2.22: Route 155 – Including Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
Poisson/NB/Gamma regression model				
Constant		-1.430	0.110	-12.975
LNADT	Log(AADT)	0.120	0.016	7.627
LENGTH	Segment Length	1.000	(Fixed Parameter)	
RLNW	Average Lane width	0.012	0.003	4.219
DGRDRAL	Guardrail Dummy variable (1 if Guardrail exists, 0 otherwise)	-0.844	0.113	-7.486
LGRDRL30	Guard rail length on a segment between 20-30%	2.729	0.586	4.659
LGRDRL40	Guard rail length on a segment between 30-40%	2.319	0.418	5.546
LGRDRL50	Guard rail length on a segment between 40-50%	2.185	0.276	7.931
LGRDRL60	Guard rail length on a segment between 50-60%	1.623	0.297	5.466
LGRDRL90	Guard rail length on a segment between 80-90%	0.764	0.251	3.036
LGRDRL00	Guard rail length on a segment between 90-100%	0.866	0.125	6.925
Zero inflation model				
Tau		-7.377	0.430	-17.142
Number of obs = 7938				
Restricted LL = -3818.624 Log likelihood = -2676.80156				

Table C2.23: Route 164 – Including Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
Constant		32.150	5.125	6.273
LNADT	Log(AADT)	-2.665	0.598	-4.458
LENGTH	Segment Length	1.000	(Fixed Parameter)	
A1	Algebraic difference in gradients	-0.504	0.123	-4.090
RLNW	Average Lane width	-0.669	0.277	-2.420
DCLVEND	culvert end Dummy variable (1 if culvert end exists, 0 otherwise)	1.197	0.234	5.122
LDITCH00	Ditch length on a segment between 90-100%	-1.847	0.440	-4.201
Alpha		7.545	0.782	9.647
Number of obs = 1944 Chi squared = 1675.122 Prob>chi2=0.000				
Restricted LL = -2621.836 Log likelihood = -1177.292				
Pseudo R2 =0.4156933				

Table C2.24: Route 169 – Including Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
Poisson/NB/Gamma regression model				
Constant		32.129	0.524	61.359
LENGTH	Segment Length	1.000	(Fixed Parameter)	
RLNW	Average Lane width	-2.803	0.047	-59.498
K1	Rate of vertical curvature	0.0004	0.7D-04	6.241
DGRDRAL	Guardrail Dummy variable (1 if Guardrail exists, 0 otherwise)	-0.303	0.054	-5.562
LGRDRL00	Guard rail length on a segment between 90-100%	-2.733	0.134	-20.405
LRDSLP00	Roadside slope length on a segment between 90-100%	0.224	0.071	3.176
Zero inflation model				
Tau		1.220	0.052	23.390
Number of obs = 3690				
Restricted LL = -3602.921 Log likelihood = -1781.07223				

Table C2.25: Route 173 – Including Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
Poisson/NB/Gamma regression model				
Constant		-1.380	0.316	-4.373
LNADT	Log(AADT)	0.149	0.040	3.742
LENGTH	Segment Length	1.000	(Fixed Parameter)	
LGRDRL50	Guard rail length on a segment between 40-50%	0.398	0.170	2.340
Zero inflation model				
Tau		-11.508	1.455	-7.911
Number of obs = 1260				
Restricted LL = -997.3612 Log likelihood = -676.73053				

Table C2.26: Route 202 – Including Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
Constant		34.580	3.319	10.419
LNADT	Log(AADT)	-3.899	0.360	-10.815
LENGTH	Segment Length	1.000	(Fixed Parameter)	
HCANG1	Horizontal Curve Central angle	0.020	0.006	3.196
K1	Rate of vertical curvature	-0.002	0.000	-5.748
LCURB00	Curb length on a segment between 90-100%	-2.401	0.915	-2.624
LTREG00	Tree group length on a segment between 90-100%	-1.002	0.395	-2.536
DDRGLET	Drainage inlet Dummy variable (1 if Drainage inlet exists, 0 otherwise)	2.380	0.192	12.419
Alpha		11.714	0.697	16.802
Number of obs = 5058 Chi squared = 4628.879 Prob>chi2=0.000				
Restricted LL = -6285.917 Log likelihood = -2629.119				
Pseudo R2 =0.4681728				

Table C2.27: Route 203 – Including Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
Constant		8.878	3.243	2.738
LNADT	Log(AADT)	-0.789	0.344	-2.295
LENGTH	Segment Length	1.000	(Fixed Parameter)	
NLANEI	Number of lanes Increasing	-2.846	0.614	-4.638
HCANG1	Horizontal Curve Central angle	0.065	0.010	6.664
A1	Algebraic difference in gradients	-0.176	0.065	-2.703
DGC1	Degree of Curvature	-0.051	0.017	-3.064
LCURB00	Curb length on a segment between 90-100%	-2.392	0.895	-2.673
LTREG00	Tree group length on a segment between 90-100%	-1.349	0.373	-3.617
LDITCH00	Ditch length on a segment between 90-100%	0.435	-2.941	0.003
DDRGLET	Drainage inlet Dummy variable (1 if Drainage inlet exists, 0 otherwise)	1.037	0.351	2.951
Alpha		10.581	0.715	14.793
Number of obs = 4203 Chi squared = 2985.447 Prob>chi2=0.000				
Restricted LL = -4784.953 Log likelihood = -2598.917				
Pseudo R2 =0.3648228				

Table C2.28: Route 206 (ZINB Model) – Including Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
Poisson/NB/Gamma regression model				
Constant		-0.258	0.037	-7.006
LENGTH	Segment Length	1.000	(Fixed Parameter)	
LTREG00	Tree group length on a segment between 90-100%	-0.069	0.031	-2.257
DFENCE	Fence Dummy variable (1 if Fence exists, 0 otherwise)	0.189	0.060	3.165
LFENCE	Fence length on a segment	-0.305	0.128	-2.386
Alpha		2.876	0.552	5.212
Zero inflation model				
Tau		-9.177	1.483	-6.188
Number of obs = 2601				
Restricted LL = -1560.795 Log likelihood = -699.8659				

Table C2.29: Route 231 – Including Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
Poisson/NB/Gamma regression model				
Constant		-1.380	0.316	-4.373
LNADT	Log(AADT)	0.149	0.040	3.742
LENGTH	Segment Length	1.000	(Fixed Parameter)	
LGRDRL50	Tree group length on a segment between 40-50%	0.398	0.170	2.340
Zero inflation model				
Tau		-11.508	1.455	-7.911
Number of obs = 1260				
Restricted LL = -997.3612 Log likelihood = -676.73053				

Table C2.30: Route 241 – Including Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
Constant		-10.227	1.106	-9.250
LNADT	Log(AADT)	1.110	0.143	7.775
LENGTH	Segment Length	1.000	(Fixed Parameter)	
HCANG1	Horizontal Curve Central angle	0.161	0.015	10.465
K1	Rate of vertical curvature	-0.006	0.001	-7.636
DGC1	Degree of Curvature	-0.536	0.036	-14.840
SWR4523	Shoulder width dummy (if shoulder width right is 4-5ft and shoulder width left is 2-3ft, value=1,else=0)	-0.946	0.229	-4.128
DDITCH	Ditch Dummy variable (1 if Culvert exists, 0 otherwise)	1.890	0.238	7.952
DDRGLET	Drainage inlet Dummy variable (1 if Drainage inlet exists, 0 otherwise)	-2.460	0.631	-3.898
LRDSLP70	Roadside slope length on a segment between 60-70%	-1.480	0.547	-2.700
Alpha		3.610	0.413	8.737
Number of obs = 2124 Chi squared = 797.7040 Prob>chi2=0.000				
Restricted LL = -2801.582 Log likelihood = -1157.933				
Pseudo R2 =0.2562023				

Table C2.31: Route 261 – Including Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
Poisson/NB/Gamma regression model				
Constant		0.712	0.788	0.903
LNADT	Log(AADT)	-0.489	0.132	-3.713
LENGTH	Segment Length	1.000	(Fixed Parameter)	
HCANG1	Horizontal Curve Central angle	0.012	0.002	5.345
LFENCE	Fence length on a segment	-0.743	0.358	-2.075
LRDSLP00	Roadside slope length on a segment between 90-100%	0.755	0.229	3.299
Zero inflation model				
Tau		-0.865	0.086	-10.055
Number of obs = 5166				
Restricted LL = -713.7194 Log likelihood = -640.47707				

Table C2.32: Route 395 – Including Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
Constant		-6.747	0.629	-10.726
LNADT	Log(AADT)	1.729	0.073	23.634
LENGTH	Segment Length	1.000	(Fixed Parameter)	
NLANEI	Number of lanes Increasing	-8.761	0.357	-24.561
HCANG1	Horizontal Curve Central angle	-0.001	0.0004	-2.122
K1	Rate of vertical curvature	-0.0004	0.8D-04	-4.965
DGC1	Degree of Curvature	0.100	0.023	4.449
RLNW	Average Lane width	0.045	0.018	2.562
DFENCE	Fence Dummy variable (1 if Fence exists, 0 otherwise)	1.903	0.615	3.094
LFENCE	Fence length on a segment	-2.662	0.993	-2.681
Alpha		7.192	0.295	24.375
Number of obs = 13590 Chi squared = 8673.862 Prob>chi2=0.000				
Restricted LL = -13311.88 Log likelihood = -5717.036				
Pseudo R2 =0.4313651				

Table C2.33: Route 410 – Including Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
Poisson/NB/Gamma regression model				
Constant		-0.158	0.060	-2.631
LNADT	Log(AADT)	-0.018	0.008	-2.322
LENGTH	Segment Length	1.000	(Fixed Parameter)	
SWR4523	Shoulder width dummy (if shoulder width right is 4-5ft and shoulder width left is 2-3ft, value=1,else=0)	0.072	0.019	3.675
DDITCH	Ditch Dummy variable (1 if Culvert exists, 0 otherwise)	0.057	0.016	3.579
Zero inflation model				
Tau		-12.770	0.617	-20.687
Number of obs = 13734				
Restricted LL = -5270.852 Log likelihood = -3282.59591				

Table C2.34: Route 411 – Including Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
Poisson/NB/Gamma regression model				
Constant		2.525	0.343	7.355
LNADT	Log(AADT)	-0.315	0.040	-7.795
LENGTH	Segment Length	1.000	(Fixed Parameter)	
LGRDRL00	Guard rail length on a segment between 90-100%	-0.167	0.043	-3.862
Zero inflation model				
Tau		-11.631	1.458	-7.979
Number of obs = 1728				
Restricted LL = -1475.581 Log likelihood = -948.92798				

Table C2.35: Route 501 – Including Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
Poisson/NB/Gamma regression model				
Constant		-3.967	0.309	-12.846
LNADT	Log(AADT)	0.588	0.037	15.950
LENGTH	Segment Length	1.000	(Fixed Parameter)	
SWR4501	Shoulder width dummy (if shoulder width right is 4-5ft and shoulder width left is 0-1ft, value=1,else=0)	-4.603	0.507	-9.085
DDITCH	Ditch Dummy variable (1 if Culvert exists, 0 otherwise)	-4.280	0.611	-7.000
Zero inflation model				
Tau		1.852	0.105	17.591
Number of obs = 1008				
Restricted LL = -973.2261 Log likelihood = -543.94696				

Table C2.36: Route 503 (ZINB Model) – Including Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
Poisson/NB/Gamma regression model				
Constant		-0.136	0.019	-7.126
LNADT	Log(AADT)	0.051	0.003	16.077
LENGTH	Segment Length	1.000	(Fixed Parameter)	
RLNW	Average Lane width	-0.035	0.002	-16.071
DFENCE	Fence Dummy variable (1 if Fence exists, 0 otherwise)	-0.288	0.027	-10.737
Alpha		4.005	0.261	15.333
Zero inflation model				
Tau		-15.249	0.870	-17.523
Number of obs = 7470				
Restricted LL = -7765.977 Log likelihood = -3264.55977				

Table C2.37: Route 507 – Including Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
Constant		-13.159	0.650	-20.245
LNADT	Log(AADT)	1.429	0.074	19.383
LENGTH	Segment Length	1.000	(Fixed Parameter)	
K1	Rate of vertical curvature	-0.003	0.000	-9.280
LCLVRT30	Culvert length on a segment between 20-30%	-7.964	3.014	-2.642
LCURB00	Curb length on a segment between 90-100%	-0.687	0.305	-2.256
LTREG00	Tree group length on a segment between 90-100%	-1.261	0.250	-5.037
DDITCH	Ditch Dummy variable (1 if Culvert exists, 0 otherwise)	0.773	0.201	3.850
LDITCH70	Ditch length on a segment between 60-70%	-1.394	0.519	-2.688
LDITCH00	Ditch length on a segment between 90-100%	1.150	0.248	-4.641
LDRDRL00	Guard rail length on a segment between 90-100%	-1.186	0.220	-5.390
Alpha		7.601	0.370	20.543
Number of obs = 5229 Chi squared = 7896.588 Prob>chi2=0.000				
Restricted LL = -11676.49 Log likelihood = -4466.035				
Pseudo R2 =0.4692346				

Table C2.38: Route 510 – Including Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
Poisson/NB/Gamma regression model				
Constant		1.229	0.281	4.371
LNADT	Log(AADT)	0.076	0.029	2.606
LENGTH	Segment Length	1.000	(Fixed Parameter)	
A1	Algebraic difference in gradients	-0.824	0.038	-21.653
K1	Rate of vertical curvature	-0.010	0.000	-19.945
DCABNET	Cabnet Dummy variable (1 if Cabnet exists, 0 otherwise)	1.954	0.303	6.441
LTREG70	Tree group length on a segment between 60-70%	0.262	0.124	2.107
DCURB	Curb Dummy variable (1 if Curb exists, 0 otherwise)	0.380	0.078	4.888
LDITCH30	Ditch length on a segment between 20-30%	-7.148	0.845	-8.459
LDITCH40	Ditch length on a segment between 30-40%	-2.094	0.400	-5.236
LDITCH50	Ditch length on a segment between 40-50%	-0.940	0.229	-4.107
DDWGNYC	Downguy Dummy variable (1 if Downguy exists, 0 otherwise)	0.329	0.112	2.946
DDRGLET	Drainage inlet Dummy variable (1 if Drainage inlet exists, 0 otherwise)	-0.327	0.065	-5.009
DFENCE	Fence Dummy variable (1 if Fence exists, 0 otherwise)	0.821	0.083	9.839
LFENCE	Fence length on a segment	-1.532	0.166	-9.238
LRDSLP30	Roadside slope length on a segment between 20-30%	-1.136	0.517	-2.196
LRDSLP60	Roadside slope length on a segment between 50-60%	-1.565	0.377	-4.140
Zero inflation model				
Tau		0.565	0.035	16.248
Number of obs = 1773				
Restricted LL = -5698.683 Log likelihood = -1948.66255				

Table C2.39: Route 525 – Including Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
Constant		11.097	3.966	2.798
LNADT	Log(AADT)	-1.342	0.431	-3.113
LENGTH	Segment Length	1.000	(Fixed Parameter)	
HCANG1	Horizontal Curve Central angle	0.067	0.026	2.565
A1	Algebraic difference in gradients	0.158	0.042	3.778
K1	Rate of vertical curvature	-0.001	0.000	-3.288
DGC1	Degree of Curvature	-0.325	0.128	-2.533
LCLVRT10	Culvert length on a segment between 0-10%	29.920	7.725	3.873
DGRDRAL	Guardrail Dummy variable (1 if Guardrail exists, 0 otherwise)	0.772	0.267	2.892
LDRDRL00	Guard rail length on a segment between 90-100%	-2.667	0.428	-6.229
Alpha		12.158	0.863	14.090
Number of obs = 3465 Chi squared = 3518.241 Prob>chi2=0.000				
Restricted LL = -4360.512 Log likelihood = -2088.262				
Pseudo R2 =0.4572252				

Table C2.40: Route 530 – Including Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
Constant		-8.583	0.600	-14.316
LNADT	Log(AADT)	1.100	0.062	17.736
LENGTH	Segment Length	1.000	(Fixed Parameter)	
K1	Rate of vertical curvature	-0.0003	0.0001	-3.091
RLNW	Average Lane width	-0.188	0.029	-6.474
LDITCH00	Ditch length on a segment between 90-100%	-0.848	0.393	-2.159
DDRGLET	Drainage inlet Dummy variable (1 if Drainage inlet exists, 0 otherwise)	0.866	0.288	3.006
Alpha		12.864	0.886	14.521
Number of obs = 6219 Chi squared = 3858.579 Prob>chi2=0.000				
Restricted LL = -6064.491 Log likelihood = -2763.301				
Pseudo R2 =0.4118026				

Table C2.41: Route 539 – Including Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
Poisson/NB/Gamma regression model				
Constant		6.341	0.953	6.657
LNADT	Log(AADT)	0.325	0.095	3.411
LENGTH	Segment Length	1.000	(Fixed Parameter)	
A1	Algebraic difference in gradients	-2.316	1.019	-2.274
K1	Rate of vertical curvature	-0.0004	0.0001	-3.381
NLANEI	Number of lanes Increasing	-7.979	0.532	-14.998
DDRGLET	Drainage inlet Dummy variable (1 if Drainage inlet exists, 0 otherwise)	0.814	0.176	4.620
Zero inflation model				
Tau		0.486	0.120	4.066
Number of obs = 2223				
Restricted LL = -1045.566 Log likelihood = -257.16155				

Table C2.42: Route 542 – Including Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
Poisson/NB/Gamma regression model				
Constant		-11.069	0.147	-75.384
LNADT	Log(AADT)	1.461	0.012	118.131
LENGTH	Segment Length	1.000	(Fixed Parameter)	
A1	Algebraic difference in gradients	-0.098	0.007	-14.878
DGC1	Degree of Curvature	0.014	0.001	11.436
RLNW	Average Lane width	-0.071	0.012	-5.943
SWR4523	Shoulder width dummy (if shoulder width right is 4-5ft and shoulder width left is 2-3ft, value=1,else=0)	-2.230	0.518	-4.308
DCLVERT	Culvert Dummy variable (1 if Culvert exists, 0 otherwise)	0.263	0.037	7.184
LCLVRT20	Culvert length on a segment between 10-20%	-4.213	1.320	-3.191
LCLVRT30	Culvert length on a segment between 20-30%	-3.034	1.046	-2.901
LCLVRT40	Culvert length on a segment between 30-40%	-2.875	1.122	-2.563
DCLVEND	Culvert end Dummy variable (1 if Culvert end exists, 0 otherwise)	-0.413	0.031	-13.340
DDITCH	Ditch Dummy variable (1 if Culvert exists, 0 otherwise)	3.374	0.270	12.514
LDITCH00	Ditch length on a segment between 90-100%	-3.452	0.288	-11.977
DGRDRAL	Guardrail Dummy variable (1 if Guardrail exists, 0 otherwise)	-0.693	0.052	-13.443
LGRDRAL	Guardrail length on a segment	0.648	0.108	5.991
Zero inflation model				
Tau		0.897	0.041	21.991
Number of obs = 11340				
Restricted LL = -9242.943 Log likelihood = -6220.45826				

Table C2.43: Route 543 – Including Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
Constant		-55.064	8.063	-6.829
LNADT	Log(AADT)	5.316	0.782	6.796
LENGTH	Segment Length	1.000	(Fixed Parameter)	
K1	Rate of vertical curvature	-0.026	0.006	-4.372
DCLVEND	Culvert end Dummy variable (1 if Culvert end exists, 0 otherwise)	2.456	0.744	3.301
Alpha		4.257	1.182	3.601
Number of obs = 270 Chi squared = 364.8672 Prob>chi2=0.000				
Restricted LL = -764.2611 Log likelihood = -162.1355				
Pseudo R2 =0.5294544				

Table C2.44: Route 548 – Including Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
Poisson/NB/Gamma regression model				
Constant		6.100	0.534	11.426
LNADT	Log(AADT)	-0.541	0.063	-8.648
LENGTH	Segment Length	1.000	(Fixed Parameter)	
RLNW	Average Lane width	-0.079	0.012	-6.385
DCLVERT	Culvert Dummy variable (1 if Culvert exists, 0 otherwise)	-2.327	0.096	-24.254
LCLVRT10	Culvert length on a segment between 0-10%	65.819	7.673	8.578
DCLVEND	Culvert end Dummy variable (1 if Culvert end exists, 0 otherwise)	-2.906	1.264	-2.300
DGRDRAL	Guardrail Dummy variable (1 if Guardrail exists, 0 otherwise)	2.152	0.069	31.376
LGRDRL10	Guardrail length on a segment between 0-10%	-73.578	2.376	-30.972
LGRDRL20	Guardrail length on a segment between 10-20%	-6.176	0.937	-6.590
Zero inflation model				
Tau		0.154	0.085	1.814
Number of obs = 387				
Restricted LL = -1162.828 Log likelihood = -656.18275				

Table C2.45: Route 702 – Including Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
Constant		-11.307	2.794	-4.047
LNADT	Log(AADT)	1.380	0.333	4.149
LENGTH	Segment Length	1.000	(Fixed Parameter)	
A1	Algebraic difference in gradients	-0.287	0.032	-8.908
K1	Rate of vertical curvature	-0.008	0.002	-4.807
LTREG60	Tree group length on a segment between 50-60%	-2.564	0.872	-2.940
LTREG70	Tree group length on a segment between 60-70%	2.889	1.106	2.614
LDITCH00	Ditch length on a segment between 90-100%	-1.647	0.327	-5.039
LFENCE	Fence length on a segment	-1.321	0.421	-3.138
Alpha		1.218	0.161	7.574
Number of obs = 504 Chi squared = 552.0719 Prob>chi2=0.000				
Restricted LL = -1603.147 Log likelihood = -538.2600				
Pseudo R2 =0.3389873				

Table C2.46: Route 900 – Including Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
Poisson/NB/Gamma regression model				
Constant		0.951	0.470	2.023
LNADT	Log(AADT)	-0.120	0.049	-2.436
LENGTH	Segment Length	1.000	(Fixed Parameter)	
SWR4523	Shoulder width dummy (if shoulder width right is 4-5ft and shoulder width left is 2-3ft, value=1,else=0)	0.115	0.017	6.694
LTREG40	Tree group length on a segment between 30-40%	0.372	0.131	2.837
LTREG60	Tree group length on a segment between 50-60%	0.356	0.144	2.463
DFENCE	Fence Dummy variable (1 if Fence exists, 0 otherwise)	-0.206	0.090	-2.299
LFENCE	Fence length on a segment	0.304	0.131	2.315
LGRDRL30	Guardrail length on a segment between 20-30%	0.773	0.307	2.520
Zero inflation model				
Tau		-17.622	2.910	-6.056
Number of obs = 3321				
Restricted LL = -1339.140 Log likelihood = -811.99731				

Table C2.47: Route 902 – Including Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
Constant		-13.034	3.923	-3.323
LNADT	Log(AADT)	1.368	0.466	2.936
LENGTH	Segment Length	1.000	(Fixed Parameter)	
DDITCH	Ditch Dummy variable (1 if Culvert exists, 0 otherwise)	0.920	0.363	2.535
Alpha		10.227	1.421	7.196
Number of obs = 981 Chi squared = 768.5760 Prob>chi2=0.000				
Restricted LL = -1237.440 Log likelihood = -606.8675				
Pseudo R2 =0.3877172				

Table C2.48: All Other Routes – Including Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
Constant		-5.302	0.077	-68.943
LNADT	Log(AADT)	0.881	0.012	72.806
LENGTH	Segment Length	1.000	(Fixed Parameter)	
NLANEI	Number of lanes Increasing	-4.213	0.056	-75.497
HCANG1	Horizontal Curve Central angle	-0.0003	0.0001	-3.205
A1	Algebraic difference in gradients	-0.034	0.004	-8.629
K1	Rate of vertical curvature	-0.0002	0.1D-04	-14.921
DGC1	Degree of Curvature	0.010	0.002	5.083
RLNW	Average Lane width	0.061	0.005	13.245
SWR4501	Shoulder width dummy (if shoulder width right is 4-5ft and shoulder width left is 0-1ft, value=1,else=0)	-0.440	0.207	-2.122
SWR4523	Shoulder width dummy (if shoulder width right is 4-5ft and shoulder width left is 2-3ft, value=1,else=0)	-0.517	0.069	-7.474
SWR1001	Shoulder width dummy (if shoulder width right is >10ft and shoulder width left is 0-1ft, value=1,else=0)	-2.180	0.420	-5.190
SWR1045	Shoulder width dummy (if shoulder width right is >10ft and shoulder width left is 4-5ft, value=1,else=0)	0.607	0.196	3.097
SWC19	Shoulder width dummy (if shoulder width center is >1ft and <9ft, value=1,else=0)	-2.995	0.158	-18.983
DCLVERT	Culvert Dummy variable (1 if Culvert exists, 0 otherwise)	0.330	0.095	3.487
LCURB00	Curb length on a segment between 90-100%	-0.599	0.137	-4.384
LTREG00	Tree group length on a segment between 90-100%	-0.316	0.092	-3.445
DCLVEND	Culvert end Dummy variable (1 if Culvert end exists, 0 otherwise)	0.215	0.085	2.519
DDITCH	Ditch Dummy variable (1 if Culvert exists, 0 otherwise)	0.347	0.066	5.227
LDITCH50	Ditch length on a segment between 40-50%	-0.812	0.401	-2.025
LDITCH00	Ditch length on a segment between 90-100%	-0.725	0.099	-7.350
DFENCE	Fence Dummy variable (1 if Fence exists, 0 otherwise)	0.481	0.178	2.692
LFENCE	Fence length on a segment	-0.732	0.217	-3.376
DGRDRAL	Guardrail Dummy variable (1 if Guardrail exists, 0 otherwise)	0.273	0.077	3.518
LGRDRL00	Guard rail length on a segment between 90-100%	-0.615	0.107	-5.753
LRDSLP00	Roadside slope length on a segment between 90-100%	-0.312	0.060	-5.200
Alpha		14.557	0.159	91.777
Number of obs = 263349 Chi squared = 130821.7 Prob>chi2=0.000				
Restricted LL = -195600.4 Log likelihood = -96337.44				
Pseudo R2 =0.4043990				

Table C2.49: Route 3 – Excluding Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
Constant		14.125	1.837	7.689
LNADT	Log(AADT)	-1.552	0.190	-8.177
LENGTH	Segment Length	1.000	(Fixed Parameter)	
K1	Rate of vertical curvature	-0.002	0.000	-4.938
SWR4523	Shoulder width dummy (if shoulder width right is 4-5ft and shoulder width left is 2-3ft, value=1,else=0)	1.476	0.574	2.571
DRDSLP	Road side slope Dummy variable (1 if Roadside slope exists, 0 otherwise)	0.722	0.159	4.554
LRDSLP00	Proportion of Roadside slope on a segment is 90-100%	-0.989	0.206	-4.809
LTREGRP	Tree group length on a segment	-1.474	0.267	-5.512
Dispersion parameter for count data model				
Alpha		8.865	0.503	17.637
Number of obs =4860 Chi squared =4122.428 Prob>chi2=0.0000000				
Restricted LL = -6100.709 Log likelihood = -3212.208				
Pseudo R^2 = 0.3908684				

Table C2.50: Route 7 – Excluding Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
Constant		5.737	0.894	6.419
LNADT	Log(AADT)	-0.999	0.109	-9.175
LENGTH	Segment Length	1.000	(Fixed Parameter)	
DGC1	Degree of Curvature	0.022	0.009	2.539
LDITCH00	Proportion of Ditch on a segment is 90-100%	0.455	0.373	1.219
Dispersion parameter for count data model				
Alpha		15.924	1.371	11.618
Number of obs = 7128 Chi squared = 1475.777 Prob>chi2= 0.000				
Restricted LL = -3202.048 Log likelihood = -2113.849				
Pseudo R2 = 0.2587504				

Table C2.51: Route 9 – Excluding Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
Poisson/NB/Gamma regression model				
Constant		-4.050	0.528	-7.674
LNADT	Log(AADT)	0.539	0.063	8.537
LENGTH	Segment Length	1.000	(Fixed Parameter)	
DGC1	Degree of Curvature	0.004	0.003	1.042
DCLVERT	Culvert Dummy variable (1 if Culvert exists, 0 otherwise)	-0.179	0.107	-1.669
LGRDRAL	Guardrail length on a segment	0.288	0.157	1.830
Zero inflation model				
Constant		-3.400	0.851	-3.997
LNADT	Log(AADT)	0.766	0.102	7.497
LENGTH	Segment Length	-6.191	0.645	-9.592
DGC1	Degree of Curvature	-0.028	0.007	-4.236
DCLVERT	Culvert Dummy variable (1 if Culvert exists, 0 otherwise)	0.603	0.247	2.439
LGRDRAL	Guardrail length on a segment	0.759	0.222	3.411
Number of obs = 8181				
Restricted LL =-3608.701 Log likelihood = -2361.84662				

Table C2.52: Route 12 – Excluding Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
Constant		-3.053	0.240	-12.719
LNADT	Log(AADT)	0.558	0.032	17.656
LENGTH	Segment Length	1.000	(Fixed Parameter)	
NLANEI	Number of lanes Increasing	-2.767	0.078	-35.624
K1	Rate of vertical curvature	0.000	0.2D-04	-18.190
DGC1	Degree of Curvature	0.059	0.004	13.327
RLNW	Average Lane width	-0.057	0.015	-3.765
SWR8910	Shoulder width dummy (if shoulder width right is 8-9ft and shoulder width left is >10ft, value=1,else=0)	0.604	0.227	2.663
DCLVERT	Culvert Dummy variable (1 if Culvert exists, 0 otherwise)	-0.445	0.142	-3.145
DDITCH	Ditch Dummy variable (1 if Ditch exists, 0 otherwise)	0.586	0.117	5.022
LDITCH50	Proportion of Ditch on a segment is 40-50%	-3.098	0.608	-5.094
LDITCH70	Proportion of Ditch on a segment is 60-70%	-1.411	0.553	-2.552
LDITCH00	Proportion of Ditch on a segment is 90-100%	-1.507	0.227	-6.638

Table C2.52 (continued): Route 12 – Excluding Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
DDRGLET	Drainage inlet Dummy variable (1 if Drainage inlet exists, 0 otherwise)	-1.041	0.479	-2.175
DFENCE	Fence Dummy variable (1 if Fence exists, 0 otherwise)	-0.353	0.108	-3.284
DMALBOX	Mailbox Dummy variable (1 if Mailbox exists, 0 otherwise)	0.472	0.230	2.055
DMFXOBJ	Fixed Object Dummy variable (1 if Fixed Object exists, 0 otherwise)	0.326	0.107	3.041
DRDSLP	Road side slope Dummy variable (1 if Road side slope exists, 0 otherwise)	-0.653	0.122	-5.340
DTREGRP	Tree group Dummy variable (1 if Tree group exists, 0 otherwise)	0.517	0.089	5.791
LRDSLP40	Proportion of Roadside slope on a segment is 30-40%	1.819	0.878	2.073
LRDSLP60	Proportion of Roadside slope on a segment is 50-60%	0.933	0.404	2.309
LRDSLP70	Proportion of Roadside slope on a segment is 60-70%	1.417	0.323	4.383
LRDSLP00	Proportion of Road side slope on a segment is 90-100%	0.438	0.128	3.414
LTRGRP00	Proportion of Tree group on a segment is 90-100%	-0.783	0.190	-4.115
Dispersion parameter for count data model				
Alpha		4.962	0.193	25.713
Number of obs = 25884 Chi squared = 6443.273 Prob>chi2= 0.000				
Restricted LL = -14237.28 Log likelihood = -9522.214				
Pseudo R^2 = 0.2527993				

Table C2.53: Route 17 – Excluding Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
Constant		-4.263	0.635	-6.716
LNADT	Log(AADT)	1.008	0.058	17.235
LENGTH	Segment Length	1.000	(Fixed Parameter)	
NLANED	Number of lanes Decreasing	-5.287	0.527	-10.025
DGRDRAL	Guardrail Dummy variable (1 if Guardrail exists, 0 otherwise)	1.670	0.723	2.310
LGRDRAL	Guardrail length on a segment	-3.573	1.360	-2.628
Dispersion parameter for count data model				
Alpha		12.058	0.669	18.020
Number of obs = 9621 Chi squared = 4191.972 Prob>chi2= 0.000				
Restricted LL = -7384.208 Log likelihood = -3858.936				
Pseudo R^2 = 0.2253				

Table C2.54: Route 18 – Excluding Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
Constant		104.551	17.406	6.007
LNADT	Log(AADT)	-10.243	1.722	-5.948
LENGTH	Segment Length	1.000	(Fixed Parameter)	
K1	Rate of vertical curvature	-0.003	0.001	-4.623
RLNW	Average Lane width	-0.310	0.050	-6.208
DBRGSTR	Bridge structure Dummy variable (1 if Bridge structure exists, 0 otherwise)	2.105	0.665	3.166
LCLVERT	Culvert length on a segment	-4.162	1.988	-2.094
DGRDRAL	Guardrail Dummy variable (1 if Guardrail exists, 0 otherwise)	1.421	0.368	3.860
LGRDRAL	Guardrail length on a segment	-1.065	0.454	-2.346
Dispersion parameter for count data model				
Alpha		5.831	0.630	9.263
Number of obs = 3528 Chi squared = 889.1777 Prob>chi2= 0.0000				
Restricted LL = -2398.584 Log likelihood = -960.5768				
Pseudo R^2 = 0.316396				

Table C2.55: Route 22 – Excluding Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
Constant		-7.054	1.168	-6.039
LNADT	Log(AADT)	1.012	0.160	6.340
LENGTH	Segment Length	1.000	(Fixed Parameter)	
RLNW	Average Lane width	-0.216	0.056	-3.833
LFENCE	Fence length on a segment	0.987	0.429	2.299
DGRDRAL	Guardrail Dummy variable (1 if Guardrail exists, 0 otherwise)	-1.580	0.570	-2.771
DRDSLP	Road side slope Dummy variable (1 if Road side slope exists, 0 otherwise)	2.002	0.628	3.187
LRDSLP	Roadside slope length on a segment	-2.887	0.791	-3.650
DSUPRT	Support Dummy variable (1 if Support exists, 0 otherwise)	0.696	0.327	2.130
Dispersion parameter for count data model				
Alpha		16.776	1.655	10.137
Number of obs = 2754 Chi squared = 1572.833 Prob>chi2= 0.000				
Restricted LL = -2449.313 Log likelihood = -1141.299				
Pseudo R^2 = 0.2425				

Table C2.56: Route 23 – Excluding Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
Constant		-8.152	2.062	-3.954
LNADT	Log(AADT)	0.603	0.320	1.887
LENGTH	Segment Length	1.000	(Fixed Parameter)	
DGC1	Degree of Curvature	0.176	0.060	2.922
DRDSLP	Road side slope Dummy variable (1 if Road side slope exists, 0 otherwise)	1.087	0.335	3.247
LRDSLP00	Proportion of Road side slope on a segment is 90-100%	-0.948	0.449	-2.111
Dispersion parameter for count data model				
Alpha		27.230	7.792	3.495
Number of obs = 4140 Chi squared = 148.1315 Prob>chi2= 0.000				
Restricted LL = -838.3338 Log likelihood = -425.1921				
Pseudo R^2 = 0.1483517				

Table C2.57: Route 25 – Excluding Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
Constant		-6.281	2.393	-2.625
LNADT	Log(AADT)	1.122	0.217	5.168
LENGTH	Segment Length	1.000	(Fixed Parameter)	
K1	Rate of vertical curvature	-0.002	0.001	-2.992
DGC1	Degree of Curvature	0.101	0.020	5.014
RLNW	Average Lane width	-0.415	0.206	-2.013
DRDSLP	Road side slope Dummy variable (1 if Road side slope exists, 0 otherwise)	0.683	0.249	2.737
LRDSLP00	Proportion of Road side slope on a segment is 90-100%	-1.244	0.390	-3.189
Dispersion parameter for count data model				
Alpha		22.310	2.699	8.265
Number of obs = 10764 Chi squared = 666.4686 Prob>chi2= 0.000				
Restricted LL = -2118.884 Log likelihood =-1635.507				
Pseudo R^2 = 0.1692626				

Table C2.58: Route 26 – Excluding Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
Constant		-2.105	0.879	-2.395
LNADT	Log(AADT)	0.351	0.108	3.260
LENGTH	Segment Length	1.000	(Fixed Parameter)	
RLNW	Average Lane width	-0.146	0.046	-3.144
DMFXOBJ	Fixed Object Dummy variable (1 if Fixed Object exists, 0 otherwise)	0.555	0.198	2.809
DPDSTAL	Pedestal Dummy variable (1 if Pedestal exists, 0 otherwise)	0.570	0.223	2.556
LRDSLP	Roadside slope length on a segment	-1.333	0.186	-7.178
DSUPRT	Support Dummy variable (1 if Support exists, 0 otherwise)	0.690	0.187	3.699
Dispersion parameter for count data model				
Alpha		8.369	0.403	20.743
Number of obs = 6732 Chi squared = Prob>chi2= 0.000				
Restricted LL = -7242.775 Log likelihood = -4515.326				
Pseudo R^2 = 0.0789				

Table C2.59: Route 27 – Excluding Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
Constant		-8.752	0.454	-19.274
LNADT	Log(AADT)	0.999	0.073	13.670
LENGTH	Segment Length	1.000	(Fixed Parameter)	
NLANEI	Number of lanes Increasing	-1.835	0.237	-7.728
K1	Rate of vertical curvature	-0.002	0.000	-4.206
RLNW	Average Lane width	0.050	0.021	2.342
DCLVEND	Culvert end Dummy variable (1 if Culvert end exists, 0 otherwise)	0.438	0.201	2.185
DDITCH	Ditch Dummy variable (1 if Ditch exists, 0 otherwise)	0.782	0.195	4.012
LDITCH00	Proportion of Ditch on a segment is 90-100%	-0.897	0.263	-3.410
Dispersion parameter for count data model				
Alpha		20.489	1.418	14.449
Number of obs = 10593 Chi squared = 3182.574 Prob>chi2= 0.000				
Restricted LL = -5183.351 Log likelihood = -2726.906				
Pseudo R^2 = 0.1910				

Table C2.60: Route 28 – Excluding Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
Constant		-5.987	0.398	-15.046
LNADT	Log(AADT)	0.528	0.050	10.481
LENGTH	Segment Length	1.000	(Fixed Parameter)	
K1	Rate of vertical curvature	0.000	0.000	-2.055
DGC1	Degree of Curvature	-0.109	0.038	-2.870
DDITCH	Ditch Dummy variable (1 if Ditch exists, 0 otherwise)	0.479	0.206	2.318
DDWGYNC	Downguy Dummy variable (1 if Downguy exists, 0 otherwise)	1.304	0.469	2.782
DGRDRAL	Guardrail Dummy variable (1 if Guardrail exists, 0 otherwise)	0.649	0.285	2.277
DPDSTAL	Pedestal Dummy variable (1 if Pedestal exists, 0 otherwise)	0.904	0.313	2.889
LRDSLP	Roadside slope length on a segment	-1.089	0.222	-4.902
Dispersion parameter for count data model				
Alpha		18.118	1.085	16.706
Number of obs = 8739 Chi squared = 4375.865 Prob>chi2= 0.000				
Restricted LL = -6006.081 Log likelihood = -3221.935				
Pseudo R^2 = 0.1151				

Table C2.61: Route 97 – Excluding Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
Constant		-1.117	1.398	-0.799
LNADT	Log(AADT)	0.800	0.134	5.979
LENGTH	Segment Length	1.000	(Fixed Parameter)	
NLANEI	Number of lanes Increasing	-5.152	0.720	-7.157
K1	Rate of vertical curvature	-0.0002	0.3D-04	-5.990
RLNW	Average Lane width	-0.145	0.056	-2.577
DDRGLET	Drainage inlet Dummy variable (1 if Drainage inlet exists, 0 otherwise)	0.595	0.282	2.111
LTRGRP00	Proportion of Tree group on a segment is 90-100%	-0.870	0.289	-3.015
Dispersion parameter for count data model				
Alpha		9.655	0.361	26.737
Number of obs = 16659 Chi squared = 6845.281 Prob>chi2= 0.000				
Restricted LL = -13738.65 Log likelihood = -9077.784				
Pseudo R^2 = 0.2738019				

Table C2.62: Route 101 – Excluding Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
Constant		-1.881	1.035	-1.817
LNADT	Log(AADT)	0.819	0.039	21.238
LENGTH	Segment Length	1.000	(Fixed Parameter)	
NLANEI	Number of lanes Increasing	-6.821	1.012	-6.741
DGC1	Degree of Curvature	0.019	0.006	3.230
SWR8901	Shoulder width dummy (if shoulder width right is 8-9ft and shoulder width left is 0-1ft, value=1,else=0)	1.210	0.555	2.181
SWC19	Shoulder width dummy (if shoulder width center is >1ft and <9ft, value=1,else=0)	-1.817	0.600	-3.027
DBRDRAL	Bridge rail Dummy variable (1 if Bridge rail exists, 0 otherwise)	-1.403	0.456	-3.074
DDITCH	Ditch Dummy variable (1 if Ditch exists, 0 otherwise)	0.309	0.129	2.388
LDITCH00	Proportion of Ditch on a segment is 90-100%	-0.963	0.166	-5.798
DMFXOBJ	Fixed Object Dummy variable (1 if Fixed Object exists, 0 otherwise)	0.636	0.313	2.032
DTREGRP	Tree group Dummy variable (1 if Tree group exists, 0 otherwise)	0.612	0.258	2.376
LTREGRP	Tree group length on a segment	-0.766	0.323	-2.374
Dispersion parameter for count data model				
Alpha		13.830	0.479	28.895
Number of obs = 37719 Chi squared = 8092.019 Prob>chi2= 0.000				
Restricted LL = -18907.09 Log likelihood = -11971.75				
Pseudo R^2 = 0.2525952				

Table C2.63: Route 106 – Excluding Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
Poisson/NB/Gamma regression model				
Constant		-0.829	0.112	-7.427
LNADT	Log(AADT)	0.082	0.013	6.360
LENGTH	Segment Length	1.000	(Fixed Parameter)	
DGC1	Degree of Curvature	0.002	0.001	3.078
DCLVEND	Culvert end Dummy variable (1 if Culver tend exists, 0 otherwise)	0.044	0.027	1.651
DDITCH	Ditch Dummy variable (1 if Ditch exists, 0 otherwise)	0.060	0.034	1.794
DRDSLP	Road side slope Dummy variable (1 if Road side slope exists, 0 otherwise)	-0.069	0.036	-1.926
Dispersion parameter				
Alpha		0.937	0.510	1.836
Zero inflation model				
Tau		-13.812	1.562	-8.844
Number of obs = 3222				
Restricted LL = -1467.044 Log likelihood = -1046.43921				

Table C2.64: Route 108 – Excluding Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
Poisson/NB/Gamma regression model				
Constant		-0.550	0.233	-2.363
LNADT	Log(AADT)	0.111	0.027	4.152
LENGTH	Segment Length	1.000	(Fixed Parameter)	
HCANG1	Horizontal Curve Central angle	0.006	0.002	3.766
RLNW	Average Lane width	-0.049	0.016	-3.117
DSUPRT	Support Dummy variable (1 if Support exists, 0 otherwise)	0.047	0.016	2.869
DRDAPRC	Road approach Dummy variable (1 if Road approach exists, 0 otherwise)	-0.049	0.020	-2.402
Dispersion parameter				
Alpha		1.168	0.649	1.798
Zero inflation model				
Tau		-16.532	2.627	-6.292
Number of obs = 1071				
Restricted LL = -592.5316 Log likelihood = -419.82887				

Table C2.65: Route 109 – Excluding Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
Constant		-11.410	0.999	-11.418
LNADT	Log(AADT)	1.173	0.130	9.048
LENGTH	Segment Length	1.000	(Fixed Parameter)	
DGC1	Degree of Curvature	0.050	0.012	4.127
DDITCH	Ditch Dummy variable (1 if Ditch exists, 0 otherwise)	0.738	0.268	2.750
LDITCH00	Proportion of Ditch on a segment is 90-100%	-1.704	0.424	-4.015
Dispersion parameter for count data model				
Alpha		12.783	1.341	9.532
Number of obs = 3627 Chi squared = 1051.215 Prob>chi2= 0.000				
Restricted LL = -2120.519 Log likelihood = -1274.963				
Pseudo R^2 = 0.291911				

Table C2.66: Route 127 – Excluding Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
Constant		-20.360	9.161	-2.222
LNADT	Log(AADT)	2.533	1.368	1.852
LENGTH	Segment Length	1.000	(Fixed Parameter)	
K1	Rate of vertical curvature	-0.003	0.002	-1.729
LDITCH	Ditch length on a segment	-1.354	0.554	-2.445
DPDSTAL	Pedestal Dummy variable (1 if Pedestal exists, 0 otherwise)	2.393	1.134	2.111
DSUPRT	Support Dummy variable (1 if Support exists, 0 otherwise)	1.465	0.542	2.705
Dispersion parameter for count data model				
Alpha		19.376	5.483	3.534
Number of obs = 2547 Chi squared = 92.05383 Prob>chi2= 0.000				
Restricted LL = -383.5740 Log likelihood = -303.6737				
Pseudo R^2 = 0.1054				

Table C2.67: Route 129 – Excluding Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
Constant		-5.992	3.439	-1.742
LNADT	Log(AADT)	-0.638	0.869	-0.735
LENGTH	Segment Length	1.000	(Fixed Parameter)	
K1	Rate of vertical curvature	-0.005	0.002	-2.372
RLNW	Average Lane width	0.635	0.297	2.136
LRDSLP00	Proportion of Road side slope on a segment is 90-100%	-1.107	0.384	-2.882
Dispersion parameter for count data model				
Alpha		35.670	8.397	4.248
Number of obs = 5031 Chi squared = 183.5678 Prob>chi2= 0.000				
Restricted LL = -554.0470 Log likelihood = -428.5501				
Pseudo R^2 = 0.176394				

Table C2.68: Route 153 – Excluding Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
Poisson/NB/Gamma regression model				
Constant		-1.166	0.350	-3.328
LNADT	Log(AADT)	0.112	0.046	2.417
LENGTH	Segment Length	1.000	(Fixed Parameter)	
DGC1	Degree of Curvature	0.009	0.003	3.109
DGRDRAL	Guardrail Dummy variable (1 if Guardrail exists, 0 otherwise)	0.065	0.023	2.792
DSUPRT	Support Dummy variable (1 if Support exists, 0 otherwise)	-0.156	0.072	-2.162
Dispersion parameter				
Alpha		1.095	0.714	1.533
Zero inflation model				
Tau		-10.575	1.132	-9.338
Number of obs = 2844				
Restricted LL = -855.1925 Log likelihood = -592.47816				

Table C2.69: Route 164 – Excluding Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
Constant		25.161	8.442	2.981
LNADT	Log(AADT)	-2.737	0.874	-3.129
LENGTH	Segment Length	1.000	(Fixed Parameter)	
A1	Algebraic difference in gradients	-0.388	0.176	-2.206
DDWGYNC	Downguy Dummy variable (1 if Downguy exists, 0 otherwise)	1.847	0.884	2.089
DRDSLP	Road side slope Dummy variable (1 if Road side slope exists, 0 otherwise)	-1.974	0.768	-2.569
DTREGRP	Tree group Dummy variable (1 if Tree group exists, 0 otherwise)	1.938	0.878	2.206
Dispersion parameter for count data model				
Alpha		8.442	1.360	6.207
Number of obs = 909 Chi squared = 429.7101 Prob>chi2= 0.000				
Restricted LL = -916.4945 Log likelihood = -554.8572				
Pseudo R^2 = 0.2791368				

Table C2.70: Route 169 – Excluding Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
Poisson/NB/Gamma regression model				
Constant		12.020	1.221	9.842
LENGTH	Segment Length	1.000	(Fixed Parameter)	
RLNW	Average Lane width	-1.023	0.111	-9.255
DGRDRAL	Guardrail Dummy variable (1 if Guardrail exists, 0 otherwise)	0.340	0.118	2.876
LGRDRAL	Guardrail length on a segment	-0.529	0.209	-2.535
Zero inflation model				
Constant		3.133	0.154	20.394
LENGTH	Segment Length	-8.112	1.208	-6.715
DGRDRAL	Guardrail Dummy variable (1 if Guardrail exists, 0 otherwise)	-0.720	0.202	-3.564
Number of obs = 2142				
Restricted LL = -1374.784 Log likelihood = -772.70930				

Table C2.71: Route 202 – Excluding Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
Constant		34.558	6.006	5.754
LNADT	Log(AADT)	-3.990	0.657	-6.074
LENGTH	Segment Length	1.000	(Fixed Parameter)	
K1	Rate of vertical curvature	-0.001	0.000	-2.695
DGC1	Degree of Curvature	0.033	0.012	2.850
DGRDRAL	Guardrail Dummy variable (1 if Guardrail exists, 0 otherwise)	0.530	0.204	2.599
DPDSTAL	Pedestal Dummy variable (1 if Pedestal exists, 0 otherwise)	-1.573	0.720	-2.186
DTREGRP	Tree group Dummy variable (1 if Tree group exists, 0 otherwise)	1.010	0.314	3.219
LTRGRP00	Proportion of Tree group on a segment is 90-100%	-1.485	0.578	-2.567
Dispersion parameter for count data model				
Alpha		9.874	1.177	8.391
Number of obs = 2790 Chi squared = 719.9093 Prob>chi2= 0.000				
Restricted LL = -1672.983 Log likelihood = -1030.564				
Pseudo R^2 = 0.258863				

Table C2.72: Route 203 – Excluding Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
Constant		-9.291	3.353	-2.771
LNADT	Log(AADT)	1.147	0.381	3.006
LENGTH	Segment Length	1.000	(Fixed Parameter)	
DGC1	Degree of Curvature	0.086	0.031	2.718
RLNW	Average Lane width	-0.266	0.052	-5.064
LDITCH00	Proportion of Ditch on a segment is 90-100%	-1.313	0.440	-2.985
DGRDRAL	Guardrail Dummy variable (1 if Guardrail exists, 0 otherwise)	1.471	0.620	2.372
LGRDRAL	Guardrail length on a segment	-5.404	1.488	-3.632
Dispersion parameter for count data model				
Alpha		7.806	0.820	9.517
Number of obs = 2997 Chi squared = 634.4946 Prob>chi2= 0.000				
Restricted LL = -1987.892 Log likelihood = -1424.424				
Pseudo R^2 = 0.1821510				

Table C2.73: Route 206 – Excluding Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
Poisson/NB/Gamma regression model				
Constant		-1.376	0.539	-2.552
LNADT	Log(AADT)	-0.129	0.060	-2.132
LENGTH	Segment Length	1.000	(Fixed Parameter)	
RLNW	Average Lane width	0.148	0.051	2.890
DDWGYNC	Downguy Dummy variable (1 if Downguy exists, 0 otherwise)	0.278	0.143	1.937
DMALBOX	Mailbox Dummy variable (1 if Mailbox exists, 0 otherwise)	0.251	0.111	2.259
Dispersion parameter				
Alpha		3.958	0.963	4.109
Zero inflation model				
Tau		-3.412	1.196	-2.853
Number of obs = 2025				
Restricted LL = -1097.187 Log likelihood = -450.68491				

Table C2.74: Route 231 – Excluding Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
Poisson/NB/Gamma regression model				
Constant		-2.179	0.312	-6.987
LNADT	Log(AADT)	0.231	0.040	5.750
LENGTH	Segment Length	1.000	(Fixed Parameter)	
K1	Rate of vertical curvature	0.000	0.99D-04	-2.622
DMFXOBJ	Fixed Object Dummy variable (1 if Fixed Object exists, 0 otherwise)	0.170	0.075	2.266
Dispersion parameter				
Alpha		1.750	0.771	2.269
Zero inflation model				
Tau		-4.855	0.598	-8.121
Number of obs = 6615				
Restricted LL = -1307.344 Log likelihood = -892.12697				

Table C2.75: Route 241 – Excluding Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
Poisson/NB/Gamma regression model				
Constant		0.427	0.208	2.057
LNADT	Log(AADT)	-0.084	0.029	-2.930
LENGTH	Segment Length	1.000	(Fixed Parameter)	
LDITCH	Ditch length on a segment	-0.088	0.026	-3.410
DRDAPRC	Road approach Dummy variable (1 if Road approach exists, 0 otherwise)	0.134	0.034	3.916
Dispersion parameter				
Alpha		1.250	0.617	2.026
Zero inflation model				
Tau		-13.183	1.712	-7.702
Number of obs = 1737				
Restricted LL = -848.4214 Log likelihood = -575.03731				

Table C2.76: Route 302 – Excluding Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
Poisson/NB/Gamma regression model				
Constant		1.109	0.396	2.797
LNADT	Log(AADT)	-0.152	0.048	-3.178
LENGTH	Segment Length	1.000	(Fixed Parameter)	
DPDSTAL	Pedestal Dummy variable (1 if Pedestal exists, 0 otherwise)	-0.085	0.041	-2.053
DTREGRP	Tree group Dummy variable (1 if Tree group exists, 0 otherwise)	0.052	0.025	2.065
Zero inflation model				
Tau		-20.219	2.904	-6.962
Number of obs = 1368				
Restricted LL = -559.5725 Log likelihood = -378.92051				

Table C2.77: Route 410 – Excluding Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
Constant		-2.735	1.114	-2.454
LNADT	Log(AADT)	0.289	0.096	3.003
LENGTH	Segment Length	1.000	(Fixed Parameter)	
A1	Algebraic difference in gradients	-0.191	0.043	-4.397
RLNW	Average Lane width	-0.172	0.081	-2.118
DSUPRT	Support Dummy variable (1 if Support exists, 0 otherwise)	0.625	0.301	2.080
DRDSLP	Road side slope Dummy variable (1 if Road side slope exists, 0 otherwise)	1.114	0.359	3.099
Dispersion parameter for count data model				
Alpha		25.581	1.851	13.822
Number of obs = 11646 Chi squared = 1955.090 Prob>chi2= 0.000				
Restricted LL = -4199.056 Log likelihood = -2646.502				
Pseudo R^2 = 0.1597				

Table C2.78: Route 411 – Excluding Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
Constant		28.966	7.022	4.125
LNADT	Log(AADT)	-3.676	0.826	-4.450
LENGTH	Segment Length	1.000	(Fixed Parameter)	
DGC1	Degree of Curvature	0.117	0.043	2.728
DDITCH	Ditch Dummy variable (1 if Ditch exists, 0 otherwise)	-2.497	1.453	-1.718
LDITCH	Ditch length on a segment	3.108	1.785	1.742
Dispersion parameter for count data model				
Alpha		10.295	2.258	4.559
Number of obs = 918 Chi squared = 157.2939 Prob>chi2= 0.000				
Restricted LL = -408.0429 Log likelihood = -281.9953				
Pseudo R^2 = 0.1417				

Table C2.79: Route 501 – Excluding Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
Poisson/NB/Gamma regression model				
Constant		-23.267	2.372	-9.808
LNADT	Log(AADT)	4.435	0.278	15.935
LENGTH	Segment Length	1.000	(Fixed Parameter)	
NLANED	Number of lanes Decreasing	-3.481	1.402	-2.483
HCANG1	Horizontal Curve Central angle	0.169	0.017	10.106
RLNW	Average Lane width	-0.983	0.234	-4.206
DRDSLP	Road side slope Dummy variable (1 if Road side slope exists, 0 otherwise)	-1.932	1.029	-1.878
Zero inflation model				
Tau		1.009	0.177	5.713
Number of obs = 585				
Restricted LL = -505.8335 Log likelihood = -298.93971				

Table C2.80: Route 503 – Excluding Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
Constant		-5.640	0.658	-8.569
LNADT	Log(AADT)	0.739	0.122	6.048
LENGTH	Segment Length	1.000	(Fixed Parameter)	
K1	Rate of vertical curvature	-0.001	0.000	-2.055
RLNW	Average Lane width	-0.192	0.040	-4.742
DSUPRT	Support Dummy variable (1 if Support exists, 0 otherwise)	-2.131	0.575	-3.709
Dispersion parameter for count data model				
Alpha		23.538	2.223	10.588
Number of obs = 5436 Chi squared = 2122.948 Prob>chi2= 0.000				
Restricted LL = -3073.644 Log likelihood = -1701.780				
Pseudo R^2 = 0.3841391				

Table C2.81: Route 507 – Excluding Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
Constant		-9.589	0.855	-11.214
LNADT	Log(AADT)	0.956	0.099	9.684
LENGTH	Segment Length	1.000	(Fixed Parameter)	
A1	Algebraic difference in gradients	-0.131	0.048	-2.727
K1	Rate of vertical curvature	-0.002	0.000	-4.453
DDITCH	Ditch Dummy variable (1 if Ditch exists, 0 otherwise)	0.617	0.206	2.992
LDITCH00	Proportion of Ditch on a segment is 90-100%	-0.952	0.270	-3.523
LGRDRL00	Proportion of Guardrail on a segment is 90-100%	-1.787	0.594	-3.009
Dispersion parameter for count data model				
Alpha		7.284	0.655	11.115
Number of obs = 2943 Chi squared = 1348.534 Prob>chi2= 0.000				
Restricted LL = -2948.827 Log likelihood = -1712.943				
Pseudo R^2 = 0.2824498				

Table C2.82: Route 510 – Excluding Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
Constant		14.951	4.621	3.235
LNADT	Log(AADT)	-1.945	0.504	-3.862
LENGTH	Segment Length	1.000	(Fixed Parameter)	
A1	Algebraic difference in gradients	-0.371	0.089	-4.156
HCANG1	Horizontal Curve Central angle	0.287	0.052	5.479
DDITCH	Ditch Dummy variable (1 if Ditch exists, 0 otherwise)	2.350	0.511	4.600
Dispersion parameter for count data model				
Alpha		12.583	2.607	4.827
Number of obs = 1035 Chi squared = 249.3032 Prob>chi2= 0.000				
Restricted LL = -675.5688 Log likelihood = -313.3147				
Pseudo R^2 = 0.2846146				

Table C2.83: Route 525 – Excluding Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
Poisson/NB/Gamma regression model				
Constant		0.829	0.232	3.581
LNADT	Log(AADT)	-0.114	0.026	-4.338
LENGTH	Segment Length	1.000	(Fixed Parameter)	
DGC1	Degree of Curvature	-0.031	0.010	-3.083
HCANG1	Horizontal Curve Central angle	0.005	0.001	3.380
LGRDRL00	Proportion of Guardrail on a segment is 90-100%	-0.095	0.043	-2.207
Dispersion parameter				
Alpha		1.482	0.749	1.980
Zero inflation model				
Tau		-12.455	1.673	-7.444
Number of obs = 1818 Chi squared = 380.4133 Prob>chi2= 0.000				
Restricted LL = -909.6662 Log likelihood = -581.497				
Pseudo R^2 = 0.2464762				

Table C2.84: Route 530 – Excluding Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
Constant		-6.626	0.782	-8.473
LNADT	Log(AADT)	1.015	0.092	11.035
LENGTH	Segment Length	1.000	(Fixed Parameter)	
A1	Algebraic difference in gradients	0.105	0.044	2.405
RLNW	Average Lane width	-0.342	0.060	-5.741
DGRDRAL	Guardrail Dummy variable (1 if Guardrail exists, 0 otherwise)	1.355	0.648	2.090
LGRDRAL	Guardrail length on a segment	-2.436	0.886	-2.751
Dispersion parameter for count data model				
Alpha		12.871	1.277	10.080
Number of obs = 4716 Chi squared = 1514.045 Prob>chi2= 0.000				
Restricted LL = -3079.240 Log likelihood = -1632.766				
Pseudo R^2 = 0.3167739				

Table C2.85: Route 542 – Excluding Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
Constant		-3.701	0.476	-7.776
LNADT	Log(AADT)	0.560	0.065	8.619
LENGTH	Segment Length	1.000	(Fixed Parameter)	
A1	Algebraic difference in gradients	-0.045	0.019	-2.420
K1	Rate of vertical curvature	-0.001	0.000	-5.223
RLNW	Average Lane width	-0.214	0.026	-8.141
SWR4523	Shoulder width dummy (if shoulder width right is 4-5ft and shoulder width left is 2-3ft, value=1,else=0)	-2.196	0.918	-2.393
DCLVERT	Culvert Dummy variable (1 if Culvert exists, 0 otherwise)	1.225	0.630	1.943
LCLVERT	Culvert length on a segment	-2.098	0.686	-3.058
Dispersion parameter for count data model				
Alpha		17.556	1.073	16.363
Number of obs = 9153 Chi squared = 2878.132 Prob>chi2= 0.000				
Restricted LL = -5299.893 Log likelihood = -3055.413				
Pseudo R^2 = 0.3201853				

Table C2.86: Route 706 – Excluding Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
Constant		-0.569	0.159	-3.584
LNADT	Log(AADT)	0.049	0.020	2.507
LENGTH	Segment Length	1.000	(Fixed Parameter)	
HCANG1	Horizontal Curve Central angle	-0.006	0.002	-3.218
DDITCH	Ditch Dummy variable (1 if Ditch exists, 0 otherwise)	-0.185	0.051	-3.628
DSUPRT	Support Dummy variable (1 if Support exists, 0 otherwise)	0.130	0.037	3.567
Dispersion parameter				
Alpha		3.969	0.500	7.941
Zero inflation model				
Tau		-13.287	1.739	-7.642
Number of obs = 1377 Chi squared = 699.5239 Prob>chi2= 0.000				
Restricted LL = -944.3003 Log likelihood = -396.4903				
Pseudo R^2 = 0.4686913				

Table C2.87: Route 900 – Excluding Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
Constant		31.533	17.236	1.830
LNADT	Log(AADT)	-3.465	1.794	-1.932
LENGTH	Segment Length	1.000	(Fixed Parameter)	
SWR4523	Shoulder width dummy (if shoulder width right is 4-5ft and shoulder width left is 2-3ft, value=1,else=0)	0.903	0.441	2.050
LDITCH	Ditch length on a segment	-1.618	0.899	-1.800
Dispersion parameter for count data model				
Alpha		14.506	2.410	6.020
Number of obs = 1710 Chi squared = 522.1204 Prob>chi2= 0.000				
Restricted LL = -1011.378 Log likelihood = -641.1842				
Pseudo R^2 = 0.2893453				

Table C2.88: Route 902 – Excluding Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
Constant		-15.324	5.141	-2.981
LNADT	Log(AADT)	1.508	0.598	2.521
LENGTH	Segment Length	1.000	(Fixed Parameter)	
DGC1	Degree of Curvature	0.094	0.057	1.659
DDITCH	Ditch Dummy variable (1 if Ditch exists, 0 otherwise)	1.652	0.566	2.917
DFENCE	Fence Dummy variable (1 if Fence exists, 0 otherwise)	-1.054	0.543	-1.941
DSUPRT	Support Dummy variable (1 if Support exists, 0 otherwise)	-1.068	0.585	-1.827
Dispersion parameter for count data model				
Alpha		6.189	1.873	3.304
Number of obs = 513 Chi squared = 135.7550 Prob>chi2= 0.000				
Restricted LL = -272.5440 Log likelihood = -184.6274				
Pseudo R^2 = 0.3067				

Table C2.89: All Other Routes – Excluding Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
Constant		-1.363	0.638	-2.139
LNADT	Log(AADT)	0.868	0.015	59.646
LENGTH	Segment Length	1.000	(Fixed Parameter)	
NLANEI	Number of lanes Increasing	-8.032	0.629	-12.767
HCANG1	Horizontal Curve Central angle	0.001	0.000	3.128
A1	Algebraic difference in gradients	-0.038	0.006	-6.390
DGC1	Degree of Curvature	0.016	0.002	7.170

Table C2.89 (continued): All Other Routes – Excluding Intersection Segments.

Variable	Description	Coeff.	S.E.	t-stat
RLNW	Average Lane width	0.029	0.010	3.010
SWR4501	Shoulder width dummy (if shoulder width right is 4-5ft and shoulder width left is 0-1ft, value=1,else=0)	-0.909	0.392	-2.319
SWR4523	Shoulder width dummy (if shoulder width right is 4-5ft and shoulder width left is 2-3ft, value=1,else=0)	-0.591	0.127	-4.668
SWR8901	Shoulder width dummy (if shoulder width right is 8-9ft and shoulder width left is 0-1ft, value=1,else=0)	-0.794	0.322	-2.464
SWR1001	Shoulder width dummy (if shoulder width right is >10ft and shoulder width left is 0-1ft, value=1,else=0)	-1.955	0.944	-2.072
SWR1045	Shoulder width dummy (if shoulder width right is >10ft and shoulder width left is 4-5ft, value=1,else=0)	1.172	0.332	3.525
SWC19	Shoulder width dummy (if shoulder width center is >1ft and <9ft, value=1,else=0)	-1.966	0.415	-4.735
DCLVERT	Culvert Dummy variable (1 if Culvert exists, 0 otherwise)	0.496	0.182	2.723
LCLVERT	Culvert length on a segment	-1.621	0.641	-2.529
LFENCE	Fence length on a segment	-0.390	0.155	-2.512
DGRDRAL	Guardrail Dummy variable (1 if Guardrail exists, 0 otherwise)	0.713	0.156	4.571
LGRDRAL	Guardrail length on a segment	-1.056	0.203	-5.191
DGYWIRE	Guywire Dummy variable (1 if Guywire exists, 0 otherwise)	2.059	0.958	2.149
DMFXOBJ	Fixed Object Dummy variable (1 if Fixed Object exists, 0 otherwise)	0.696	0.162	4.293
DRDSLP	Road side slope Dummy variable (1 if Road side slope exists, 0 otherwise)	0.762	0.155	4.908
LRDSLP	Roadside slope length on a segment	-0.994	0.189	-5.245
DRCHCRP	Rockout cropping Dummy variable (1 if rockout cropping exists, 0 otherwise)	-0.832	0.310	-2.685
Dispersion parameter for count data model				
Alpha		17.629	0.293	60.077
Number of obs = 151362 Chi squared =37225.55 Prob>chi2= 0.000				
Restricted LL = -64969.81 Log likelihood = -38254.32				
Pseudo R^2 = 0.3273031				

Appendix C3: Route Specific Comparison Table (ROADWAY GEOMETRICS vs. ROADWAY GEOMETRICS+ROADSIDE)

Table C3.1: Model Comparison with and without Roadside Variables – Including Intersection Segments.

SR#	Restricted L-L	Without roadside Vars.					
		Obs	# Parameters	R^2	chi^2	Log L-L	P
SR3	-6051.10	6525	5	0.029	354.61	-5873.8	0.00
SR7	-3460.39	10215	5	0.020	138.39	-3391.19	0.00
SR21	-1641.79	21456	4	0.030	99.40	-1592.09	0.00
SR23	-635.19	5247	3	0.008	9.67	-630.36	0.01
SR25	-2198.42	12483	5	0.029	129.38	-2133.73	0.00
SR26	-4501.83	6732	2	0.002	14.37	-4494.65	0.00
SR27	-2840.39	10593	7	0.077	436.68	-2622.05	0.00
SR28	-3260.52	8739	4	0.028	183.97	-3168.54	0.00
SR31	-479.15	4086	3	0.021	20.02	-469.14	0.00
SR97	-13008.4	21600	9	0.015	386.16	-12815.31	0.00
SR104	-2493.08	3141	5	0.049	243.04	-2371.56	0.00
SR109	-2085.92	4788	5	0.035	144.09	-2013.87	0.00
SR115	-261.24	342	5	0.041	21.32	-250.58	0.00
SR123	-19.79	2268	2	0.001	0.27	-19.66	0.60
SR125	-329.27	3159	5	0.082	53.80	-302.37	0.00
SR127	-407.15	2835	2	0.001	1.18	-407.15	0.28
SR129	-482.20	5886	4	0.024	23.33	-470.53	0.00
SR153	-790.67	3366	3	0.009	14.60	-783.37	0.00
SR155	-2457.14	7938	3	0.012	56.87	-2428.71	0.00
SR160	-335.72	333	3	0.040	26.97	-322.24	0.00
SR164	-1301.32	1944	5	0.084	218.89	-1191.88	0.00
SR165	-397.91	4302	4	0.066	52.67	-371.57	0.00
SR169	-1532.97	3690	5	0.032	96.48	-1484.73	0.00
SR172	-233.51	2682	3	0.033	15.39	-225.81	0.00
SR173	-647.42	1260	4	0.019	24.21	-635.31	0.00
SR174	-815.44	2673	4	0.043	70.29	-780.30	0.00
SR202	-2803.67	5058	5	0.062	349.34	-2629.00	0.00
SR203	-2596.53	4203	4	0.016	82.22	-2555.42	0.00
SR206	-743.28	2601	3	0.018	26.4	-730.08	0.00
SR215	-857.87	810	4	0.062	105.84	-804.94	0.00
SR223	-432.85	585	3	0.021	18.56	-423.57	0.00
SR240	-559.71	2538	3	0.154	172.53	-473.45	0.00

Table C3.1 (continued): Model Comparison with and without Roadside Variables – Including Intersection Segments.

SR#	Restricted L-L	Without roadside Vars.					
		Obs	# Parameters	R^2	chi^2	Log L-L	P
SR241	-1043.56	2124	4	0.0271	56.49	-1015.32	0.00
SR260	-502.95	2547	4	0.0825	82.96	-461.47	0.00
SR261	-581.29	5166	3	0.0081	9.40	-576.59	0.01
SR270	-72.49	1413	2	0.3912	56.72	-44.13	0.00
SR274	-22.14	243	2	0.0202	0.89	-21.70	0.34
SR290	-142.22	2340	2	0.1757	49.99	-117.23	0.00
SR302	-712.46	1980	3	0.1109	157.96	-633.48	0.00
SR305	-821.49	1503	5	0.0205	33.23	-795.87	0.00
SR307	-312.92	135	3	0.0509	31.84	-297.00	0.00
SR410	-3167.79	13734	6	0.0089	56.23	-3139.68	0.00
SR432	-61.62	855	2	0.5423	66.50	-28.07	0.00
SR500	-181.43	2007	2	0.2058	74.68	-144.09	0.00
SR501	-466.83	1008	4	0.0398	37.15	-448.26	0.00
SR502	-626.57	765	3	0.0060	7.47	-622.83	0.02
SR503	-3518.37	7470	4	0.0215	150.98	-3442.88	0.00
SR504	-1762.21	6948	4	0.0962	338.88	-1592.77	0.00
SR505	-810.88	1485	4	0.0878	142.31	-739.72	0.00
SR507	-4666.52	5229	4	0.0487	454.3	-4439.37	0.00
SR510	-1431.78	1773	6	0.0536	153.6	-1354.97	0.00
SR525	-2146.67	3465	4	0.0188	80.85	-2106.24	0.00
SR530	-2849.41	6219	3	0.0489	278.93	-2709.95	0.00
SR532	-1835.85	1269	3	0.0029	10.64	-1830.53	0.00
SR539	-355.49	2223	5	0.3246	230.8	-240.09	0.00
SR542	-4681.87	11340	8	0.0372	348.14	-4507.80	0.00
SR543	-200.32	270	4	0.1961	78.55	-161.05	0.00
SR544	-584.74	396	4	0.0642	75.04	-547.23	0.00
SR548	-510.93	387	3	0.0082	8.38	-506.74	0.02
SR702	-562.43	504	4	0.055	61.91	-531.48	0.00
SR821	-696.25	3384	3	0.0061	8.45	-692.02	0.01
SR900	-802.04	3321	4	0.0802	128.57	-737.75	0.00
SR902	-622.29	981	3	0.0189	23.56	-610.51	0.00
SR903	-744.62	1638	4	0.0395	58.84	-715.20	0.00
SR906	-214.21	495	2	0.0000	0.00	-214.21	0.99
SR970	-594.67	693	3	0.0086	10.25	-589.55	0.01

Table C3.1 (continued): Model Comparison with and without Roadside Variables – Including Intersection Segments.

SR#	Restricted L-L	With roadside Vars.					
		Obs	# Parameters	R^2	chi^2	Log L-L	P
SR3	-6051.1	6525	11	0.0423	511.48	-5795.36	0.00
SR7	-3460.39	10215	11	0.0387	268.17	-3326.3	0.00
SR21	-1641.79	21456	4	0.0303	99.4	-1592.09	0.00
SR23	-635.19	5247	4	0.0104	13.19	-628.59	0.00
SR25	-2198.42	12483	7	0.0322	141.68	-2127.57	0.00
SR26	-4501.83	6732	5	0.0067	60.73	-4471.5	0.00
SR27	-2840.39	10593	10	0.0815	462.89	-2608.94	0.00
SR28	-3260.52	8739	7	0.0323	210.95	-3155.05	0.00
SR31	-479.15	4086	6	0.0315	30.17	-464.06	0.00
SR97	-13008.4	21600	10	0.0154	399.73	-12808.53	0.00
SR104	-2493.08	3141	5	0.0487	243.04	-2371.56	0.00
SR109	-2085.92	4788	13	0.0495	206.31	-1982.76	0.00
SR115	-261.24	342	6	0.1019	53.23	-234.62	0.00
SR123	-19.79	2268	2	0.0007	0.27	-19.66	0.60
SR125	-329.27	3159	5	0.0817	53.8	-302.37	0.00
SR127	-407.15	2835	3	0.0057	4.67	-405.41	0.10
SR129	-482.2	5886	4	0.0242	23.33	-470.53	0.00
SR153	-790.67	3366	4	0.0140	22.2	-779.57	0.00
SR155	-2457.14	7938	5	0.0131	64.37	-2424.96	0.00
SR160	-335.72	333	3	0.0402	26.97	-322.24	0.00
SR164	-1301.32	1944	8	0.106	275.95	-1163.34	0.00
SR165	-397.91	4302	4	0.0662	52.67	-371.57	0.00
SR169	-1532.97	3690	7	0.0349	107.15	-1479.39	0.00
SR172	-233.51	2682	3	0.0330	15.39	-225.81	0.00
SR173	-647.42	1260	5	0.0218	28.21	-633.31	0.00
SR174	-815.44	2673	4	0.0431	70.29	-780.3	0.00
SR202	-2803.67	5058	11	0.0797	446.71	-2580.32	0.00
SR203	-2596.53	4203	6	0.0207	107.47	-2542.8	0.00
SR206	-743.28	2601	4	0.0248	36.8	-724.88	0.00
SR215	-857.87	810	4	0.0617	105.84	-804.94	0.00
SR223	-432.85	585	4	0.0256	22.17	-421.76	0.00
SR240	-559.71	2538	3	0.1541	172.53	-473.45	0.00
SR241	-1043.56	2124	6	0.0381	79.51	-1003.81	0.00
SR260	-502.95	2547	4	0.0825	82.96	-461.47	0.00
SR261	-581.29	5166	5	0.0174	20.22	-571.18	0.00
SR270	-72.49	1413	2	0.3912	56.72	-44.13	0.00

Table C3.1 (continued): Model Comparison with and without Roadside Variables – Including Intersection Segments.

SR#	Restricted L-L	With roadside Vars.					
		Obs	# Parameters	R^2	chi^2	Log L-L	P
SR274	-22.14	243	2	0.0202	0.89	-21.70	0.34
SR290	-142.22	2340	2	0.1757	49.99	-117.23	0.00
SR302	-712.46	1980	5	0.1161	165.4	-629.75	0.00
SR305	-821.49	1503	5	0.0205	33.23	-795.87	0.00
SR307	-312.92	135	3	0.0509	31.84	-297.00	0.00
SR410	-3167.79	13734	7	0.0119	75.50	-3130.04	0.00
SR432	-61.62	855	2	0.5423	66.50	-28.07	0.00
SR500	-181.43	2007	2	0.2058	74.68	-144.09	0.00
SR501	-466.83	1008	4	0.0398	37.15	-448.26	0.00
SR502	-626.57	765	3	0.0060	7.47	-622.83	0.02
SR503	-3518.37	7470	4	0.0215	150.98	-3442.88	0.00
SR504	-1762.21	6948	5	0.0971	342.25	-1591.08	0.00
SR505	-810.88	1485	5	0.0897	145.39	-738.18	0.00
SR507	-4666.52	5229	11	0.0598	558.32	-4387.36	0.00
SR510	-1431.78	1773	8	0.0602	172.39	-1345.58	0.00
SR525	-2146.67	3465	7	0.0243	104.30	-2094.52	0.00
SR530	-2849.41	6219	5	0.0535	305.12	-2696.85	0.00
SR532	-1835.85	1269	6	0.0114	42.00	-1814.85	0.00
SR539	-355.49	2223	6	0.3406	242.16	-234.41	0.00
SR542	-4681.87	11340	9	0.0377	352.79	-4505.48	0.00
SR543	-200.32	270	5	0.2218	88.88	-155.88	0.00
SR544	-584.74	396	5	0.0674	78.80	-545.35	0.00
SR548	-510.93	387	5	0.0230	23.48	-499.19	0.00
SR702	-562.43	504	6	0.0803	90.33	-517.27	0.00
SR821	-696.25	3384	3	0.0061	8.45	-692.02	0.01
SR900	-802.04	3321	5	0.0829	132.99	-735.54	0.00
SR902	-622.29	981	6	0.0423	52.60	-595.99	0.00
SR903	-744.62	1638	4	0.0395	58.84	-715.20	0.00
SR906	-214.21	495	2	0.0000	0.00	-214.21	0.99
SR970	-594.67	693	3	0.0086	10.25	-589.55	0.01

Table C3.1 (continued): Model Comparison with and without Roadside Variables – Including Intersection Segments.

SR#	Restricted L-L	Percent Difference			
		# Parameters	R^2	chi^2	Log L-L
SR3	-6051.10	120.00%	44.37%	44.24%	-1.34%
SR7	-3460.39	120.00%	93.50%	93.78%	-1.91%
SR21	-1641.79	0.00%	0.00%	0.00%	0.00%
SR23	-635.19	33.33%	36.84%	36.40%	-0.28%
SR25	-2198.42	40.00%	9.52%	9.51%	-0.29%
SR26	-4501.83	150.00%	318.75%	322.62%	-0.52%
SR27	-2840.39	42.86%	5.98%	6.00%	-0.50%
SR28	-3260.52	75.00%	14.54%	14.67%	-0.43%
SR31	-479.15	100.00%	50.72%	50.70%	-1.08%
SR97	-13008.4	11.11%	4.05%	3.51%	-0.05%
SR104	-2493.08	0.00%	0.00%	0.00%	0.00%
SR109	-2085.92	160.00%	43.48%	43.18%	-1.54%
SR115	-261.24	20.00%	149.75%	149.67%	-6.37%
SR123	-19.79	0.00%	0.00%	0.00%	0.00%
SR125	-329.27	0.00%	0.00%	0.00%	0.00%
SR127	-407.15	50.00%	307.14%	295.76%	-0.43%
SR129	-482.20	0.00%	0.00%	0.00%	0.00%
SR153	-790.67	33.33%	52.17%	52.05%	-0.49%
SR155	-2457.14	66.67%	12.93%	13.19%	-0.15%
SR160	-335.72	0.00%	0.00%	0.00%	0.00%
SR164	-1301.32	60.00%	26.04%	26.07%	-2.39%
SR165	-397.91	0.00%	0.00%	0.00%	0.00%
SR169	-1532.97	40.00%	10.79%	11.06%	-0.36%
SR172	-233.51	0.00%	0.00%	0.00%	0.00%
SR173	-647.42	25.00%	16.58%	16.52%	-0.31%
SR174	-815.44	0.00%	0.00%	0.00%	0.00%
SR202	-2803.67	120.00%	27.93%	27.87%	-1.85%
SR203	-2596.53	50.00%	31.01%	30.71%	-0.49%
SR206	-743.28	33.33%	39.33%	39.39%	-0.71%
SR215	-857.87	0.00%	0.00%	0.00%	0.00%
SR223	-432.85	33.33%	19.63%	19.45%	-0.43%
SR240	-559.71	0.00%	0.00%	0.00%	0.00%
SR241	-1043.56	50.00%	40.59%	40.75%	-1.13%
SR260	-502.95	0.00%	0.00%	0.00%	0.00%
SR261	-581.29	66.67%	114.81%	115.11%	-0.94%
SR270	-72.49	0.00%	0.00%	0.00%	0.00%

Table C3.1 (continued): Model Comparison with and without Roadside Variables – Including Intersection Segments.

SR#	Restricted L-L	Percent Difference			
		# Parameters	R^2	chi^2	Log L-L
SR274	-22.14	0.00%	0.00%	0.00%	0.00%
SR290	-142.22	0.00%	0.00%	0.00%	0.00%
SR302	-712.46	66.67%	4.69%	4.71%	-0.59%
SR305	-821.49	0.00%	0.00%	0.00%	0.00%
SR307	-312.92	0.00%	0.00%	0.00%	0.00%
SR410	-3167.79	16.67%	33.71%	34.27%	-0.31%
SR432	-61.62	0.00%	0.00%	0.00%	0.00%
SR500	-181.43	0.00%	0.00%	0.00%	0.00%
SR501	-466.83	0.00%	0.00%	0.00%	0.00%
SR502	-626.57	0.00%	0.00%	0.00%	0.00%
SR503	-3518.37	0.00%	0.00%	0.00%	0.00%
SR504	-1762.21	25.00%	0.94%	0.99%	-0.11%
SR505	-810.88	25.00%	2.16%	2.16%	-0.21%
SR507	-4666.52	175.00%	22.79%	22.90%	-1.17%
SR510	-1431.78	33.33%	12.31%	12.23%	-0.69%
SR525	-2146.67	75.00%	29.26%	29.00%	-0.56%
SR530	-2849.41	66.67%	9.41%	9.39%	-0.48%
SR532	-1835.85	100.00%	293.10%	294.74%	-0.86%
SR539	-355.49	20.00%	4.93%	4.92%	-2.37%
SR542	-4681.87	12.50%	1.34%	1.34%	-0.05%
SR543	-200.32	25.00%	13.11%	13.15%	-3.21%
SR544	-584.74	25.00%	4.98%	5.01%	-0.34%
SR548	-510.93	66.67%	180.49%	180.19%	-1.49%
SR702	-562.43	50.00%	46.00%	45.91%	-2.67%
SR821	-696.25	0.00%	0.00%	0.00%	0.00%
SR900	-802.04	25.00%	3.37%	3.44%	-0.30%
SR902	-622.29	100.00%	123.81%	123.26%	-2.38%
SR903	-744.62	0.00%	0.00%	0.00%	0.00%
SR906	-214.21	0.00%	0.00%	0.00%	0.00%
SR970	-594.67	0.00%	0.00%	0.00%	0.00%

Appendix D: Traditional SPF and Advanced SPF for Individual Crash Types

Table D.1: SPF with LNADT and Length Offset: Roadside Crash Type

Variable	Description	Coeff.	S.E.	t-stat
Constant		-5.098	0.089	-57.195
LNADT	Log(AADT)	0.264	0.011	23.345
LENGTH	Segment Length	1.000	(Fixed Parameter)	
Alpha		22.425	0.320	70.176
Number of obs = 426546 Chi squared = 44402.74 Prob>chi2=0.000				
Restricted LL = -101234.9 Log likelihood = -77939.20				
Pseudo R^2 = 0.2217020				

Table D.2: SPF with LNADT, Length Offset and Route Dummies: Roadside Crash Type

Variable	Description	Coeff.	S.E.	t-stat
Constant		-3.872	0.10	-39.316
LNADT	Log(AADT)	0.100	0.01	8.163
LENGTH	Segment Length	1.000	(Fixed Parameter)	
SRN3	SR3 Dummy (1 if SR=3, 0 otherwise)	0.475	0.10	4.749
SRN7	SR7 Dummy (1 if SR=7, 0 otherwise)	0.261	0.07	3.495
SRN9	SR9 Dummy (1 if SR=9, 0 otherwise)	0.149	0.07	2.094
SRN11	SR11 Dummy (1 if SR=11, 0 otherwise)	-0.241	0.11	-2.290
SRN12	SR12 Dummy (1 if SR=12, 0 otherwise)	0.163	0.04	4.140
SRN21	SR21 Dummy (1 if SR=21, 0 otherwise)	-1.574	0.07	-22.235
SRN23	SR23 Dummy (1 if SR=23, 0 otherwise)	-0.899	0.12	-7.675
SRN25	SR25 Dummy (1 if SR=25, 0 otherwise)	-0.546	0.07	-7.631
SRN27	SR27 Dummy (1 if SR=27, 0 otherwise)	-0.373	0.08	-4.552
SRN31	SR31 Dummy (1 if SR=31, 0 otherwise)	-0.939	0.14	-6.577
SRN97	SR97 Dummy (1 if SR=97, 0 otherwise)	0.811	0.05	16.779
SRN104	SR104 Dummy (1 if SR=104, 0 otherwise)	0.638	0.15	4.197
SRN106	SR106 Dummy (1 if SR=106, 0 otherwise)	0.353	0.12	2.950
SRN124	SR124 Dummy (1 if SR=124, 0 otherwise)	0.366	0.06	5.989
SRN127	SR127 Dummy (1 if SR=172, 0 otherwise)	-0.570	0.14	-4.143
SRN129	SR129 Dummy (1 if SR=129, 0 otherwise)	-1.179	0.12	-9.699
SRN172	SR172 Dummy (1 if SR=172, 0 otherwise)	-1.382	0.22	-6.354
SRN195	SR195 Dummy (1 if SR=195, 0 otherwise)	0.853	0.08	10.081
SRN203	SR203 Dummy (1 if SR=203, 0 otherwise)	0.554	0.14	3.983
SRN211	SR211 Dummy (1 if SR=211, 0 otherwise)	0.438	0.20	2.193
SRN215	SR215 Dummy (1 if SR=215, 0 otherwise)	-2.396	1.10	-2.183
SRN231	SR231 Dummy (1 if SR=231, 0 otherwise)	-0.608	0.08	-7.448

Table D.2 (continued): SPF with LNADT, Length Offset and Route Dummies: Roadside Crash Type

Variable	Description	Coeff.	S.E.	t-stat
SRN241	SR241 Dummy (1 if SR=241, 0 otherwise)	0.658	0.15	4.367
SRN272	SR272 Dummy (1 if SR=272, 0 otherwise)	-0.740	0.17	-4.273
SRN290	SR290 Dummy (1 if SR=290, 0 otherwise)	-2.666	0.44	-6.017
SRN305	SR305 Dummy (1 if SR=305, 0 otherwise)	-1.265	0.32	-3.965
SRN395	SR395 Dummy (1 if SR=395, 0 otherwise)	-0.260	0.06	-4.293
SRN411	SR411 Dummy (1 if SR=411, 0 otherwise)	0.387	0.18	2.100
SRN507	SR507 Dummy (1 if SR=507, 0 otherwise)	0.734	0.13	5.623
SRN539	SR539 Dummy (1 if SR=539, 0 otherwise)	-1.513	0.23	-6.654
SRN542	SR542 Dummy (1 if SR=542, 0 otherwise)	0.489	0.06	7.748
SRN821	SR821 Dummy (1 if SR=821, 0 otherwise)	-0.344	0.12	-2.912
SRN906	SR906 Dummy (1 if SR=906, 0 otherwise)	0.908	0.25	3.688
SRN970	SR970 Dummy (1 if SR=970, 0 otherwise)	0.654	0.29	2.262
SR160544	SR160 & SR544 & SR274 Dummy (1 if SR=160 or 544 or 274, 0 otherwise)	-0.826	0.272	-3.040
SR115281	SR115 & SR281 Dummy (1 if SR=115 or 281, 0 otherwise)	0.678	0.183	3.710
SR502730	SR502 & SR730 Dummy (1 if SR=502 or 730, 0 otherwise)	0.573	0.260	2.210
SR432532	SR432 & SR532 Dummy (1 if SR=432 or 532, 0 otherwise)	-0.500	0.166	-3.010
SR123169	SR123 & SR169 Dummy (1 if SR=123 or 169, 0 otherwise)	-0.828	0.116	-7.160
SR261142	SR261 & SR142 Dummy (1 if SR=261 or 142, 0 otherwise)	-0.963	0.131	-7.330
SR26022	SR260 & SR22 Dummy (1 if SR=260 or 22, 0 otherwise)	-0.539	0.130	-4.166
SR294096	SR292 & SR409 & SR6 Dummy (1 if SR=292 or 409 or 6, 0 otherwise)	0.274	0.088	3.090
SR108109	SR108 & SR109 Dummy (1 if SR=108 or 109, 0 otherwise)	0.502	0.086	5.810
SR534105	SR534 & SR105 Dummy (1 if SR=534 or 105, 0 otherwise)	0.408	0.111	3.680
SR112150	SR112 & SR150 Dummy (1 if SR=112 or 150, 0 otherwise)	-0.161	0.061	-2.650
SR17107	SR17 & SR107 Dummy (1 if SR=17 or 107, 0 otherwise)	0.227	0.070	3.430
SR141221	SR141 & SR221 Dummy (1 if SR=141 or 221, 0 otherwise)	0.211	0.099	2.130
SR223243	SR223 & SR243 Dummy (1 if SR=223 or 243, 0 otherwise)	0.678	0.160	4.247
SR26702	SR26 & SR702 Dummy (1 if SR=26 or 702, 0 otherwise)	0.852	0.093	9.173
Alpha		19.943	0.295	67.705
Number of obs = 426546 Chi squared = 41556.21 Prob>chi2=0.000				
Restricted LL = -101234.9 Log likelihood = -76978.84				
Pseudo R^2 = 0.2125487				

Table D.3: SPF with LNADT, Length Offset and Roadway Geometrics: Roadside Crash Type

Variable	Description	Coeff.	S.E.	t-stat
Constant		-0.970	0.736	-1.319
LNADT	Log(AADT)	0.574	0.013	45.518
LENGTH	Segment Length	1.000	(Fixed Parameter)	
NLANEI	Number of lanes Increasing	-3.644	0.178	-20.487
NLANED	Number of lanes Decreasing	-2.365	0.707	-3.345
HCANG1	Horizontal Curve Central angle	0.001	0.000	4.669
A1	Algebraic difference in gradients	-0.038	0.004	-8.782
MK1	Rate of vertical curvature/5280	-0.296	0.062	-4.762
DGC1	Degree of Curvature	0.023	0.002	12.258
RLNW	Average Lane width	-0.038	0.009	-4.393
SWR4523	Shoulder width dummy (if shoulder width right is 4-5ft and shoulder width left is 2-3ft, value=1,else=0)	-0.440	0.088	-5.004
SWR8910	Shoulder width dummy (if shoulder width right is 8-9ft and shoulder width left is >10ft, value=1,else=0)	-0.571	0.249	-2.293
SWC19	Shoulder width dummy (if shoulder width center is >1ft and <9ft, value=1,else=0)	-2.360	0.391	-6.028
Alpha		18.079	0.261	69.368
Number of obs = 426546 Chi squared = 40297.01 Prob>chi2=0.000				
Restricted LL = -101234.9 Log likelihood = -75555.31				
Pseudo R^2 = 0.2105298				

Table D.4: SPF with LNADT, Length Offset, Roadway Geometrics and Route Dummies: Roadside Crash Type

Variable	Description	Coeff.	S.E.	t-stat
Constant		-0.231	0.70	-0.330
LNADT	Log(AADT)	0.477	0.01	33.416
LENGTH	Segment Length	1.000	(Fixed Parameter)	
NLANEI	Number of lanes Increasing	-3.558	0.19	-18.777
NLANED	Number of lanes Decreasing	-2.212	0.67	-3.321
A1	Algebraic difference in gradients	-0.032	0.00	-7.340
MK1	Rate of vertical curvature/5280	-0.474	0.05	-8.862
DGC1	Degree of Curvature	0.029	0.00	16.538
RLNW	Average Lane width	-0.064	0.01	-7.880
SWR4523	Shoulder width dummy (if shoulder width right is 4-5ft and shoulder width left is 2-3ft, value=1,else=0)	-0.416	0.09	-4.555
SWC19	Shoulder width dummy (if shoulder width center is >1ft and <9ft, value=1,else=0)	-2.339	0.43	-5.413
SRN3	SR3 Dummy (1 if SR=3, 0 otherwise)	0.279	0.12	2.33
SRN7	SR7 Dummy (1 if SR=7, 0 otherwise)	0.188	0.07	2.624
SRN11	SR11 Dummy (1 if SR=11, 0 otherwise)	-0.574	0.10	-5.751
SRN12	SR12 Dummy (1 if SR=12, 0 otherwise)	0.231	0.04	5.742
SRN17	SR17 Dummy (1 if SR=17, 0 otherwise)	0.350	0.07	5.193
SRN18	SR18 Dummy (1 if SR=18, 0 otherwise)	0.835	0.31	2.687
SRN21	SR21 Dummy (1 if SR=21, 0 otherwise)	-1.074	0.07	-15.088
SRN23	SR23 Dummy (1 if SR=23, 0 otherwise)	-0.406	0.11	-3.588
SRN25	SR25 Dummy (1 if SR=25, 0 otherwise)	-0.233	0.07	-3.340
SRN26	SR26 Dummy (1 if SR=26, 0 otherwise)	0.944	0.08	11.172
SRN27	SR27 Dummy (1 if SR=27, 0 otherwise)	-0.286	0.08	-3.386
SRN31	SR31 Dummy (1 if SR=31, 0 otherwise)	-0.672	0.14	-4.659
SRN97	SR97 Dummy (1 if SR=97, 0 otherwise)	0.623	0.04	13.959
SRN104	SR104 Dummy (1 if SR=104, 0 otherwise)	0.501	0.16	3.229
SRN112	SR112 Dummy (1 if SR=112, 0 otherwise)	-0.180	0.06	-2.953
SRN124	SR124 Dummy (1 if SR=124, 0 otherwise)	0.435	0.06	7.712
SRN129	SR129 Dummy (1 if SR=129, 0 otherwise)	-1.038	0.12	-8.791
SRN150	SR150 Dummy (1 if SR=150, 0 otherwise)	-0.723	0.15	-4.946
SRN172	SR172 Dummy (1 if SR=172, 0 otherwise)	-0.662	0.21	-3.111
SRN195	SR195 Dummy (1 if SR=195, 0 otherwise)	0.824	0.09	9.379
SRN202	SR202 Dummy (1 if SR=202, 0 otherwise)	-0.652	0.14	-4.801
SRN206	SR206 Dummy (1 if SR=206, 0 otherwise)	0.337	0.11	3.172
SRN211	SR211 Dummy (1 if SR=211, 0 otherwise)	0.459	0.18	2.518
SRN215	SR215 Dummy (1 if SR=215, 0 otherwise)	-2.689	1.10	-2.447
SRN231	SR231 Dummy (1 if SR=231, 0 otherwise)	-0.361	0.08	-4.557
SRN241	SR241 Dummy (1 if SR=241, 0 otherwise)	0.733	0.13	5.455

Table D.4 (continued): SPF with LNADT, Length Offset, Roadway Geometrics and Route Dummies: Roadside Crash Type

Variable	Description	Coeff.	S.E.	t-stat
SRN243	SR243 Dummy (1 if SR=243, 0 otherwise)	0.566	0.17	3.417
SRN271	SR271 Dummy (1 if SR=271, 0 otherwise)	0.447	0.22	2.051
SRN272	SR272 Dummy (1 if SR=272, 0 otherwise)	-0.413	0.18	-2.358
SRN290	SR290 Dummy (1 if SR=290, 0 otherwise)	-2.160	0.49	-4.451
SRN305	SR305 Dummy (1 if SR=305, 0 otherwise)	-1.978	0.31	-6.41
SRN395	SR395 Dummy (1 if SR=395, 0 otherwise)	0.260	0.08	3.278
SRN410	SR410 Dummy (1 if SR=410, 0 otherwise)	0.193	0.06	3.48
SRN504	SR504 Dummy (1 if SR=504, 0 otherwise)	-0.439	0.08	-5.807
SRN507	SR507 Dummy (1 if SR=507, 0 otherwise)	0.255	0.12	2.106
SRN542	SR542 Dummy (1 if SR=542, 0 otherwise)	0.366	0.06	6.202
SRN821	SR821 Dummy (1 if SR=821, 0 otherwise)	-0.288	0.11	-2.561
SRN906	SR906 Dummy (1 if SR=906, 0 otherwise)	1.387	0.25	5.453
SR160544	SR160 & SR544 & SR274 Dummy (1 if SR=160 or 544 or 274, 0 otherwise)	-0.996	0.27	-3.689
SR531543	SR531 & SR543 Dummy (1 if SR=531 or 543, 0 otherwise)	-0.574	0.28	-2.082
SR115281	SR115 & SR281 Dummy (1 if SR=115 or 281, 0 otherwise)	0.371	0.17	2.199
SR432532	SR432 & SR532 Dummy (1 if SR=432 or 532, 0 otherwise)	-0.580	0.20	-2.945
SR123169	SR123 & SR169 Dummy (1 if SR=123 or 169, 0 otherwise)	-1.034	0.13	-7.755
SR261142	SR261 & SR142 Dummy (1 if SR=261 or 142, 0 otherwise)	-0.519	0.13	-4.033
SR26022	SR260 & SR22 Dummy (1 if SR=260 or 22, 0 otherwise)	-0.314	0.12	-2.539
SR174508	SR174& SR508 Dummy (1 if SR=174 or 508, 0 otherwise)	0.180	0.08	2.149
SR108109	SR108 & SR109 Dummy (1 if SR=108 or 109, 0 otherwise)	0.237	0.08	2.848
SR534105	SR534 & SR105 Dummy (1 if SR=534 or 105, 0 otherwise)	0.313	0.10	3.078
Alpha		16.625	0.25	67.012
Number of obs = 426546 Chi squared = 38222.59 Prob>chi2=0.000				
Restricted LL = -101234.9 Log likelihood = -74875.05				
Pseudo R^2 = 0.2033412				

Table D.5: SPF with LNADT, Length Offset, Roadway Geometrics and Roadside Features: Roadside Crash Type

Variable	Description	Coeff.	S.E.	t-stat
Constant		-0.979	0.73	-1.343
LNADT	Log(AADT)	0.563	0.01	44.727
LENGTH	Segment Length	1.000	(Fixed Parameter)	
NLANEI	Number of lanes Increasing	-3.625	0.18	-20.441
NLANED	Number of lanes Decreasing	-2.330	0.70	-3.329
HCANG1	Horizontal Curve Central angle	0.001	0.00	5.152
A1	Algebraic difference in gradients	-0.036	0.00	-8.532
MK1	Rate of vertical curvature/5280	-0.280	0.06	-4.489

Table D.5 (continued): SPF with LNADT, Length Offset, Roadway Geometrics and Roadside Features: Roadside Crash Type

Variable	Description	Coeff.	S.E.	t-stat
DGC1	Degree of Curvature	0.024	0.00	13.11
RLNW	Average Lane width	-0.037	0.01	-4.289
SWR4523	Shoulder width dummy (if shoulder width right is 4-5ft and shoulder width left is 2-3ft, value=1,else=0)	-0.447	0.10	-4.449
SWR8910	Shoulder width dummy (if shoulder width right is 8-9ft and shoulder width left is >10ft, value=1,else=0)	-0.624	0.25	-2.463
SWC19	Shoulder width dummy (if shoulder width center is >1ft and <9ft, value=1,else=0)	-2.346	0.39	-6.026
LGRDRL80	Proportion of Guardrail on a segment is 70-80%	-0.855	0.31	-2.81
LGRDRL00	Proportion of Guardrail on a segment is 90-100%	-0.813	0.09	-8.69
LRDSLP00	Proportion of Roadside slope on a segment is 90-100%	-0.405	0.07	-5.515
LFENCE20	Proportion of Fence on a segment is 10-20%	-4.442	2.11	-2.107
LFENCE70	Proportion of Fence on a segment is 60-70%	-0.993	0.48	-2.091
LDITCH90	Proportion of Ditch on a segment is 80-90%	0.428	0.20	2.198
DCLVERT	Culvert Dummy variable (1 if Culvert exists, 0 otherwise)	0.595	0.19	4.635
LCLVERT	Culvert length on a segment	-2.118	0.42	-5.017
DDITCH	Ditch Dummy variable (1 if Ditch exists, 0 otherwise)	0.508	0.11	4.512
LDITCH	Ditch length on a segment	-0.740	0.13	-5.658
DGRDRAL	Guardrail Dummy variable (1 if Guardrail exists, 0 otherwise)	0.362	0.07	5.358
DMFXOBJ	Fixed Object Dummy variable (1 if Fixed Object exists, 0 otherwise)	0.223	0.09	2.604
DRDAPRC	Road approach Dummy variable (1 if Road approach exists, 0 otherwise)	-0.171	0.07	-2.366
DRDSLP	Road side slope Dummy variable (1 if Road side slope exists, 0 otherwise)	0.213	0.07	3.078
LRCHCRP	Rock out cropping length on a segment	-0.898	0.29	-3.135
DTREGRP	Tree group Dummy variable (1 if Tree group exists, 0 otherwise)	0.428	0.11	3.759
LTREGRP	Tree group length on a segment	-0.613	0.15	-4.074
Alpha		77.594	1.68	46.084
Number of obs = 426546 Chi squared = 39398.42 Prob>chi2=0.000				
Restricted LL = -101234.9 Log likelihood = -75344.68				
Pseudo R^2 = 0.2072643				

Table D.6: SPF with LNADT, Length Offset, Roadway Geometrics, Roadside Features and Route Dummies: Roadside Crash Type

Variable	Description	Coeff.	S.E.	t-stat
Constant		0.693	-0.38	0.700
LNADT	Log(AADT)	0.462	0.01	33.828
LENGTH	Segment Length	1.000	(Fixed Parameter)	
NLANEI	Number of lanes Increasing	-3.442	0.18	-19.589
NLANED	Number of lanes Decreasing	-2.167	0.66	-3.272
HCANG1	Horizontal Curve Central angle	0.000	0.00	2.105
A1	Algebraic difference in gradients	-0.031	0.00	-7.219
MK1	Rate of vertical curvature/5280	-0.468	0.05	-8.849
DGC1	Degree of Curvature	0.029	0.00	15.130
RLNW	Average Lane width	-0.067	0.01	-8.575
SWR4523	Shoulder width dummy (if shoulder width right is 4-5ft and shoulder width left is 2-3ft, value=1,else=0)	-0.401	0.10	-4.091
SWR8910	Shoulder width dummy (if shoulder width right is 8-9ft and shoulder width left is >10ft, value=1,else=0)	-0.449	0.23	-1.945
SWC19	Shoulder width dummy (if shoulder width center is >1ft and <9ft, value=1,else=0)	-2.341	0.43	-5.443
LGRDRL80	Proportion of Guardrail on a segment is 70-80%	-0.885	0.32	-2.800
LGRDRL00	Proportion of Guardrail on a segment is 90-100%	-0.818	0.09	-8.750
LRDSLP00	Proportion of Roadside slope on a segment is 90-100%	-0.427	0.07	-5.840
LFENCE20	Proportion of Fence on a segment is 10-20%	-4.161	2.04	-2.040
LFENCE70	Proportion of Fence on a segment is 60-70%	-0.981	0.48	-2.060
LDITCH90	Proportion of Ditch on a segment is 80-90%	0.421	0.19	2.200
DCLVERT	Culvert Dummy variable (1 if Culvert exists, 0 otherwise)	0.574	0.13	4.567
LCLVERT	Culvert length on a segment	-2.128	0.41	-5.230
DDITCH	Ditch Dummy variable (1 if Ditch exists, 0 otherwise)	0.453	0.11	4.041
LDITCH	Ditch length on a segment	-0.678	0.13	-5.231
DGRDRAL	Guardrail Dummy variable (1 if Guardrail exists, 0 otherwise)	0.406	0.07	6.042
DMFXOBJ	Fixed Object Dummy variable (1 if Fixed Object exists, 0 otherwise)	0.241	0.08	2.898
DRDAPRC	Road approach Dummy variable (1 if Road approach exists, 0 otherwise)	-0.167	0.07	-2.290
DRDSLP	Road side slope Dummy variable (1 if Road side slope exists, 0 otherwise)	0.204	0.07	2.955
LRCHCRP	Rock out cropping length on a segment	-0.941	0.29	-3.220
DTREGRP	Tree group Dummy variable (1 if Tree group exists, 0 otherwise)	0.437	0.11	3.929
LTREGRP	Tree group length on a segment	-0.557	0.15	-3.763
SRN3	SR3 Dummy (1 if SR=3, 0 otherwise)	0.289	0.12	2.445
SRN7	SR7 Dummy (1 if SR=7, 0 otherwise)	0.213	0.07	2.968

Table D.6 (continued): SPF with LNADT, Length Offset, Roadway Geometrics, Roadside Features and Route Dummies: Roadside Crash Type

Variable	Description	Coeff.	S.E.	t-stat
SRN11	SR11 Dummy (1 if SR=11, 0 otherwise)	-0.542	0.10	-5.441
SRN12	SR12 Dummy (1 if SR=12, 0 otherwise)	0.229	0.04	5.733
SRN21	SR21 Dummy (1 if SR=21, 0 otherwise)	-1.092	0.07	-15.475
SRN23	SR23 Dummy (1 if SR=23, 0 otherwise)	-0.442	0.12	-3.687
SRN25	SR25 Dummy (1 if SR=25, 0 otherwise)	-0.239	0.07	-3.427
SRN31	SR31 Dummy (1 if SR=31, 0 otherwise)	-0.663	0.15	-4.434
SRN97	SR97 Dummy (1 if SR=97, 0 otherwise)	0.618	0.04	14.088
SRN104	SR104 Dummy (1 if SR=104, 0 otherwise)	0.546	0.15	3.56
SRN124	SR124 Dummy (1 if SR=124, 0 otherwise)	0.454	0.06	8.046
SRN129	SR129 Dummy (1 if SR=129, 0 otherwise)	-0.981	0.12	-8.151
SRN172	SR172 Dummy (1 if SR=172, 0 otherwise)	-0.673	0.21	-3.173
SRN195	SR195 Dummy (1 if SR=195, 0 otherwise)	0.856	0.09	9.882
SRN211	SR211 Dummy (1 if SR=211, 0 otherwise)	0.432	0.18	2.356
SRN215	SR215 Dummy (1 if SR=215, 0 otherwise)	-2.651	1.10	-2.417
SRN231	SR231 Dummy (1 if SR=231, 0 otherwise)	-0.359	0.08	-4.486
SRN241	SR241 Dummy (1 if SR=241, 0 otherwise)	0.762	0.13	5.690
SRN272	SR272 Dummy (1 if SR=272, 0 otherwise)	-0.416	0.17	-2.384
SRN290	SR290 Dummy (1 if SR=290, 0 otherwise)	-2.127	0.49	-4.359
SRN305	SR305 Dummy (1 if SR=305, 0 otherwise)	-1.911	0.31	-6.211
SRN395	SR395 Dummy (1 if SR=395, 0 otherwise)	0.255	0.08	3.266
SRN542	SR542 Dummy (1 if SR=542, 0 otherwise)	0.376	0.06	6.222
SRN821	SR821 Dummy (1 if SR=821, 0 otherwise)	-0.276	0.11	-2.469
SRN906	SR906 Dummy (1 if SR=906, 0 otherwise)	1.410	0.25	5.614
SR160544	SR160 & SR544 & SR274 Dummy (1 if SR=160 or 544 or 274, 0 otherwise)	-0.933	0.27	-3.510
SR115281	SR115 & SR281 Dummy (1 if SR=115 or 281, 0 otherwise)	0.441	0.18	2.470
SR432532	SR432 & SR532 Dummy (1 if SR=432 or 532, 0 otherwise)	-0.583	0.20	-2.910
SR123169	SR123 & SR169 Dummy (1 if SR=123 or 169, 0 otherwise)	-1.032	0.14	-7.560
SR261142	SR261 & SR142 Dummy (1 if SR=261 or 142, 0 otherwise)	-0.525	0.13	-4.080
SR26022	SR260 & SR22 Dummy (1 if SR=260 or 22, 0 otherwise)	-0.326	0.12	-2.649
SR108109	SR108 & SR109 Dummy (1 if SR=108 or 109, 0 otherwise)	0.230	0.08	2.770
SR534105	SR534 & SR105 Dummy (1 if SR=534 or 105, 0 otherwise)	0.278	0.10	2.740
SR112150	SR112 & SR150 Dummy (1 if SR=112 or 150, 0 otherwise)	-0.257	0.06	-4.56

Table D.6 (continued): SPF with LNADT, Length Offset, Roadway Geometrics, Roadside Features and Route Dummies: Roadside Crash Type

Variable	Description	Coeff.	S.E.	t-stat
SR17107	SR17 & SR107 Dummy (1 if SR=17 or 107, 0 otherwise)	0.317	0.06	4.993
SR141221	SR141 & SR221 Dummy (1 if SR=141 or 221, 0 otherwise)	0.215	0.09	2.370
SR223243	SR223 & SR243 Dummy (1 if SR=223 or 243, 0 otherwise)	0.496	0.14	3.556
SR26702	SR26 & SR702 Dummy (1 if SR=26 or 702, 0 otherwise)	0.909	0.08	11.262
Alpha		16.329	0.24	66.950
Number of obs = 426546 Chi squared = 37694.94 Prob>chi2=0.000				
Restricted LL = -101234.9 Log likelihood = -74728.37				
Pseudo R^2 = 0.2014139				

Table D.7: SPF with LNADT and Length Offset: Roadway Crash Type

Variable	Description	Coeff.	S.E.	t-stat
Constant		-8.849	0.125	-70.698
LNADT	Log(AADT)	0.754	0.016	46.780
LENGTH	Segment Length	1.000	(Fixed Parameter)	
Alpha		52.420	0.761	68.840
Number of obs = 426546 Chi squared = 130165.5 Prob>chi2=0.000				
Restricted LL = -143509.3 Log likelihood = -71795.80				
Pseudo R^2 = 0.4754781				

Table D.8: SPF with LNADT, Length Offset and Route Dummies: Roadway Crash Type

Variable	Description	Coeff.	S.E.	t-stat
Constant		-7.796	0.144	-54.235
LNADT	Log(AADT)	0.608	0.018	33.863
LENGTH	Segment Length	1.000	(Fixed Parameter)	
SRN3	SR3 Dummy (1 if SR=3, 0 otherwise)	0.917	0.179	5.114
SRN11	SR11 Dummy (1 if SR=11, 0 otherwise)	-0.351	0.113	-3.097
SRN12	SR12 Dummy (1 if SR=12, 0 otherwise)	0.332	0.054	6.128
SRN18	SR18 Dummy (1 if SR=18, 0 otherwise)	-0.370	0.163	-2.273
SRN21	SR21 Dummy (1 if SR=21, 0 otherwise)	-1.131	0.091	-12.433
SRN23	SR23 Dummy (1 if SR=23, 0 otherwise)	-0.859	0.179	-4.806
SRN25	SR25 Dummy (1 if SR=25, 0 otherwise)	-0.374	0.088	-4.228
SRN26	SR26 Dummy (1 if SR=26, 0 otherwise)	1.053	0.148	7.116
SRN31	SR31 Dummy (1 if SR=31, 0 otherwise)	-1.179	0.212	-5.550
SRN97	SR97 Dummy (1 if SR=97, 0 otherwise)	0.713	0.089	8.047
SRN104	SR104 Dummy (1 if SR=104, 0 otherwise)	1.374	0.369	3.724
SRN112	SR112 Dummy (1 if SR=112, 0 otherwise)	-0.306	0.076	-4.054
SRN124	SR124 Dummy (1 if SR=124, 0 otherwise)	0.939	0.188	5.005
SRN129	SR129 Dummy (1 if SR=129, 0 otherwise)	-0.956	0.149	-6.403
SRN172	SR172 Dummy (1 if SR=172, 0 otherwise)	-1.064	0.322	-3.304

Table D.8 (continued): SPF with LNADT, Length Offset and Route Dummies: Roadway Crash Type

Variable	Description	Coeff.	S.E.	t-stat
SRN195	SR195 Dummy (1 if SR=195, 0 otherwise)	0.341	0.124	2.756
SRN206	SR206 Dummy (1 if SR=206, 0 otherwise)	0.501	0.118	4.263
SRN231	SR231 Dummy (1 if SR=231, 0 otherwise)	-0.387	0.110	-3.516
SRN243	SR243 Dummy (1 if SR=243, 0 otherwise)	0.660	0.315	2.097
SRN272	SR272 Dummy (1 if SR=272, 0 otherwise)	-1.042	0.339	-3.074
SRN290	SR290 Dummy (1 if SR=290, 0 otherwise)	-1.791	0.164	-10.913
SRN395	SR395 Dummy (1 if SR=395, 0 otherwise)	0.461	0.089	5.210
SRN504	SR504 Dummy (1 if SR=504, 0 otherwise)	-0.548	0.128	-4.294
SRN507	SR507 Dummy (1 if SR=507, 0 otherwise)	0.655	0.215	3.049
SRN542	SR542 Dummy (1 if SR=542, 0 otherwise)	0.517	0.072	7.188
SRN906	SR906 Dummy (1 if SR=906, 0 otherwise)	1.214	0.479	2.532
SR160544	SR160 & SR544 & SR274 Dummy (1 if SR=160 or 544 or 274, 0 otherwise)	-1.458	0.580	-2.492
SR531543	SR531 & SR543 Dummy (1 if SR=531 or 543, 0 otherwise)	0.850	0.400	2.121
SR432532	SR432 & SR532 Dummy (1 if SR=432 or 532, 0 otherwise)	1.073	0.360	3.007
SR123169	SR123 & SR169 Dummy (1 if SR=123 or 169, 0 otherwise)	-0.532	0.140	-3.692
SR261142	SR261 & SR142 Dummy (1 if SR=261 or 142, 0 otherwise)	-0.670	0.150	-4.491
SR108109	SR108 & SR109 Dummy (1 if SR=108 or 109, 0 otherwise)	0.288	0.140	2.064
Alpha		49.173	0.730	67.070
Number of obs = 426546 Chi squared = 123817.7 Prob>chi2=0.000				
Restricted LL = -143509.3 Log likelihood = -71331.9				
Pseudo R^2 = 0.4646390				

Table D.9: SPF with LNADT, Length Offset and Roadway Geometrics: Roadway Crash Type

Variable	Description	Coeff.	S.E.	t-stat
Constant		-6.748	0.12	-56.51
LNADT	Log(AADT)	0.999	0.02	58.312
LENGTH	Segment Length	1.000	(Fixed Parameter)	
AVGLANEN	Average Number of Lanes, (nlanei+nlaned)/2	-4.614	0.08	-60.18
HCANG1	Horizontal Curve Central angle	-0.0005	0.00	-3.105
A1	Algebraic difference in gradients	-0.017	0.01	-3.151
MK1	Rate of vertical curvature/5280	-0.312	0.08	-3.675
DGC1	Degree of Curvature	0.004	0.00	2.482
RLNW	Average Lane width	0.064	0.01	5.806
SWR2367	Shoulder width dummy (if shoulder width right is 2-3ft and shoulder width left is 6-7ft, value=1,else=0)	-0.723	0.27	-2.659
SWR8901	Shoulder width dummy (if shoulder width right is 8-9ft and shoulder width left is 0-1ft, value=1,else=0)	-0.721	0.30	-2.446
SWR8910	Shoulder width dummy (if shoulder width right is 8-9ft and shoulder width left is >10ft, value=1,else=0)	-0.477	0.21	-2.224
SWR1001	Shoulder width dummy (if shoulder width right is >10ft and shoulder width left is 0-1ft, value=1,else=0)	-2.524	0.95	-2.646
SWR1023	Shoulder width dummy (if shoulder width right is >10ft and shoulder width left is 2-3ft, value=1,else=0)	-1.792	0.60	-2.969
SWC19	Shoulder width dummy (if shoulder width center is >1ft and <9ft, value=1,else=0)	-2.988	0.19	-15.783
Alpha		40.693	0.58	69.761
Number of obs = 426546 Chi squared = 113365.8 Prob>chi2=0.000				
Restricted LL = -143509.3 Log likelihood = -69841.87				
Pseudo R^2 = 0.4479984				

Table D.10: SPF with LNADT, Length Offset, Roadway Geometrics and Route Dummies: Roadway Crash Type

Variable	Description	Coeff.	S.E.	t-stat
Constant		-6.25	0.127	-49.001
LNADT	Log(AADT)	0.95	0.018	53.297
LENGTH	Segment Length	1.000	(Fixed Parameter)	
AVGLANEN	Average Number of Lanes, (nlanei+nlaned)/2	-4.47	0.09	-50.918
HCANG1	Horizontal Curve Central angle	0.00	0.0002	-6.736
A1	Algebraic difference in gradients	-0.01	0.005	-2.237
MK1	Rate of vertical curvature/5280	-0.40	0.067	-5.957
DGC1	Degree of Curvature	0.01	0.002	5.064
RLNW	Average Lane width	0.03	0.011	2.365
SWR2367	Shoulder width dummy (if shoulder width right is 2-3ft and shoulder width left is 6-7ft, value=1,else=0)	-0.66	0.261	-2.529
SWR8901	Shoulder width dummy (if shoulder width right is 8-9ft and shoulder width left is 0-1ft, value=1,else=0)	-0.56	0.278	-1.999
SWR8910	Shoulder width dummy (if shoulder width right is 8-9ft and shoulder width left is >10ft, value=1,else=0)	-0.49	0.237	-2.053
SWR1001	Shoulder width dummy (if shoulder width right is >10ft and shoulder width left is 0-1ft, value=1,else=0)	-2.26	0.951	-2.381
SWR1023	Shoulder width dummy (if shoulder width right is >10ft and shoulder width left is 2-3ft, value=1,else=0)	-1.63	0.579	-2.818
SWC19	Shoulder width dummy (if shoulder width center is >1ft and <9ft, value=1,else=0)	-3.15	0.310	-10.181
SRN3	SR3 Dummy (1 if SR=3, 0 otherwise)	0.63	0.202	3.096
SRN11	SR11 Dummy (1 if SR=11, 0 otherwise)	-0.44	0.098	-4.465
SRN12	SR12 Dummy (1 if SR=12, 0 otherwise)	0.62	0.052	11.858
SRN17	SR17 Dummy (1 if SR=17, 0 otherwise)	0.23	0.091	2.508
SRN21	SR21 Dummy (1 if SR=21, 0 otherwise)	-0.56	0.085	-6.555
SRN23	SR23 Dummy (1 if SR=23, 0 otherwise)	-0.38	0.167	-2.264
SRN26	SR26 Dummy (1 if SR=26, 0 otherwise)	1.14	0.119	9.628
SRN31	SR31 Dummy (1 if SR=31, 0 otherwise)	-0.88	0.202	-4.364
SRN97	SR97 Dummy (1 if SR=97, 0 otherwise)	0.55	0.074	7.498
SRN104	SR104 Dummy (1 if SR=104, 0 otherwise)	1.06	0.301	3.527
SRN112	SR112 Dummy (1 if SR=112, 0 otherwise)	-0.22	0.067	-3.305
SRN124	SR124 Dummy (1 if SR=124, 0 otherwise)	0.99	0.152	6.494
SRN129	SR129 Dummy (1 if SR=129, 0 otherwise)	-0.60	0.144	-4.152
SRN195	SR195 Dummy (1 if SR=195, 0 otherwise)	0.27	0.123	2.212

Table D.10 (continued): SPF with LNADT, Length Offset, Roadway Geometrics and Route Dummies: Roadway Crash Type

Variable	Description	Coeff.	S.E.	t-stat
SRN206	SR206 Dummy (1 if SR=206, 0 otherwise)	0.65	0.115	5.621
SRN221	SR221 Dummy (1 if SR=221, 0 otherwise)	0.38	0.172	2.196
SRN290	SR290 Dummy (1 if SR=290, 0 otherwise)	-1.24	0.266	-4.667
SRN395	SR395 Dummy (1 if SR=395, 0 otherwise)	0.87	0.126	6.862
SRN504	SR504 Dummy (1 if SR=504, 0 otherwise)	-0.57	0.117	-4.905
SRN510	SR510 Dummy (1 if SR=510, 0 otherwise)	-0.62	0.294	-2.102
SRN542	SR542 Dummy (1 if SR=542, 0 otherwise)	0.56	0.060	9.356
SRN906	SR906 Dummy (1 if SR=906, 0 otherwise)	1.63	0.427	3.817
SR160544	SR160 & SR544 & SR274 Dummy (1 if SR=160 or 544 or 274, 0 otherwise)	-1.80	0.530	-3.400
SR123169	SR123 & SR169 Dummy (1 if SR=123 or 169, 0 otherwise)	-0.76	0.170	-4.578
Alpha		38.676	0.567	68.157
Number of obs = 426546 Chi squared = 109346.1 Prob>chi2=0.000				
Restricted LL = -143509.3 Log likelihood = -69436.99				
Pseudo R^2 = 0.4405208				

Table D.11: SPF with LNADT, Length Offset, Roadway Geometrics and Roadside Features: Roadway Crash Type

Variable	Description	Coeff.	S.E.	t-stat
Constant		-6.760	0.119	-56.782
LNADT	Log(AADT)	0.990	0.017	58.452
LENGTH	Segment Length	1.000	(Fixed Parameter)	
AVGLANEN	Average Number of Lanes, (nlanei+nlaned)/2	-4.589	0.076	-60.225
HCANG1	Horizontal Curve Central angle	0.000	0.0002	-2.846
A1	Algebraic difference in gradients	-0.014	0.006	-2.487
MK1	Rate of vertical curvature/5280	-0.296	0.086	-3.425
DGC1	Degree of Curvature	0.006	0.002	3.247
RLNW	Average Lane width	0.068	0.011	6.199
SWR2367	Shoulder width dummy (if shoulder width right is 2-3ft and shoulder width left is 6-7ft, value=1,else=0)	-0.687	0.269	-2.556
SWR8901	Shoulder width dummy (if shoulder width right is 8-9ft and shoulder width left is 0-1ft, value=1,else=0)	-0.737	0.290	-2.539
SWR8910	Shoulder width dummy (if shoulder width right is 8-9ft and shoulder width left is >10ft, value=1,else=0)	-0.467	0.216	-2.162
SWR1001	Shoulder width dummy (if shoulder width right is >10ft and shoulder width left is 0-1ft, value=1,else=0)	-2.654	1.037	-2.558
SWR1023	Shoulder width dummy (if shoulder width right is >10ft and shoulder width left is 2-3ft, value=1,else=0)	-1.753	0.606	-2.893
SWC19	Shoulder width dummy (if shoulder width center is >1ft and <9ft, value=1,else=0)	-2.974	0.188	-15.832
LGRDRL70	Proportion of Guardrail on a segment is 60-70%	-0.981	0.412	-2.382
LGRDRL00	Proportion of Guardrail on a segment is 90-100%	-0.764	0.115	-6.628
LBRDRL00	Proportion of Bridge rail on a segment is 90-100%	-0.396	0.159	-2.496
LFENCE30	Proportion of Fence on a segment is 20-30%	2.289	1.254	1.826
LCVT4060	Proportion of Culvert on a segment is 40-60%	-2.052	0.874	-2.349
LTRGRP50	Proportion of Tree group on a segment is 40-50%	-0.968	0.615	-1.573
LTRGRP00	Proportion of Tree group on a segment is 90-100%	-0.811	0.144	-5.648
LDITCH00	Proportion of Ditch on a segment is 90-100%	-0.462	0.066	-7.032

Table D.11 (continued): SPF with LNADT, Length Offset, Roadway Geometrics and Roadside Features: Roadway Crash Type

Variable	Description	Coeff.	S.E.	t-stat
DCLVERT	Culvert Dummy variable (1 if Culvert exists, 0 otherwise)	0.360	0.130	2.770
DGRDRAL	Guardrail Dummy variable (1 if Guardrail exists, 0 otherwise)	0.317	0.095	3.316
DMALBOX	Mailbox Dummy variable (1 if Mailbox exists, 0 otherwise)	0.362	0.157	2.298
DMFXOBJ	Fixed Object Dummy variable (1 if Fixed Object exists, 0 otherwise)	0.402	0.115	3.486
DTREGRP	Tree Group Dummy variable (1 if Tree Group exists, 0 otherwise)	0.317	0.101	3.134
Alpha		40.009	0.573	69.807
Number of obs = 426546 Chi squared = 111556.2 Prob>chi2=0.000				
Restricted LL = -143509.3 Log likelihood = -69724.67				
Pseudo R^2 = 0.4444372				

Table D.12: SPF with LNADT, Length Offset, Roadway Geometrics, Roadside Features and Route Dummies: Roadway Crash Type

Variable	Description	Coeff.	S.E.	t-stat
Constant		-6.017	0.117	-51.255
LNADT	Log(AADT)	0.963	0.018	54.636
LENGTH	Segment Length	1.000	(Fixed Parameter)	
AVGLANEN	Average Number of Lanes, (nlanei+nlaned)/2	-4.490	0.079	-57.001
HCANG1	Horizontal Curve Central angle	-0.001	0.000	-6.469
MK1	Rate of vertical curvature/5280	-0.387	0.065	-5.943
DGC1	Degree of Curvature	0.012	0.002	5.912
SWR2367	Shoulder width dummy (if shoulder width right is 2-3ft and shoulder width left is 6-7ft, value=1,else=0)	-0.642	0.258	-2.490
SWR8901	Shoulder width dummy (if shoulder width right is 8-9ft and shoulder width left is 0-1ft, value=1,else=0)	-0.615	0.276	-2.230
SWR1001	Shoulder width dummy (if shoulder width right is >10ft and shoulder width left is 0-1ft, value=1,else=0)	-2.299	1.069	-2.152
SWR1023	Shoulder width dummy (if shoulder width right is >10ft and shoulder width left is 2-3ft, value=1,else=0)	-1.537	0.578	-2.661
SWC19	Shoulder width dummy (if shoulder width center is >1ft and <9ft, value=1,else=0)	-3.123	0.307	-10.178
LGRDRL70	Proportion of Guardrail on a segment is 60-70%	-1.136	0.416	-2.727
LGRDRL00	Proportion of Guardrail on a segment is 90-100%	-0.803	0.115	-6.968
LCVT4060	Proportion of Culvert on a segment is 40-60%	-1.821	0.822	-2.216
LTRGRP00	Proportion of Tree group on a segment is 90-100%	-0.655	0.138	-4.739
LDITCH00	Proportion of Ditch on a segment is 90-100%	-0.461	0.065	-7.085
DCLVERT	Culvert Dummy variable (1 if Culvert exists, 0 otherwise)	0.342	0.136	2.510
DGRDRAL	Guardrail Dummy variable (1 if Guardrail exists, 0 otherwise)	0.430	0.097	4.432
DMALBOX	Mailbox Dummy variable (1 if Mailbox exists, 0 otherwise)	0.382	0.158	2.415
DMFXOBJ	Fixed Object Dummy variable (1 if Fixed Object exists, 0 otherwise)	0.356	0.108	3.283
DTREGRP	Tree Group Dummy variable (1 if Tree Group exists, 0 otherwise)	0.249	0.095	2.632

Table D.12 (continued): SPF with LNADT, Length Offset, Roadway Geometrics, Roadside Features and Route Dummies: Roadway Crash Type

Variable	Description	Coeff.	S.E.	t-stat
SRN3	SR3 Dummy (1 if SR=3, 0 otherwise)	0.558	0.196	2.843
SRN9	SR9 Dummy (1 if SR=9, 0 otherwise)	-0.306	0.074	-4.109
SRN11	SR11 Dummy (1 if SR=11, 0 otherwise)	-0.442	0.096	-4.594
SRN12	SR12 Dummy (1 if SR=12, 0 otherwise)	0.596	0.056	10.649
SRN17	SR17 Dummy (1 if SR=17, 0 otherwise)	0.240	0.090	2.668
SRN21	SR21 Dummy (1 if SR=21, 0 otherwise)	-0.569	0.085	-6.691
SRN22	SR22 Dummy (1 if SR=22, 0 otherwise)	1.165	0.302	3.855
SRN23	SR23 Dummy (1 if SR=23, 0 otherwise)	-0.333	0.164	-2.030
SRN26	SR26 Dummy (1 if SR=26, 0 otherwise)	1.155	0.116	9.992
SRN27	SR27 Dummy (1 if SR=27, 0 otherwise)	0.375	0.072	5.169
SRN31	SR31 Dummy (1 if SR=31, 0 otherwise)	-0.848	0.201	-4.211
SRN97	SR97 Dummy (1 if SR=97, 0 otherwise)	0.556	0.072	7.669
SRN104	SR104 Dummy (1 if SR=104, 0 otherwise)	1.081	0.297	3.641
SRN112	SR112 Dummy (1 if SR=112, 0 otherwise)	-0.226	0.066	-3.427
SRN124	SR124 Dummy (1 if SR=124, 0 otherwise)	1.012	0.149	6.782
SRN129	SR129 Dummy (1 if SR=129, 0 otherwise)	-0.620	0.150	-4.143
SRN195	SR195 Dummy (1 if SR=195, 0 otherwise)	0.292	0.120	2.442
SRN202	SR202 Dummy (1 if SR=202, 0 otherwise)	-0.406	0.179	-2.264
SRN203	SR203 Dummy (1 if SR=203, 0 otherwise)	-0.562	0.160	-3.501
SRN206	SR206 Dummy (1 if SR=206, 0 otherwise)	0.641	0.106	6.046
SRN221	SR221 Dummy (1 if SR=221, 0 otherwise)	0.391	0.169	2.305
SRN290	SR290 Dummy (1 if SR=290, 0 otherwise)	-1.206	0.264	-4.570
SRN395	SR395 Dummy (1 if SR=395, 0 otherwise)	0.892	0.120	7.439
SRN504	SR504 Dummy (1 if SR=504, 0 otherwise)	-0.585	0.116	-5.063
SRN542	SR542 Dummy (1 if SR=542, 0 otherwise)	0.523	0.060	8.738
SRN706	SR706 Dummy (1 if SR=706, 0 otherwise)	0.575	0.123	4.682
SRN904	SR904 Dummy (1 if SR=904, 0 otherwise)	0.690	0.297	2.324
SRN906	SR906 Dummy (1 if SR=906, 0 otherwise)	1.687	0.424	3.975
SR123169	SR123 & SR169 Dummy (1 if SR=123 or 169, 0 otherwise)	-0.841	0.170	-4.950
SR26022	SR260 & SR22 Dummy (1 if SR=260 or 22, 0 otherwise)	-0.878	0.226	-3.885
SR153900	SR153 & SR900 Dummy (1 if SR=153 or 900, 0 otherwise)	-0.326	0.120	-2.724
Alpha		37.862	0.563	67.301
Number of obs = 426546 Chi squared = 106962.6 Prob>chi2=0.000				
Restricted LL = -143509.3 Log likelihood = -69300.41				
Pseudo R^2 = 0.4355803				

Table D.13: SPF with LNADT and Length Offset: PDO Crash Type

Variable	Description	Coeff.	S.E.	t-stat
Constant		-7.015	0.093	-75.574
LNADT	Log(AADT)	0.525	0.012	44.875
LENGTH	Segment Length	1.000	(Fixed Parameter)	
Alpha		29.486	0.395	74.738
Number of obs = 426546 Chi squared = 79741.81 Prob>chi2=0.000				
Restricted LL = -125656.0 Log likelihood = -82237.88				
Pseudo R^2 = 0.3265195				

Table D.14: SPF with LNADT, Length Offset and Route Dummies: PDO Crash Type

Variable	Description	Coeff.	S.E.	t-stat
Constant		-5.931	0.104	-56.948
LNADT	Log(AADT)	0.377	0.013	29.844
LENGTH	Segment Length	1.000	(Fixed Parameter)	
SRN3	SR3 Dummy (1 if SR=3, 0 otherwise)	0.828	0.114	7.242
SRN11	SR11 Dummy (1 if SR=11, 0 otherwise)	-0.394	0.089	-4.451
SRN12	SR12 Dummy (1 if SR=12, 0 otherwise)	0.376	0.041	9.244
SRN14	SR14 Dummy (1 if SR=14, 0 otherwise)	0.110	0.054	2.018
SRN21	SR21 Dummy (1 if SR=21, 0 otherwise)	-1.548	0.087	-17.871
SRN23	SR23 Dummy (1 if SR=23, 0 otherwise)	-0.651	0.122	-5.325
SRN25	SR25 Dummy (1 if SR=25, 0 otherwise)	-0.493	0.079	-6.270
SRN26	SR26 Dummy (1 if SR=26, 0 otherwise)	1.079	0.115	9.375
SRN31	SR31 Dummy (1 if SR=31, 0 otherwise)	-1.179	0.195	-6.043
SRN97	SR97 Dummy (1 if SR=97, 0 otherwise)	0.816	0.063	12.951
SRN112	SR112 Dummy (1 if SR=112, 0 otherwise)	-0.411	0.075	-5.509
SRN124	SR124 Dummy (1 if SR=124, 0 otherwise)	0.683	0.121	5.623
SRN127	SR127 Dummy (1 if SR=127, 0 otherwise)	-1.302	0.213	-6.128
SRN129	SR129 Dummy (1 if SR=129, 0 otherwise)	-0.998	0.121	-8.221
SRN141	SR141 Dummy (1 if SR=141, 0 otherwise)	0.364	0.179	2.033
SRN155	SR155 Dummy (1 if SR=155, 0 otherwise)	-0.196	0.087	-2.267
SRN161	SR161 Dummy (1 if SR=161, 0 otherwise)	-0.563	0.132	-4.269
SRN172	SR172 Dummy (1 if SR=172, 0 otherwise)	-1.551	0.318	-4.878
SRN195	SR195 Dummy (1 if SR=195, 0 otherwise)	0.596	0.089	6.705
SRN206	SR206 Dummy (1 if SR=206, 0 otherwise)	0.304	0.132	2.305
SRN231	SR231 Dummy (1 if SR=231, 0 otherwise)	-0.699	0.100	-7.015
SRN241	SR241 Dummy (1 if SR=241, 0 otherwise)	0.489	0.180	2.724
SRN243	SR243 Dummy (1 if SR=243, 0 otherwise)	0.624	0.233	2.674
SRN272	SR272 Dummy (1 if SR=272, 0 otherwise)	-0.516	0.210	-2.458
SRN290	SR290 Dummy (1 if SR=290, 0 otherwise)	-1.783	0.203	-8.794
SRN305	SR305 Dummy (1 if SR=305, 0 otherwise)	0.528	0.197	2.680

Table D.14 (continued): SPF with LNADT, Length Offset and Route Dummies: PDO Crash Type

Variable	Description	Coeff.	S.E.	t-stat
SRN395	SR395 Dummy (1 if SR=395, 0 otherwise)	0.252	0.059	4.305
SRN504	SR504 Dummy (1 if SR=504, 0 otherwise)	-0.580	0.089	-6.494
SRN507	SR507 Dummy (1 if SR=507, 0 otherwise)	0.571	0.129	4.410
SRN539	SR539 Dummy (1 if SR=539, 0 otherwise)	-1.430	0.144	-9.956
SRN542	SR542 Dummy (1 if SR=542, 0 otherwise)	0.668	0.057	11.712
SR502730	SR502 & SR730 Dummy (1 if SR=502 or 730, 0 otherwise)	0.819	0.290	2.828
SR432532	SR432 & SR532 Dummy (1 if SR=432 or 532, 0 otherwise)	0.883	0.200	4.410
SR123169	SR123 & SR169 Dummy (1 if SR=123 or 169, 0 otherwise)	-0.713	0.116	-6.174
SR261142	SR261 & SR142 Dummy (1 if SR=261 or 142, 0 otherwise)	-0.698	0.130	-5.356
SR108109	SR108 & SR109 Dummy (1 if SR=108 or 109, 0 otherwise)	0.372	0.102	3.635
SR534105	SR534 & SR105 Dummy (1 if SR=534 or 105, 0 otherwise)	0.315	0.126	2.495
Alpha		26.823	0.366	73.190
Number of obs = 426546 Chi squared = 75461.25 Prob>chi2=0.000				
Restricted LL = -125656.0 Log likelihood = -81390.39				
Pseudo R^2 = 0.3167419				

Table D.15: SPF with LNADT, Length Offset and Roadway Geometrics: PDO Crash Type

Variable	Description	Coeff.	S.E.	t-stat
Constant		0.102	-46.330	0.000
LNADT	Log(AADT)	0.799	0.013	60.198
LENGTH	Segment Length	1.000	(Fixed Parameter)	
NLANEI	Number of lanes Increasing	-1.767	0.082	-21.626
NLANED	Number of lanes Decreasing	-2.924	0.094	-31.090
A1	Algebraic difference in gradients	-0.021	0.004	-4.764
MK1	Rate of vertical curvature/5280	-0.269	0.067	-4.007
DGC1	Degree of Curvature	0.010	0.002	6.371
RLNW	Average Lane width	0.034	0.008	4.406
SWR2367	Shoulder width dummy (if shoulder width right is 2-3ft and shoulder width left is 6-7ft, value=1,else=0)	-0.405	0.197	-2.055
SWR4523	Shoulder width dummy (if shoulder width right is 4-5ft and shoulder width left is 2-3ft, value=1,else=0)	-0.291	0.084	-3.466
SWR8901	Shoulder width dummy (if shoulder width right is 8-9ft and shoulder width left is 0-1ft, value=1,else=0)	-0.565	0.265	-2.136
SWR8910	Shoulder width dummy (if shoulder width right is 8-9ft and shoulder width left is >10ft, value=1,else=0)	-0.646	0.214	-3.017
SWR1023	Shoulder width dummy (if shoulder width right is >10ft and shoulder width left is 2-3ft, value=1,else=0)	-1.194	0.342	-3.490
SWC19	Shoulder width dummy (if shoulder width center is >1ft and <9ft, value=1,else=0)	-3.942	0.522	-7.558
Alpha		22.901	0.309	74.114
Number of obs = 426546 Chi squared = 70377.49 Prob>chi2=0.000				
Restricted LL = -125656.0 Log likelihood = -79690.91				
Pseudo R^2 = 0.3063096				

Table D.16: SPF with LNADT, Length Offset, Roadway Geometrics and Route Dummies: PDO Crash Type

Variable	Description	Coeff.	S.E.	t-stat
Constant		-4.208	0.107	-39.348
LNADT	Log(AADT)	0.740	0.013	55.181
LENGTH	Segment Length	1.000	(Fixed Parameter)	
NLANEI	Number of lanes Increasing	-1.526	0.075	-20.464
NLANED	Number of lanes Decreasing	-3.015	0.101	-29.953
A1	Algebraic difference in gradients	-0.014	0.005	-3.024
MK1	Rate of vertical curvature/5280	-0.428	0.053	-8.078
DGC1	Degree of Curvature	0.014	0.002	8.230
SWR2367	Shoulder width dummy (if shoulder width right is 2-3ft and shoulder width left is 6-7ft, value=1,else=0)	-0.400	0.190	-2.106
SWR4523	Shoulder width dummy (if shoulder width right is 4-5ft and shoulder width left is 2-3ft, value=1,else=0)	-0.233	0.080	-2.919
SWR8910	Shoulder width dummy (if shoulder width right is 8-9ft and shoulder width left is >10ft, value=1,else=0)	-0.541	0.193	-2.805
SWR1023	Shoulder width dummy (if shoulder width right is >10ft and shoulder width left is 2-3ft, value=1,else=0)	-1.057	0.330	-3.203
SWC19	Shoulder width dummy (if shoulder width center is >1ft and <9ft, value=1,else=0)	-3.921	0.499	-7.864
SRN3	SR3 Dummy (1 if SR=3, 0 otherwise)	0.648	0.135	4.798
SRN11	SR11 Dummy (1 if SR=11, 0 otherwise)	-0.453	0.078	-5.840
SRN12	SR12 Dummy (1 if SR=12, 0 otherwise)	0.559	0.041	13.617
SRN14	SR14 Dummy (1 if SR=14, 0 otherwise)	0.112	0.052	2.148
SRN17	SR17 Dummy (1 if SR=17, 0 otherwise)	0.272	0.073	3.721
SRN18	SR18 Dummy (1 if SR=18, 0 otherwise)	0.752	0.234	3.212
SRN21	SR21 Dummy (1 if SR=21, 0 otherwise)	-0.941	0.084	-11.241
SRN26	SR26 Dummy (1 if SR=26, 0 otherwise)	1.219	0.093	13.162
SRN31	SR31 Dummy (1 if SR=31, 0 otherwise)	-0.806	0.188	-4.284
SRN97	SR97 Dummy (1 if SR=97, 0 otherwise)	0.672	0.054	12.402
SRN112	SR112 Dummy (1 if SR=112, 0 otherwise)	-0.282	0.067	-4.192
SRN124	SR124 Dummy (1 if SR=124, 0 otherwise)	0.811	0.100	8.089
SRN127	SR127 Dummy (1 if SR=127, 0 otherwise)	-0.922	0.203	-4.533
SRN129	SR129 Dummy (1 if SR=129, 0 otherwise)	-0.630	0.119	-5.284
SRN141	SR141 Dummy (1 if SR=141, 0 otherwise)	0.428	0.154	2.781
SRN161	SR161 Dummy (1 if SR=161, 0 otherwise)	-0.535	0.144	-3.715
SRN172	SR172 Dummy (1 if SR=172, 0 otherwise)	-0.791	0.311	-2.546
SRN174	SR174 Dummy (1 if SR=174, 0 otherwise)	0.401	0.155	2.578
SRN195	SR195 Dummy (1 if SR=195, 0 otherwise)	0.595	0.092	6.494
SRN202	SR202 Dummy (1 if SR=202, 0 otherwise)	-0.509	0.114	-4.453
SRN203	SR203 Dummy (1 if SR=203, 0 otherwise)	-0.366	0.121	-3.036
SRN206	SR206 Dummy (1 if SR=206, 0 otherwise)	0.604	0.106	5.678

Table D.16 (continued): SPF with LNADT, Length Offset, Roadway Geometrics and Route Dummies: PDO Crash Type

Variable	Description	Coeff.	S.E.	t-stat
SRN231	SR231 Dummy (1 if SR=231, 0 otherwise)	-0.352	0.093	-3.789
SRN241	SR241 Dummy (1 if SR=241, 0 otherwise)	0.609	0.153	3.971
SRN243	SR243 Dummy (1 if SR=243, 0 otherwise)	0.533	0.195	2.738
SRN290	SR290 Dummy (1 if SR=290, 0 otherwise)	-1.158	0.284	-4.076
SRN395	SR395 Dummy (1 if SR=395, 0 otherwise)	0.749	0.083	9.033
SRN504	SR504 Dummy (1 if SR=504, 0 otherwise)	-0.497	0.084	-5.925
SRN542	SR542 Dummy (1 if SR=542, 0 otherwise)	0.735	0.049	15.113
SRN904	SR904 Dummy (1 if SR=904, 0 otherwise)	0.470	0.192	2.447
SRN906	SR906 Dummy (1 if SR=906, 0 otherwise)	1.970	0.292	6.754
SRN970	SR970 Dummy (1 if SR=970, 0 otherwise)	1.275	0.359	3.554
SR502730	SR502 & SR730 Dummy (1 if SR=502 or 730, 0 otherwise)	0.693	0.264	2.624
SR432532	SR432 & SR532 Dummy (1 if SR=432 or 532, 0 otherwise)	0.673	0.250	2.694
SR123169	SR123 & SR169 Dummy (1 if SR=123 or 169, 0 otherwise)	-0.864	0.132	-6.523
SR108109	SR108 & SR109 Dummy (1 if SR=108 or 109, 0 otherwise)	0.261	0.089	2.931
SR534105	SR534 & SR105 Dummy (1 if SR=534 or 105, 0 otherwise)	0.312	0.110	2.846
Alpha		21.114	0.291	72.537
Number of obs = 426546 Chi squared = 66790.13 Prob>chi2=0.000				
Restricted LL = -125656.0 Log likelihood = -78933.00				
Pseudo R^2 = 0.2972994				

Table D.17: SPF with LNADT, Length Offset, Roadway Geometrics and Roadside Features: PDO Crash Type

Variable	Description	Coeff.	S.E.	t-stat
Constant		-4.761	0.102	-46.625
LNADT	Log(AADT)	0.787	0.013	59.384
LENGTH	Segment Length	1.000	(Fixed Parameter)	
NLANEI	Number of lanes Increasing	-1.749	0.080	-21.958
NLANED	Number of lanes Decreasing	-2.886	0.092	-31.216
A1	Algebraic difference in gradients	-0.018	0.004	-4.142
MK1	Rate of vertical curvature/5280	-0.260	0.068	-3.826
DGC1	Degree of Curvature	0.011	0.002	7.171
RLNW	Average Lane width	0.037	0.008	4.890
SWR4523	Shoulder width dummy (if shoulder width right is 4-5ft and shoulder width left is 2-3ft, value=1,else=0)	-0.344	0.097	-3.564
SWR8901	Shoulder width dummy (if shoulder width right is 8-9ft and shoulder width left is 0-1ft, value=1,else=0)	-0.653	0.260	-2.516
SWR8910	Shoulder width dummy (if shoulder width right is 8-9ft and shoulder width left is >10ft, value=1,else=0)	-0.650	0.212	-3.070
SWR1023	Shoulder width dummy (if shoulder width right is >10ft and shoulder width left is 2-3ft, value=1,else=0)	-1.143	0.342	-3.342

Table D.17 (continued): SPF with LNADT, Length Offset, Roadway Geometrics and Roadside Features: PDO Crash Type

Variable	Description	Coeff.	S.E.	t-stat
SWC19	Shoulder width dummy (if shoulder width center is >1ft and <9ft, value=1,else=0)	-3.930	0.517	-7.602
LGRDRL70	Proportion of Guardrail on a segment is 60-70%	-0.770	0.325	-2.372
LGRDRL80	Proportion of Guardrail on a segment is 70-80%	-0.857	0.383	-2.241
LGRDRL00	Proportion of Guardrail on a segment is 90-100%	-0.943	0.102	-9.250
LBRDRL60	Proportion of Bridge rail on a segment is 50-60%	-4.421	2.180	-2.028
LBRDRL90	Proportion of Bridge rail on a segment is 80-90%	-1.706	0.814	-2.095
LCLVRT30	Proportion of Culvert on a segment is 20-30%	-4.064	1.268	-3.206
LCLVRT50	Proportion of Culvert on a segment is 40-50%	-2.754	1.252	-2.199
LCLVRT60	Proportion of Culvert on a segment is 50-60%	-2.911	1.446	-2.013
LCLVRT00	Proportion of Culvert on a segment is 90-100%	-0.456	0.216	-2.109
LTRGRP00	Proportion of Tree group on a segment is 90-100%	-0.761	0.121	-6.289
LDITCH70	Proportion of Ditch on a segment is 60-70%	-0.513	0.253	-2.025
LDITCH00	Proportion of Ditch on a segment is 90-100%	-0.653	0.082	-7.923
DCLVERT	Culvert Dummy variable (1 if Culvert exists, 0 otherwise)	0.364	0.114	3.206
DDITCH	Ditch Dummy variable (1 if Ditch exists, 0 otherwise)	0.451	0.065	6.985
DFENCE	Fence Dummy variable (1 if Fence exists, 0 otherwise)	-0.249	0.063	-3.935
DGRDRAL	Guardrail Dummy variable (1 if Guardrail exists, 0 otherwise)	0.459	0.078	5.874
DMFXOBJ	Fixed Object Dummy variable (1 if Fixed Object exists, 0 otherwise)	0.410	0.091	4.524
LRCHCRP	Rock out cropping length on a segment	-0.535	0.225	-2.379
DTREGRP	Tree Group Dummy variable (1 if Tree Group exists, 0 otherwise)	0.233	0.076	3.085
Alpha		22.305	0.301	74.056
Number of obs = 426546 Chi squared = 68816.71 Prob>chi2=0.000				
Restricted LL = -125656.0 Log likelihood = -79473.52				
Pseudo R^2 = 0.3021407				

Table D.18: SPF with LNADT, Length Offset, Roadway Geometrics, Roadside Features and Route Dummies: PDO Crash Type

Variable	Description	Coeff.	S.E.	t-stat
Constant		-4.335	0.104	-41.650
LNADT	Log(AADT)	0.734	0.013	56.219
LENGTH	Segment Length	1.000	(Fixed Parameter)	
NLANEI	Number of lanes Increasing	-1.518	0.071	-21.417
NLANED	Number of lanes Decreasing	-2.876	0.095	-30.424
A1	Algebraic difference in gradients	-0.011	0.004	-2.508
MK1	Rate of vertical curvature/5280	-0.417	0.054	-7.733
DGC1	Degree of Curvature	0.014	0.002	8.658
SWR4523	Shoulder width dummy (if shoulder width right is 4-5ft and shoulder width left is 2-3ft, value=1,else=0)	-0.283	0.092	-3.067
SWR8901	Shoulder width dummy (if shoulder width right is 8-9ft and shoulder width left is 0-1ft, value=1,else=0)	-0.545	0.254	-2.146
SWR8910	Shoulder width dummy (if shoulder width right is 8-9ft and shoulder width left is >10ft, value=1,else=0)	-0.526	0.194	-2.712
SWR1023	Shoulder width dummy (if shoulder width right is >10ft and shoulder width left is 2-3ft, value=1,else=0)	-1.013	0.331	-3.065
SWC19	Shoulder width dummy (if shoulder width center is >1ft and <9ft, value=1,else=0)	-3.929	0.496	-7.930
LGRDRL70	Proportion of Guardrail on a segment is 60-70%	-0.952	0.342	-2.786
LGRDRL80	Proportion of Guardrail on a segment is 70-80%	-0.944	0.376	-2.508
LGRDRL00	Proportion of Guardrail on a segment is 90-100%	-0.980	0.100	-9.780
LBRDRL60	Proportion of Bridge rail on a segment is 50-60%	-4.427	2.060	-2.150
LCLVRT30	Proportion of Culvert on a segment is 20-30%	-3.652	1.210	-3.019
LCLVRT00	Proportion of Culvert on a segment is 90-100%	-0.548	0.237	-2.316
LTRGRP00	Proportion of Tree group on a segment is 90-100%	-0.663	0.119	-5.596
LDITCH00	Proportion of Ditch on a segment is 90-100%	-0.608	0.078	-7.760
DCLVERT	Culvert Dummy variable (1 if Culvert exists, 0 otherwise)	0.252	0.107	2.357
DDITCH	Ditch Dummy variable (1 if Ditch exists, 0 otherwise)	0.423	0.060	7.097
DFENCE	Fence Dummy variable (1 if Fence exists, 0 otherwise)	-0.220	0.065	-3.398
DGRDRAL	Guardrail Dummy variable (1 if Guardrail exists, 0 otherwise)	0.525	0.076	6.925
DMFXOBJ	Fixed Object Dummy variable (1 if Fixed Object exists, 0 otherwise)	0.349	0.089	3.933
LRCHCRP	Rock out cropping length on a segment	-0.725	0.239	-3.038
DTREGRP	Tree Group Dummy variable (1 if Tree Group exists, 0 otherwise)	0.219	0.074	2.958
SRN3	SR3 Dummy (1 if SR=3, 0 otherwise)	0.591	0.131	4.511
SRN11	SR11 Dummy (1 if SR=11, 0 otherwise)	-0.416	0.077	-5.402
SRN12	SR12 Dummy (1 if SR=12, 0 otherwise)	0.545	0.040	13.511

Table D.18 (continued): SPF with LNADT, Length Offset, Roadway Geometrics, Roadside Features and Route Dummies: PDO Crash Type

Variable	Description	Coeff.	S.E.	t-stat
SRN21	SR21 Dummy (1 if SR=21, 0 otherwise)	-0.933	0.084	-11.167
SRN26	SR26 Dummy (1 if SR=26, 0 otherwise)	1.209	0.090	13.408
SRN31	SR31 Dummy (1 if SR=31, 0 otherwise)	-0.806	0.194	-4.162
SRN97	SR97 Dummy (1 if SR=97, 0 otherwise)	0.638	0.053	12.059
SRN112	SR112 Dummy (1 if SR=112, 0 otherwise)	-0.273	0.067	-4.081
SRN124	SR124 Dummy (1 if SR=124, 0 otherwise)	0.829	0.099	8.378
SRN127	SR127 Dummy (1 if SR=127, 0 otherwise)	-0.939	0.213	-4.416
SRN129	SR129 Dummy (1 if SR=129, 0 otherwise)	-0.613	0.123	-4.979
SRN141	SR141 Dummy (1 if SR=141, 0 otherwise)	0.445	0.152	2.924
SRN161	SR161 Dummy (1 if SR=161, 0 otherwise)	-0.543	0.142	-3.827
SRN172	SR172 Dummy (1 if SR=172, 0 otherwise)	-0.789	0.309	-2.552
SRN195	SR195 Dummy (1 if SR=195, 0 otherwise)	0.622	0.090	6.893
SRN206	SR206 Dummy (1 if SR=206, 0 otherwise)	0.544	0.117	4.663
SRN231	SR231 Dummy (1 if SR=231, 0 otherwise)	-0.351	0.093	-3.775
SRN241	SR241 Dummy (1 if SR=241, 0 otherwise)	0.621	0.153	4.052
SRN243	SR243 Dummy (1 if SR=243, 0 otherwise)	0.483	0.191	2.529
SRN290	SR290 Dummy (1 if SR=290, 0 otherwise)	-1.176	0.280	-4.193
SRN395	SR395 Dummy (1 if SR=395, 0 otherwise)	0.749	0.081	9.261
SRN504	SR504 Dummy (1 if SR=504, 0 otherwise)	-0.514	0.084	-6.137
SRN542	SR542 Dummy (1 if SR=542, 0 otherwise)	0.758	0.050	15.296
SRN904	SR904 Dummy (1 if SR=904, 0 otherwise)	0.387	0.193	2.006
SRN906	SR906 Dummy (1 if SR=906, 0 otherwise)	1.996	0.288	6.928
SRN970	SR970 Dummy (1 if SR=970, 0 otherwise)	1.296	0.353	3.672
SR160544	SR160 & SR544 Dummy (1 if SR=160 or 544, 0 otherwise)	-0.974	0.371	-2.625
SR502730	SR502 & SR730 Dummy (1 if SR=502 or 730, 0 otherwise)	0.713	0.260	2.747
SR432532	SR432 & SR532 Dummy (1 if SR=432 or 532, 0 otherwise)	0.666	0.240	2.780
SR123169	SR123 & SR169 Dummy (1 if SR=123 or 169, 0 otherwise)	-0.883	0.134	-6.616
SR24165	SR24 & SR165 Dummy (1 if SR=24 or 165, 0 otherwise)	0.223	0.068	3.305
SR510902	SR510& SR902 Dummy (1 if SR=510 or 902, 0 otherwise)	-0.554	0.158	-3.503
SR174508	SR174& SR508 Dummy (1 if SR=174 or 508, 0 otherwise)	0.249	0.093	2.664
SR108109	SR108 & SR109 Dummy (1 if SR=108 or 109, 0 otherwise)	0.198	0.093	2.125
SR534105	SR534 & SR105 Dummy (1 if SR=534 or 105, 0 otherwise)	0.288	0.107	2.687
Alpha		37.862	0.563	67.301
Number of obs = 426546 Chi squared = 65778.50 Prob>chi2=0.000				
Restricted LL = -125656.0 Log likelihood = -78755.74				
Pseudo R^2 = 0.2945878				

Table D.19: SPF with LNADT and Length Offset: Possible Injury Crash Type

Variable	Description	Coeff.	S.E.	t-stat
Constant		-9.650	0.188	-51.418
LNADT	Log(AADT)	0.715	0.024	29.637
LENGTH	Segment Length	1.000	(Fixed Parameter)	
Alpha		113.077	2.600	43.483
Number of obs = 426546 Chi squared = 79741.81 Prob>chi2=0.000				
Restricted LL = -56841.29 Log likelihood = -30994.98				
Pseudo R^2 = 0.3265195				

Table D.20: SPF with LNADT, Length Offset and Route Dummies: Possible Injury Crash Type

Variable	Description	Coeff.	S.E.	t-stat
Constant		-8.740	0.199	-43.837
LNADT	Log(AADT)	0.593	0.025	23.300
LENGTH	Segment Length	1.000	(Fixed Parameter)	
SRN3	SR3 Dummy (1 if SR=3, 0 otherwise)	0.870	0.218	3.995
SRN7	SR7 Dummy (1 if SR=7, 0 otherwise)	0.416	0.145	2.872
SRN14	SR14 Dummy (1 if SR=14, 0 otherwise)	-0.247	0.109	-2.277
SRN21	SR21 Dummy (1 if SR=21, 0 otherwise)	-1.205	0.144	-8.386
SRN23	SR23 Dummy (1 if SR=23, 0 otherwise)	-1.212	0.385	-3.148
SRN25	SR25 Dummy (1 if SR=25, 0 otherwise)	-0.565	0.152	-3.729
SRN26	SR26 Dummy (1 if SR=26, 0 otherwise)	0.599	0.191	3.141
SRN28	SR28 Dummy (1 if SR=28, 0 otherwise)	0.326	0.159	2.053
SRN31	SR31 Dummy (1 if SR=31, 0 otherwise)	-1.481	0.439	-3.376
SRN97	SR97 Dummy (1 if SR=97, 0 otherwise)	0.421	0.113	3.737
SRN104	SR104 Dummy (1 if SR=104, 0 otherwise)	1.251	0.505	2.475
SRN290	SR290 Dummy (1 if SR=290, 0 otherwise)	-3.252	0.598	-5.440
SRN395	SR395 Dummy (1 if SR=395, 0 otherwise)	0.256	0.122	2.090
SRN503	SR503 Dummy (1 if SR=503, 0 otherwise)	0.689	0.162	4.258
SRN504	SR504 Dummy (1 if SR=504, 0 otherwise)	-0.495	0.188	-2.637
SRN507	SR507 Dummy (1 if SR=507, 0 otherwise)	0.989	0.398	2.486
SRN539	SR539 Dummy (1 if SR=539, 0 otherwise)	-1.473	0.244	-6.051
SRN542	SR542 Dummy (1 if SR=542, 0 otherwise)	0.428	0.149	2.875

Table D.20 (continued): SPF with LNADT, Length Offset and Route Dummies: Possible Injury Crash Type

Variable	Description	Coeff.	S.E.	t-stat
SR432532	SR432 & SR532 Dummy (1 if SR=432 or 532, 0 otherwise)	1.156	0.558	2.074
SR123169	SR123 & SR169 Dummy (1 if SR=123 or 169, 0 otherwise)	-0.524	0.218	-2.408
SR261142	SR261 & SR142 Dummy (1 if SR=261 or 142, 0 otherwise)	-0.767	0.261	-2.937
Alpha		106.791	2.525	42.288
Number of obs = 426546 Chi squared = 45619.75 Prob>chi2=0.000				
Restricted LL = -56841.29 Log likelihood = -30836.59				
Pseudo R^2 = 0.4251887				

Table D.21: SPF with LNADT, Length Offset and Roadway Geometrics: Possible Injury Crash Type

Variable	Description	Coeff.	S.E.	t-stat
Constant		-7.682	0.198	-38.749
LNADT	Log(AADT)	0.973	0.027	36.018
LENGTH	Segment Length	1.000	(Fixed Parameter)	
NLANEI	Number of lanes Increasing	-1.707	0.262	-6.520
NLANED	Number of lanes Decreasing	-2.589	0.268	-9.648
A1	Algebraic difference in gradients	-0.020	0.009	-2.244
MK1	Rate of vertical curvature/5280	-1.241	0.156	-7.978
DGC1	Degree of Curvature	0.011	0.003	3.876
RLNW	Average Lane width	0.037	0.016	2.261
SWR4523	Shoulder width dummy (if shoulder width right is 4-5ft and shoulder width left is 2-3ft, value=1,else=0)	0.254	0.122	2.087
SWR8910	Shoulder width dummy (if shoulder width right is 8-9ft and shoulder width left is >10ft, value=1,else=0)	-1.410	0.628	-2.245
SWC19	Shoulder width dummy (if shoulder width center is >1ft and <9ft, value=1,else=0)	-2.105	0.229	-9.209
Alpha		86.263	1.991	43.316
Number of obs = 426546 Chi squared = 42141.58 Prob>chi2=0.000				
Restricted LL = -56841.29 Log likelihood = -30211.46				
Pseudo R^2 = 0.4108788				

Table D.22: SPF with LNADT, Length Offset, Roadway Geometrics and Route Dummies: Possible Injury Crash Type

Variable	Description	Coeff.	S.E.	t-stat
Constant		0.178	-40.455	0.000
LNADT	Log(AADT)	0.938	0.028	33.823
LENGTH	Segment Length	1.000	(Fixed Parameter)	
NLANEI	Number of lanes Increasing	-1.572	0.240	-6.547
NLANED	Number of lanes Decreasing	-2.548	0.249	-10.228
A1	Algebraic difference in gradients	-0.020	0.009	-2.188
MK1	Rate of vertical curvature/5280	-1.342	0.153	-8.798
DGC1	Degree of Curvature	0.010	0.003	3.426
SWR8910	Shoulder width dummy (if shoulder width right is 8-9ft and shoulder width left is >10ft, value=1,else=0)	-1.336	0.597	-2.237
SWC19	Shoulder width dummy (if shoulder width center is >1ft and <9ft, value=1,else=0)	-2.430	0.467	-5.200
SRN3	SR3 Dummy (1 if SR=3, 0 otherwise)	0.579	0.243	2.388
SRN7	SR7 Dummy (1 if SR=7, 0 otherwise)	0.413	0.131	3.162
SRN14	SR14 Dummy (1 if SR=14, 0 otherwise)	-0.301	0.101	-2.971
SRN21	SR21 Dummy (1 if SR=21, 0 otherwise)	-0.718	0.141	-5.078
SRN23	SR23 Dummy (1 if SR=23, 0 otherwise)	-0.742	0.371	-2.002
SRN26	SR26 Dummy (1 if SR=26, 0 otherwise)	0.658	0.158	4.161
SRN28	SR28 Dummy (1 if SR=28, 0 otherwise)	0.345	0.133	2.592
SRN31	SR31 Dummy (1 if SR=31, 0 otherwise)	-1.217	0.432	-2.816
SRN97	SR97 Dummy (1 if SR=97, 0 otherwise)	0.239	0.097	2.458
SRN104	SR104 Dummy (1 if SR=104, 0 otherwise)	1.057	0.450	2.350
SRN124	SR124 Dummy (1 if SR=124, 0 otherwise)	0.863	0.098	8.786
SRN290	SR290 Dummy (1 if SR=290, 0 otherwise)	-2.690	0.749	-3.591
SRN395	SR395 Dummy (1 if SR=395, 0 otherwise)	0.700	0.159	4.406
SRN503	SR503 Dummy (1 if SR=503, 0 otherwise)	0.630	0.141	4.471
SRN504	SR504 Dummy (1 if SR=504, 0 otherwise)	-0.507	0.174	-2.924
SRN542	SR542 Dummy (1 if SR=542, 0 otherwise)	0.393	0.124	3.164
SR123169	SR123 & SR169 Dummy (1 if SR=123 or 169, 0 otherwise)	-0.753	0.238	-3.160
Alpha		83.239	1.965	42.356
Number of obs = 426546 Chi squared = 41257.62 Prob>chi2=0.000				
Restricted LL = -56841.29 Log likelihood = -30108.20				
Pseudo R^2 = 0.4065831				

Table D.23: SPF with LNADT, Length Offset, Roadway Geometrics and Roadside Features: Possible Injury Crash Type

Variable	Description	Coeff.	S.E.	t-stat
Constant		-7.564	0.197	-38.344
LNADT	Log(AADT)	0.966	0.027	36.297
LENGTH	Segment Length	1.000	(Fixed Parameter)	
NLANEI	Number of lanes Increasing	-1.716	0.255	-6.735
NLANED	Number of lanes Decreasing	-2.605	0.262	-9.951
A1	Algebraic difference in gradients	-0.019	0.009	-2.167
MK1	Rate of vertical curvature/5280	-1.158	0.158	-7.311
DGC1	Degree of Curvature	0.012	0.003	4.256
RLNW	Average Lane width	0.035	0.016	2.140
SWR8910	Shoulder width dummy (if shoulder width right is 8-9ft and shoulder width left is >10ft, value=1,else=0)	-1.393	0.626	-2.225
SWC19	Shoulder width dummy (if shoulder width center is >1ft and <9ft, value=1,else=0)	-2.081	0.229	-9.094
LGRDRL00	Proportion of Guardrail on a segment is 90-100%	-0.829	0.191	-4.337
LBRDRL60	Proportion of Bridge rail on a segment is 50-60%	3.849	1.155	3.332
LFENCE00	Proportion of Fence on a segment is 90-100%	-0.499	0.185	-2.689
LDITCH00	Proportion of Ditch on a segment is 90-100%	-0.421	0.142	-2.972
DGRDRAL	Guardrail Dummy variable (1 if Guardrail exists, 0 otherwise)	0.313	0.145	2.161
DRDSLP	Road side slope Dummy variable (1 if Road side slope exists, 0 otherwise)	1.014	0.220	4.599
LRDSLP	Roadside slope length on a segment	-1.345	0.270	-4.987
Alpha		84.446	1.949	43.333
Number of obs = 426546 Chi squared = 41502.91 Prob>chi2=0.000				
Restricted LL = -56841.29 Log likelihood = -30152.20				
Pseudo R^2 = 0.4076614				

Table D.24: SPF with LNADT, Length Offset, Roadway Geometrics, Roadside Features and Route Dummies: Possible Injury Crash Type

Variable	Description	Coeff.	S.E.	t-stat
Constant		-6.994	0.180	-38.936
LNADT	Log(AADT)	0.914	0.028	32.951
LENGTH	Segment Length	1.000	(Fixed Parameter)	
NLANEI	Number of lanes Increasing	-1.571	0.234	-6.703
NLANED	Number of lanes Decreasing	-2.555	0.244	-10.489
A1	Algebraic difference in gradients	-0.018	0.009	-2.023
MK1	Rate of vertical curvature/5280	-1.250	0.154	-8.102
DGC1	Degree of Curvature	0.011	0.003	3.695
SWR8910	Shoulder width dummy (if shoulder width right is 8-9ft and shoulder width left is >10ft, value=1,else=0)	-1.309	0.593	-2.206
SWC19	Shoulder width dummy (if shoulder width center is >1ft and <9ft, value=1,else=0)	-2.406	0.464	-5.180
LGRDRL00	Proportion of Guardrail on a segment is 90-100%	-0.863	0.191	-4.524
LBRDRL60	Proportion of Bridge rail on a segment is 50-60%	4.124	1.107	3.726
LFENCE00	Proportion of Fence on a segment is 90-100%	-0.487	0.183	-2.666
LDITCH00	Proportion of Ditch on a segment is 90-100%	-0.448	0.143	-3.139
DGRDRAL	Guardrail Dummy variable (1 if Guardrail exists, 0 otherwise)	0.386	0.146	2.652
DRDSLP	Road side slope Dummy variable (1 if Road side slope exists, 0 otherwise)	1.023	0.215	4.749
LRDSLP	Roadside slope length on a segment	-1.320	0.264	-5.007
SRN3	SR3 Dummy (1 if SR=3, 0 otherwise)	0.588	0.240	2.447
SRN7	SR7 Dummy (1 if SR=7, 0 otherwise)	0.386	0.130	2.976
SRN14	SR14 Dummy (1 if SR=14, 0 otherwise)	-0.289	0.101	-2.862
SRN21	SR21 Dummy (1 if SR=21, 0 otherwise)	-0.782	0.141	-5.560
SRN23	SR23 Dummy (1 if SR=23, 0 otherwise)	-0.752	0.368	-2.043
SRN25	SR25 Dummy (1 if SR=25, 0 otherwise)	-0.314	0.143	-2.203
SRN26	SR26 Dummy (1 if SR=26, 0 otherwise)	0.653	0.157	4.154
SRN28	SR28 Dummy (1 if SR=28, 0 otherwise)	0.314	0.132	2.379
SRN31	SR31 Dummy (1 if SR=31, 0 otherwise)	-1.222	0.432	-2.830
SRN97	SR97 Dummy (1 if SR=97, 0 otherwise)	0.246	0.097	2.521
SRN104	SR104 Dummy (1 if SR=104, 0 otherwise)	1.066	0.446	2.392
SRN290	SR290 Dummy (1 if SR=290, 0 otherwise)	-2.662	0.747	-3.563
SRN395	SR395 Dummy (1 if SR=395, 0 otherwise)	0.682	0.157	4.338

Table D.24 (continued): SPF with LNADT, Length Offset, Roadway Geometrics, Roadside Features and Route Dummies: Possible Injury Crash Type

Variable	Description	Coeff.	S.E.	t-stat
SRN503	SR503 Dummy (1 if SR=503, 0 otherwise)	0.610	0.140	4.359
SRN504	SR504 Dummy (1 if SR=504, 0 otherwise)	-0.579	0.174	-3.324
SRN542	SR542 Dummy (1 if SR=542, 0 otherwise)	0.355	0.124	2.864
SR123169	SR123 & SR169 Dummy (1 if SR=123 or 169, 0 otherwise)	-0.811	0.257	-3.162
Alpha		81.708	1.912	42.740
Number of obs = 426546 Chi squared = 40681.19 Prob>chi2=0.000				
Restricted LL = -56841.29 Log likelihood = -30054.96				
Pseudo R^2 = 0.4036188				

Table D.25: SPF with LNADT and Length Offset: Evident Injury Crash Type

Variable	Description	Coeff.	S.E.	t-stat
Constant		-7.158	0.169	-42.248
LNADT	Log(AADT)	0.418	0.021	19.444
LENGTH	Segment Length	1.000	(Fixed Parameter)	
Alpha		97.663	2.139	45.656
Number of obs = 426546 Chi squared = 41717.59 Prob>chi2=0.000				
Restricted LL = -34677.89, Log likelihood = -34197.10				
Pseudo R^2 = 0.3788658				

Table D.26: SPF with LNADT, Length Offset and Route Dummies: Evident Injury Crash Type

Variable	Description	Coeff.	S.E.	t-stat
Constant		-6.344	0.181	-34.989
LNADT	Log(AADT)	0.309	0.023	13.510
LENGTH	Segment Length	1.000	(Fixed Parameter)	
SRN3	SR3 Dummy (1 if SR=3, 0 otherwise)	0.581	0.207	2.801
SRN17	SR17 Dummy (1 if SR=17, 0 otherwise)	0.354	0.138	2.555
SRN18	SR18 Dummy (1 if SR=18, 0 otherwise)	-0.593	0.213	-2.785
SRN21	SR21 Dummy (1 if SR=21, 0 otherwise)	-1.138	0.116	-9.792
SRN22	SR22 Dummy (1 if SR=22, 0 otherwise)	1.557	0.578	2.694
SRN23	SR23 Dummy (1 if SR=23, 0 otherwise)	-0.875	0.245	-3.572
SRN25	SR25 Dummy (1 if SR=25, 0 otherwise)	-0.310	0.140	-2.212
SRN26	SR26 Dummy (1 if SR=26, 0 otherwise)	0.876	0.211	4.146
SRN27	SR27 Dummy (1 if SR=27, 0 otherwise)	-0.454	0.170	-2.664
SRN97	SR97 Dummy (1 if SR=97, 0 otherwise)	0.707	0.099	7.171
SRN104	SR104 Dummy (1 if SR=104, 0 otherwise)	1.239	0.392	3.159
SRN153	SR153 Dummy (1 if SR=153, 0 otherwise)	-0.527	0.246	-2.145
SRN155	SR155 Dummy (1 if SR=155, 0 otherwise)	0.315	0.121	2.600
SRN195	SR195 Dummy (1 if SR=195, 0 otherwise)	0.581	0.153	3.800

Table D.26 (continued): SPF with LNADT, Length Offset and Route Dummies: Evident Injury Crash Type

Variable	Description	Coeff.	S.E.	t-stat
SRN272	SR272 Dummy (1 if SR=272, 0 otherwise)	-1.675	0.393	-4.267
SRN290	SR290 Dummy (1 if SR=290, 0 otherwise)	-2.183	0.336	-6.487
SRN504	SR504 Dummy (1 if SR=504, 0 otherwise)	-0.376	0.160	-2.344
SRN507	SR507 Dummy (1 if SR=507, 0 otherwise)	0.594	0.271	2.190
SRN539	SR539 Dummy (1 if SR=539, 0 otherwise)	-1.045	0.288	-3.628
SRN706	SR706 Dummy (1 if SR=706, 0 otherwise)	0.944	0.150	6.308
SR123169	SR123 & SR169 Dummy (1 if SR=123 or 169, 0 otherwise)	-0.808	0.210	-3.855
SR261142	SR261 & SR142 Dummy (1 if SR=261 or 142, 0 otherwise)	-0.756	0.242	-3.124
SR26022	SR260 & SR22 Dummy (1 if SR=260 or 22, 0 otherwise)	-1.299	0.494	-2.626
Alpha		91.592	2.125	43.108
Number of obs = 426546 Chi squared = 40412.78 Prob>chi2=0.000				
Restricted LL = -34677.89, Log likelihood = -34004.16				
Pseudo R^2 =0.3727391				

Table D.27: SPF with LNADT, Length Offset and Roadway Geometrics: Evident Injury Crash Type

Variable	Description	Coeff.	S.E.	t-stat
Constant		-3.389	0.379	-8.942
LNADT	Log(AADT)	0.706	0.022	31.855
LENGTH	Segment Length	1.000	(Fixed Parameter)	
NLANEI	Number of lanes Increasing	-2.884	0.240	-12.014
NLANED	Number of lanes Decreasing	-3.032	0.353	-8.584
A1	Algebraic difference in gradients, percent	-0.041	0.008	-4.855
DGC1	Degree of Curvature	0.022	0.003	6.758
SWR4523	Shoulder width dummy (if shoulder width right is 4-5ft and shoulder width left is 2-3ft, value=1,else=0)	-0.552	0.170	-3.245
SWC19	Shoulder width dummy (if shoulder width center is >1ft and <9ft, value=1,else=0)	-1.871	0.504	-3.715
Alpha		78.788	1.711	46.053
Number of obs = 426546 Chi squared = 38799.23 Prob>chi2=0.000				
Restricted LL = -34677.89, Log likelihood = -33373.33				
Pseudo R^2 =0.3676053				

Table D.28: SPF with LNADT, Length Offset, Roadway Geometrics and Route Dummies: Evident Injury Crash Type

Variable	Description	Coeff.	S.E.	t-stat
Constant		-3.224	0.376	-8.573
LNADT	Log(AADT)	0.652	0.023	27.842
LENGTH	Segment Length	1.000	(Fixed Parameter)	
NLANEI	Number of lanes Increasing	-2.795	0.235	-11.909
NLANED	Number of lanes Decreasing	-2.926	0.347	-8.424
A1	Algebraic difference in gradients, percent	-0.040	0.009	-4.683
DGC1	Degree of Curvature	0.026	0.003	7.570
SWR4523	Shoulder width dummy (if shoulder width right is 4-5ft and shoulder width left is 2-3ft, value=1,else=0)	-0.499	0.168	-2.968
SWC19	Shoulder width dummy (if shoulder width center is >1ft and <9ft, value=1,else=0)	-1.904	0.507	-3.757
SRN17	SR17 Dummy (1 if SR=17, 0 otherwise)	0.419	0.130	3.224
SRN21	SR21 Dummy (1 if SR=21, 0 otherwise)	-0.639	0.112	-5.692
SRN22	SR22 Dummy (1 if SR=22, 0 otherwise)	1.166	0.549	2.124
SRN26	SR26 Dummy (1 if SR=26, 0 otherwise)	0.912	0.180	5.053
SRN97	SR97 Dummy (1 if SR=97,0 otherwise)	0.497	0.090	5.539
SRN104	SR104 Dummy (1 if SR=104, 0 otherwise)	1.027	0.391	2.628
SRN153	SR153 Dummy (1 if SR=153, 0 otherwise)	-0.492	0.232	-2.119
SRN155	SR155 Dummy (1 if SR=155, 0 otherwise)	0.384	0.108	3.548
SRN195	SR195 Dummy (1 if SR=195, 0 otherwise)	0.535	0.161	3.325
SRN272	SR272 Dummy (1 if SR=272, 0 otherwise)	-1.579	0.520	-3.037
SRN290	SR290 Dummy (1 if SR=290, 0 otherwise)	-1.583	0.460	-3.440
SRN504	SR504 Dummy (1 if SR=504, 0 otherwise)	-0.399	0.155	-2.581
SRN706	SR706 Dummy (1 if SR=706, 0 otherwise)	0.816	0.138	5.902
SR123169	SR123 & SR169 Dummy (1 if SR=123 or 169,1 0 otherwise)	-0.971	0.246	-3.946
SR26022	SR260 & SR22 Dummy (1 if SR=260 or 22,1 0 otherwise)	-0.943	0.466	-2.022
Alpha		76.118	1.752	43.438
Number of obs = 426546 Chi squared = 38088.03 Prob>chi2=0.000				
Restricted LL = -34677.89, Log likelihood = -33262.98				
Pseudo R^2 =0.3640817				

Table D.29: SPF with LNADT, Length Offset, Roadway Geometrics and Roadside Features: Evident Injury Crash Type

Variable	Description	Coeff.	S.E.	t-stat
Constant		-3.337	0.378	-8.816
LNADT	Log(AADT)	0.698	0.022	31.888
LENGTH	Segment Length	1.000	(Fixed Parameter)	
NLANEI	Number of lanes Increasing	-2.883	0.239	-12.082
NLANED	Number of lanes Decreasing	-3.011	0.353	-8.540
A1	Algebraic difference in gradients, percent	-0.040	0.008	-4.810
DGC1	Degree of Curvature	0.024	0.003	7.198
SWR4523	Shoulder width dummy (if shoulder width right is 4-5ft and shoulder width left is 2-3ft, value=1,else=0)	-0.568	0.169	-3.361
SWC19	Shoulder width dummy (if shoulder width center is >1ft and <9ft, value=1,else=0)	-1.854	0.501	-3.697
LGRDRL50	Proportion of guardrail length on a segment is 50%	-1.706	0.823	-2.073
LGRDRL00	Proportion of guardrail length on a segment is 100%	-0.687	0.168	-4.092
LFENCE00	Proportion of fence length on a segment is 100%	-0.401	0.140	-2.874
LDITCH00	Proportion of ditch length on a segment is 100%	-0.623	0.108	-5.794
DGRDRAL	Guardrail Dummy variable (1 if guardrail exists, 0 otherwise)	0.318	0.137	2.331
DMALBOX	Mailbox Dummy variable (1 if Mailbox exists, 0 otherwise)	0.526	0.227	2.316
DMFXOBJ	Fixed object Dummy variable (1 if Fixed object exists, 0 otherwise)	0.489	0.160	3.062
DRCHCRP	Rock out cropping Dummy variable (1 if Rock out cropping exists, 0 otherwise)	-1.256	0.519	-2.422
Alpha		77.594	1.684	46.084
Number of obs = 426546 Chi squared = 38481.97 Prob>chi2=0.000				
Restricted LL = -34677.89, Log likelihood = -33324.91				
Pseudo R^2 =0.3660355				

Table D.30: SPF with LNADT, Length Offset, Roadway Geometrics, Roadside Features and Route Dummies: Evident Injury Crash Type

Variable	Description	Coeff.	S.E.	t-stat
Constant		-3.148	0.375	-8.395
LNADT	Log(AADT)	0.639	0.023	27.837
LENGTH	Segment Length	1.000	(Fixed Parameter)	
NLANEI	Number of lanes Increasing	-2.785	0.233	-11.950
NLANED	Number of lanes Decreasing	-2.909	0.346	-8.409
A1	Algebraic difference in gradients, percent	-0.040	0.009	-4.631
DGC1	Degree of Curvature	0.027	0.003	8.006
SWR4523	Shoulder width dummy (if shoulder width right is 4-5ft and shoulder width left is 2-3ft, value=1,else=0)	-0.516	0.167	-3.097

Table D.30 (continued): SPF with LNADT, Length Offset, Roadway Geometrics, Roadside Features and Route Dummies: Evident Injury Crash Type

Variable	Description	Coeff.	S.E.	t-stat
SWC19	Shoulder width dummy (if shoulder width center is >1ft and <9ft, value=1,else=0)	-1.882	0.502	-3.749
LGRDRL50	Proportion of guardrail length on a segment is 50%	-1.678	0.805	-2.084
LGRDRL00	Proportion of guardrail length on a segment is 100%	-0.717	0.167	-4.294
LFENCE00	Proportion of fence length on a segment is 100%	-0.410	0.135	-3.032
LDITCH00	Proportion of ditch length on a segment is 100%	-0.613	0.104	-5.872
DGRDRAL	Guardrail Dummy variable (1 if guardrail exists, 0 otherwise)	0.384	0.137	2.803
DMALBOX	Mailbox Dummy variable (1 if Mailbox exists, 0 otherwise)	0.615	0.224	2.742
DMFXOBJ	Fixed object Dummy variable (1 if Fixed object exists, 0 otherwise)	0.463	0.155	2.992
DRCHCRP	Rock out cropping Dummy variable (1 if Rock out cropping exists, 0 otherwise)	-1.345	0.536	-2.509
SRN17	SR17 Dummy (1 if SR=17, 0 otherwise)	0.416	0.129	3.239
SRN21	SR21 Dummy (1 if SR=21, 0 otherwise)	-0.668	0.112	-5.971
SRN22	SR22 Dummy (1 if SR=22, 0 otherwise)	1.173	0.546	2.150
SRN26	SR26 Dummy (1 if SR=26, 0 otherwise)	0.921	0.178	5.182
SRN97	SR97 Dummy (1 if SR=97,0 otherwise)	0.515	0.090	5.753
SRN104	SR104 Dummy (1 if SR=104, 0 otherwise)	1.038	0.386	2.690
SRN153	SR153 Dummy (1 if SR=153, 0 otherwise)	-0.553	0.251	-2.206
SRN155	SR155 Dummy (1 if SR=155, 0 otherwise)	0.375	0.107	3.500
SRN195	SR195 Dummy (1 if SR=195, 0 otherwise)	0.542	0.159	3.408
SRN272	SR272 Dummy (1 if SR=272, 0 otherwise)	-1.625	0.526	-3.088
SRN290	SR290 Dummy (1 if SR=290, 0 otherwise)	-1.566	0.457	-3.423
SRN504	SR504 Dummy (1 if SR=504, 0 otherwise)	-0.402	0.151	-2.661
SRN706	SR706 Dummy (1 if SR=706, 0 otherwise)	0.815	0.136	5.991
SR123169	SR123 & SR169 Dummy (1 if SR=123 or 169,1 0 otherwise)	-0.972	0.243	-3.993
SR26022	SR260 & SR22 Dummy (1 if SR=260 or 22,1 0 otherwise)	-0.961	0.465	-2.067
Alpha		74.876	1.720	43.545
Number of obs = 426546 Chi squared = 37765.20 Prob>chi2=0.000				
Restricted LL = -34677.89, Log likelihood = -33209.90				
Pseudo R^2 =0.3624821				

Table D.31: SPF with LNADT and Length Offset: Serious Injury Crash Type

Variable	Description	Coeff.	S.E.	t-stat
Constant		-8.709	0.388	-22.473
LNADT	Log(AADT)	0.459	0.049	9.279
LENGTH	Segment Length	1.000	(Fixed Parameter)	
Alpha		406.456	18.989	21.405
Number of obs = 426546	Chi squared = 17881.62	Prob>chi2=0.000		
Restricted LL = -20438.92	Log likelihood = -11233.85			
Pseudo R^2 = 0.4431704				

Table D.32: SPF with LNADT, Length Offset and Route Dummies: Serious Injury Crash Type

Variable	Description	Coeff.	S.E.	t-stat
Constant		-8.063	0.406	-19.839
LNADT	Log(AADT)	0.380	0.051	7.411
LENGTH	Segment Length	1.000	(Fixed Parameter)	
SRN21	SR21 Dummy (1 if SR=21, 0 otherwise)	-1.247	0.293	-4.250
SRN25	SR25 Dummy (1 if SR=25, 0 otherwise)	-0.552	0.243	-2.274
SRN97	SR97 Dummy (1 if SR=97, 0 otherwise)	0.466	0.220	2.118
SRN150	SR150 Dummy (1 if SR=150, 0 otherwise)	-2.086	1.033	-2.018
SRN539	SR539 Dummy (1 if SR=539, 0 otherwise)	-1.830	0.606	-3.019
SR261142	SR261 & SR142 Dummy (1 if SR=261 or 142, 0 otherwise)	-1.379	0.555	-2.483
Alpha		395.868	18.641	21.237
Number of obs = 426546	Chi squared = 17737.65	Prob>chi2=0.000		
Restricted LL = -20438.92	Log likelihood = -11209.74			
Pseudo R^2 = 0.4417060				

Table D.33: SPF with LNADT, Length Offset and Roadway Geometrics: Serious Injury Crash Type

Variable	Description	Coeff.	S.E.	t-stat
Constant		-8.156	0.494	-16.526
LNADT	Log(AADT)	0.505	0.052	9.740
LENGTH	Segment Length	1.000	(Fixed Parameter)	
DGC1	Degree of Curvature	0.028	0.009	2.968
RLNW	Average Lane width	-0.085	0.032	-2.658
Alpha				
Number of obs = 426546	Chi squared = 17803.29	Prob>chi2=0.000		
Restricted LL = -20438.92	Log likelihood = -11221.64			
Pseudo R^2 = 0.4423555				

Table D.34: SPF with LNADT, Length Offset, Roadway Geometrics and Route Dummies: Serious Injury Crash Type

Variable	Description	Coeff.	S.E.	t-stat
Constant		-7.256	0.493	-14.704
LNADT	Log(AADT)	0.428	0.053	8.133
LENGTH	Segment Length	1.000	(Fixed Parameter)	
DGC1	Degree of Curvature	0.030	0.009	3.186
RLNW	Average Lane width	-0.108	0.029	-3.740
SRN11	SR11 Dummy (1 if SR=11, 0 otherwise)	-0.919	0.418	-2.200
SRN21	SR21 Dummy (1 if SR=21, 0 otherwise)	-1.270	0.295	-4.308
SRN25	SR25 Dummy (1 if SR=25, 0 otherwise)	-0.607	0.275	-2.208
SRN97	SR97 Dummy (1 if SR=97, 0 otherwise)	0.515	0.215	2.392
SRN150	SR150 Dummy (1 if SR=150, 0 otherwise)	-2.233	1.037	-2.153
SRN539	SR539 Dummy (1 if SR=539, 0 otherwise)	-1.787	0.630	-2.837
SR261142	SR261 & SR142 Dummy (1 if SR=261 or 142, 0 otherwise)	-1.605	0.579	-2.772
Alpha		389.038	18.274	21.289
Number of obs = 426546 Chi squared = 17638.05 Prob>chi2=0.000				
Restricted LL = -20438.92 Log likelihood = -11193.23				
Pseudo R^2 = 0.4406813				

Table D.35: SPF with LNADT, Length Offset, Roadway Geometrics and Roadside Features: Serious Injury Crash Type

Variable	Description	Coeff.	S.E.	t-stat
Constant		-8.238	0.503	-16.363
LNADT	Log(AADT)	0.497	0.052	9.638
LENGTH	Segment Length	1.000	(Fixed Parameter)	
DGC1	Degree of Curvature	0.029	0.009	3.090
RLNW	Average Lane width	-0.074	0.033	-2.228
LGRDRL00	Proportion of Guardrail on a segment is 90-100%	-0.888	0.355	-2.502
DBRDRAL	Bridge rail Dummy variable (1 if Bridge rail exists, 0 otherwise)	-0.994	0.422	-2.356
DGRDRAL	Guardrail Dummy variable (1 if Guardrail exists, 0 otherwise)	0.695	0.315	2.209
Alpha		397.519	18.899	21.034
Number of obs = 426546 Chi squared = 17719.70 Prob>chi2=0.000				
Restricted LL = -20438.92 Log likelihood = -11214.50				
Pseudo R^2 = 0.4413519				

Table D.36: SPF with LNADT, Length Offset, Roadway Geometrics, Roadside Features and Route Dummies: Serious Injury Crash Type

Variable	Description	Coeff.	S.E.	t-stat
Constant		-7.236	0.495	-14.619
LNADT	Log(AADT)	0.418	0.052	8.012
LENGTH	Segment Length	1.000	(Fixed Parameter)	
DGC1	Degree of Curvature	0.031	0.010	3.259
RLNW	Average Lane width	-0.105	0.029	-3.579
LGRDRL00	Proportion of Guardrail on a segment is 90-100%	-0.837	0.347	-2.409
DGRDRAL	Guardrail Dummy variable (1 if Guardrail exists, 0 otherwise)	0.605	0.308	1.966
SRN11	SR11 Dummy (1 if SR=11, 0 otherwise)	-0.906	0.418	-2.167
SRN21	SR21 Dummy (1 if SR=21, 0 otherwise)	-1.267	0.294	-4.309
SRN25	SR25 Dummy (1 if SR=25, 0 otherwise)	-0.605	0.276	-2.193
SRN97	SR97 Dummy (1 if SR=97, 0 otherwise)	0.511	0.213	2.399
SRN150	SR150 Dummy (1 if SR=150, 0 otherwise)	-2.211	1.034	-2.138
SRN539	SR539 Dummy (1 if SR=539, 0 otherwise)	-1.767	0.625	-2.829
SR261142	SR261 & SR142 Dummy (1 if SR=261 or 142, 0 otherwise)	-1.615	0.578	-2.794
Alpha		386.325	18.478	20.907
Number of obs = 426546 Chi squared = 17565.71 Prob>chi2=0.000				
Restricted LL = -20438.92 Log likelihood = -11188.22				
Pseudo R^2 = 0.4397788				

Table D.37: SPF with LNADT and Length Offset: Fatal Crash Type

Variable	Description	Coeff.	S.E.	t-stat
Poisson/NB/Gamma regression model				
Constant		-2.359	0.065	-36.226
LNADT	Log(AADT)	0.086	0.008	11.058
LENGTH	Segment Length	1.000	(Fixed Parameter)	
Zero inflation model				
Tau		-2.980	0.016	-183.711
Number of obs = 426546				
Restricted LL = -11164.09 Log likelihood = -7606.62300				

Table D.38: SPF with LNADT, Length Offset and Route Dummies: Fatal Crash Type

Variable	Description	Coeff.	S.E.	t-stat
Poisson/NB/Gamma regression model				
Constant		-2.317	0.067	-34.450
LNADT	Log(AADT)	0.081	0.008	10.034
LENGTH	Segment Length	1.000	(Fixed Parameter)	
SRN9	SR9 Dummy (1 if SR=9, 0 otherwise)	-0.216	0.072	-2.986
SRN21	SR21 Dummy (1 if SR=21, 0 otherwise)	-0.210	0.082	-2.575
SRN27	SR27 Dummy (1 if SR=27, 0 otherwise)	-0.611	0.260	-2.350
SRN97	SR97 Dummy (1 if SR=97, 0 otherwise)	0.154	0.027	5.606
SRN702	SR702 Dummy (1 if SR=702, 0 otherwise)	0.365	0.145	2.509
Zero inflation model				
Tau		-2.972	0.016	-182.984
Number of obs = 426546				
Restricted LL = -11164.09 Log likelihood = -7582.52240				

Table D.39: SPF with LNADT, Length Offset and Roadway Geometrics: Fatal Crash Type

Variable	Description	Coeff.	S.E.	t-stat
Poisson/NB/Gamma regression model				
Constant		-1.877	0.228	-8.249
LNADT	Log(AADT)	0.183	0.008	22.820
LENGTH	Segment Length	1.000	(Fixed Parameter)	
NLANED	Number of lanes Decreasing	-0.870	0.191	-4.544
HCANG1	Horizontal Curve Central angle	0.000	0.9D-04	4.965
DGC1	Degree of Curvature	0.005	0.002	3.224
RLNW	Average Lane width	-0.033	0.005	-6.048
Zero inflation model				
Tau		-2.976	0.032	-92.030
Number of obs = 426546				
Restricted LL = -11164.09 Log likelihood = -7412.52795				

Table D.40: SPF with LNADT, Length Offset, Roadway Geometrics and Route Dummies: Fatal Crash Type

Variable	Description	Coeff.	S.E.	t-stat
Poisson/NB/Gamma regression model				
Constant		-1.841	0.228	-8.082
LNADT	Log(AADT)	0.184	0.008	22.974
LENGTH	Segment Length	1.000	(Fixed Parameter)	
NLANED	Number of lanes Decreasing	-0.868	0.192	-4.519
HCANG1	Horizontal Curve Central angle	0.000	0.9D-04	4.485
DGC1	Degree of Curvature	0.006	0.002	3.332
RLNW	Average Lane width	-0.037	0.005	-6.790
SRN9	SR9 Dummy (1 if SR=9, 0 otherwise)	-0.295	0.073	-4.034
SRN27	SR27 Dummy (1 if SR=27, 0 otherwise)	-0.601	0.262	-2.295
SRN97	SR97 Dummy (1 if SR=97, 0 otherwise)	0.091	0.027	3.294
SRN702	SR702 Dummy (1 if SR=702, 0 otherwise)	0.294	0.145	2.019
Zero inflation model				
Tau		-2.973	0.032	-91.671
Number of obs = 426546				
Restricted LL = -11164.09 Log likelihood = -7394.10969				

Table D.41: SPF with LNADT, Length Offset, Roadway Geometrics and Roadside Features: Fatal Crash Type

Variable	Description	Coeff.	S.E.	t-stat
Poisson/NB/Gamma regression model				
Constant		-1.841	0.227	-8.120
LNADT	Log(AADT)	0.181	0.008	22.668
LENGTH	Segment Length	1.000	(Fixed Parameter)	
NLANED	Number of lanes Decreasing	-0.864	0.191	-4.535
HCANG1	Horizontal Curve Central angle	0.000	0.9D-04	4.811
DGC1	Degree of Curvature	0.005	0.002	3.189
RLNW	Average Lane width	-0.033	0.005	-6.176
LGRDRL90	Proportion of Guardrail on a segment is 80-90%	0.323	0.134	2.406
LCLVRT10	Proportion of Culvert on a segment is 0-10%	7.659	3.253	2.355
LCLVRT20	Proportion of Culvert on a segment is 10-20%	4.001	1.734	2.308
DCLVERT	Culvert Dummy variable (1 if Culvert exists, 0 otherwise)	-0.582	0.188	-3.092
DGYWIRE	Guywire Dummy variable (1 if Guywire exists, 0 otherwise)	-0.349	0.126	-2.771
Zero inflation model				
Tau		-3.016	0.033	-92.453
Number of obs = 426546				
Restricted LL = -11164.09 Log likelihood = -7400.64025				

Table D.42: SPF with LNADT, Length Offset, Roadway Geometrics, Roadside Features and Route Dummies: Fatal Crash Type

Variable	Description	Coeff.	S.E.	t-stat
Poisson/NB/Gamma regression model				
Constant		-1.809	0.227	-7.964
LNADT	Log(AADT)	0.182	0.008	22.788
LENGTH	Segment Length	1.000	(Fixed Parameter)	
NLANED	Number of lanes Decreasing	-0.863	0.192	-4.504
HCANG1	Horizontal Curve Central angle	0.000	0.9D-04	4.370
DGC1	Degree of Curvature	0.006	0.002	3.300
RLNW	Average Lane width	-0.037	0.005	-6.858
LGRDRL90	Proportion of Guardrail on a segment is 80-90%	0.330	0.135	2.453
LCLVRT10	Proportion of Culvert on a segment is 0-10%	6.941	3.284	2.114
LCLVRT20	Proportion of Culvert on a segment is 10-20%	3.678	1.753	2.098
DCLVERT	Culvert Dummy variable (1 if Culvert exists, 0 otherwise)	-0.524	0.191	-2.748
DGYWIRE	Guywire Dummy variable (1 if Guywire exists, 0 otherwise)	-0.353	0.127	-2.779
SRN9	SR9 Dummy (1 if SR=9, 0 otherwise)	-0.249	0.073	-3.389
SRN27	SR27 Dummy (1 if SR=27, 0 otherwise)	-0.599	0.260	-2.308
SRN97	SR97 Dummy (1 if SR=97, 0 otherwise)	0.089	0.027	3.239
SRN702	SR702 Dummy (1 if SR=702, 0 otherwise)	0.315	0.146	2.166
Zero inflation model				
Tau		-3.007	0.033	-91.957
Number of obs = 426546				
Restricted LL = -11164.09 Log likelihood = -7383.95605				

Table D.43: SPF with LNADT and Length Offset: Unknown Crash Type

Variable	Description	Coeff.	S.E.	t-stat
Constant		-7.610	0.349	-21.825
LNADT	Log(AADT)	0.168	0.043	3.870
LENGTH	Segment Length	1.000	(Fixed Parameter)	
Alpha		69.293	8.051	8.606
Number of obs = 426546 Chi squared = 543.0109 Prob>chi2=0.000				
Restricted LL = -6305.138 Log likelihood = -6001.411				
Pseudo R^2 = 0.0432822				

Table D.44: SPF with LNADT, Length Offset and Route Dummies: Unknown Crash Type

Variable	Description	Coeff.	S.E.	t-stat
Constant		-7.883	0.367	-21.502
LNADT	Log(AADT)	0.182	0.045	4.015
LENGTH	Segment Length	1.000	(Fixed Parameter)	
SRN7	SR7 Dummy (1 if SR=7, 0 otherwise)	0.630	0.248	2.539
SRN9	SR9 Dummy (1 if SR=9, 0 otherwise)	0.522	0.231	2.262
SRN18	SR18 Dummy (1 if SR=18, 0 otherwise)	-1.577	0.735	-2.144
SRN22	SR22 Dummy (1 if SR=22, 0 otherwise)	1.269	0.389	3.266
SRN26	SR26 Dummy (1 if SR=26, 0 otherwise)	0.690	0.290	2.377
SRN97	SR97 Dummy (1 if SR=97, 0 otherwise)	0.469	0.158	2.968
SRN155	SR155 Dummy (1 if SR=155, 0 otherwise)	0.775	0.179	4.340
SRN173	SR173 Dummy (1 if SR=173, 0 otherwise)	1.411	0.534	2.643
SRN203	SR203 Dummy (1 if SR=203, 0 otherwise)	0.788	0.355	2.218
SRN241	SR241 Dummy (1 if SR=241, 0 otherwise)	1.380	0.425	3.250
SRN243	SR243 Dummy (1 if SR=243, 0 otherwise)	1.807	0.420	4.306
SRN302	SR302 Dummy (1 if SR=302, 0 otherwise)	1.188	0.422	2.816
SRN906	SR906 Dummy (1 if SR=906, 0 otherwise)	2.025	0.742	2.729
SR108109	SR108 & SR109 Dummy (1 if SR=108 or 109, 0 otherwise)	0.727	0.294	2.477
SR24165	SR24 & SR165 Dummy (1 if SR=24 or 165, 0 otherwise)	0.786	0.242	3.254
Alpha		59.063	7.887	7.489
Number of obs = 426546 Chi squared = 513.7560 Prob>chi2=0.000				
Restricted LL = -6305.138 Log likelihood = -5945.302				
Pseudo R^2 = 0.0414174				

Table D.45: SPF with LNADT, Length Offset and Roadway Geometrics: Unknown Crash Type

Variable	Description	Coeff.	S.E.	t-stat
Constant		-4.999	1.040	-4.804
LNADT	Log(AADT)	0.429	0.045	9.610
LENGTH	Segment Length	1.000	(Fixed Parameter)	
NLANEI	Number of lanes Increasing	-4.543	0.999	-4.547
MK1	Rate of vertical curvature/5280	-1.564	0.390	-4.014
DGC1	Degree of Curvature	0.016	0.006	2.502
Alpha		59.292	7.007	8.462
Number of obs = 426546 Chi squared = 534.3481 Prob>chi2=0.000				
Restricted LL = -6305.138 Log likelihood = -5880.656				
Pseudo R^2 = 0.0434583				

Table D.46: SPF with LNADT, Length Offset, Roadway Geometrics and Route Dummies: Unknown Crash Type

Variable	Description	Coeff.	S.E.	t-stat
Constant		-5.381	1.043	-5.161
LNADT	Log(AADT)	0.459	0.045	10.127
LENGTH	Segment Length	1.000	(Fixed Parameter)	
NLANEI	Number of lanes Increasing	-4.480	0.997	-4.492
MK1	Rate of vertical curvature/5280	-1.794	0.391	-4.590
DGC1	Degree of Curvature	0.018	0.007	2.764
SRN22	SR22 Dummy (1 if SR=22, 0 otherwise)	1.279	0.388	3.299
SRN26	SR26 Dummy (1 if SR=26, 0 otherwise)	0.642	0.287	2.241
SRN155	SR155 Dummy (1 if SR=155, 0 otherwise)	0.682	0.182	3.751
SRN173	SR173 Dummy (1 if SR=173, 0 otherwise)	1.264	0.522	2.420
SRN241	SR241 Dummy (1 if SR=241, 0 otherwise)	1.284	0.413	3.109
SRN243	SR243 Dummy (1 if SR=243, 0 otherwise)	1.570	0.411	3.825
SRN906	SR906 Dummy (1 if SR=906, 0 otherwise)	2.194	0.779	2.814
SR24165	SR24 & SR165 Dummy (1 if SR=24 or 165, 0 otherwise)	0.780	0.243	3.216
Alpha		53.337	7.248	7.359
Number of obs = 426546 Chi squared = 511.5234 Prob>chi2=0.000				
Restricted LL = -6305.138 Log likelihood = -5846.090				
Pseudo R^2 = 0.0419154				

Table D.47: SPF with LNADT, Length Offset, Roadway Geometrics and Roadside Features: Unknown Crash Type

Variable	Description	Coeff.	S.E.	t-stat
Constant		-4.992	1.040	-4.799
LNADT	Log(AADT)	0.434	0.045	9.723
LENGTH	Segment Length	1.000	(Fixed Parameter)	
DGC1	Degree of Curvature	0.017	0.006	2.652
NLANEI	Number of lanes Increasing	-4.595	0.999	-4.601
LGRDRL00	Proportion of Guardrail on a segment is 90-100%	-1.005	0.322	-3.124
LTRGRP00		-1.563	0.594	-2.630
Alpha		58.554	6.807	8.602
Number of obs = 426546 Chi squared = 532.0612 Prob>chi2=0.000				
Restricted LL = -6305.138 Log likelihood = -5872.240				
Pseudo R^2 = 0.0433397				

Table D.48: SPF with LNADT, Length Offset, Roadway Geometrics, Roadside Features and Route Dummies: Unknown Crash Type

Variable	Description	Coeff.	S.E.	t-stat
Constant		-5.363	1.043	-5.143
LNADT	Log(AADT)	0.462	0.045	10.186
LENGTH	Segment Length	1.000	(Fixed Parameter)	
DGC1	Degree of Curvature	0.019	0.007	2.910
NLANEI	Number of lanes Increasing	-4.539	0.997	-4.553
LGRDRL00	Proportion of Guardrail on a segment is 90-100%	-1.004	0.331	-3.033
LTRGRP00	Proportion of Guardrail on a segment is 90-100%	-1.489	0.593	-2.508
SRN22	SR22 Dummy (1 if SR=22, 0 otherwise)	1.181	0.380	3.111
SRN26	SR26 Dummy (1 if SR=26, 0 otherwise)	0.578	0.285	2.026
SRN155	SR155 Dummy (1 if SR=155, 0 otherwise)	0.659	0.180	3.667
SRN173	SR173 Dummy (1 if SR=173, 0 otherwise)	1.276	0.529	2.413
SRN241	SR241 Dummy (1 if SR=241, 0 otherwise)	1.329	0.408	3.260
SRN243	SR243 Dummy (1 if SR=243, 0 otherwise)	1.548	0.405	3.820
SRN906	SR906 Dummy (1 if SR=906, 0 otherwise)	2.183	0.771	2.832
SR24165	SR24 & SR165 Dummy (1 if SR=24 or 165, 0 otherwise)	0.722	0.242	2.983
Alpha		53.330	7.045	7.570
Number of obs = 426546 Chi squared = 511.9190 Prob>chi2=0.000				
Restricted LL = -6305.138 Log likelihood = -5839.385				
Pseudo R^2 = 0.0419926				

Table D.49: SPF with LNADT and Length Offset: High Injury (injury/non injury>1) Crash Type

Variable	Description	Coeff.	S.E.	t-stat
Constant		-7.409	0.125	-59.283
LNADT	Log(AADT)	0.554	0.016	34.647
LENGTH	Segment Length	1.000	(Fixed Parameter)	
Alpha		59.417	0.907	65.499
Number of obs = 426546 Chi squared = 101025.5 Prob>chi2=0.000				
Restricted LL = -116263.0 Log likelihood = -62628.35				
Pseudo R^2 = 0.4464580				

Table D.50: SPF with LNADT, Length Offset and Route Dummies: High Injury (injury/non injury>1) Crash Type

Variable	Description	Coeff.	S.E.	t-stat
Constant		-6.459	0.140	-46.183
LNADT	Log(AADT)	0.432	0.018	24.425
LENGTH	Segment Length	1.000	(Fixed Parameter)	
SRN3	SR3 Dummy (1 if SR=3, 0 otherwise)	0.706	0.153	4.603
SRN7	SR7 Dummy (1 if SR=7, 0 otherwise)	0.282	0.111	2.542
SRN18	SR18 Dummy (1 if SR=18, 0 otherwise)	-0.616	0.157	-3.914

Table D.50 (continued): SPF with LNADT, Length Offset and Route Dummies: High Injury (injury/non injury>1) Crash Type

Variable	Description	Coeff.	S.E.	t-stat
SRN21	SR21 Dummy (1 if SR=21, 0 otherwise)	-1.131	0.087	-12.951
SRN22	SR22 Dummy (1 if SR=22, 0 otherwise)	0.964	0.355	2.715
SRN23	SR23 Dummy (1 if SR=23, 0 otherwise)	-1.007	0.203	-4.95
SRN25	SR25 Dummy (1 if SR=25, 0 otherwise)	-0.431	0.099	-4.378
SRN26	SR26 Dummy (1 if SR=26, 0 otherwise)	0.785	0.146	5.381
SRN27	SR27 Dummy (1 if SR=27, 0 otherwise)	-0.241	0.112	-2.158
SRN31	SR31 Dummy (1 if SR=31, 0 otherwise)	-0.824	0.191	-4.306
SRN97	SR97 Dummy (1 if SR=97, 0 otherwise)	0.532	0.083	6.398
SRN129	SR129 Dummy (1 if SR=129, 0 otherwise)	-1.016	0.170	-5.986
SRN172	SR172 Dummy (1 if SR=172, 0 otherwise)	-0.747	0.278	-2.69
SRN195	SR195 Dummy (1 if SR=195, 0 otherwise)	0.383	0.134	2.858
SRN206	SR206 Dummy (1 if SR=206, 0 otherwise)	0.426	0.125	3.394
SRN211	SR211 Dummy (1 if SR=211, 0 otherwise)	0.630	0.293	2.146
SRN272	SR272 Dummy (1 if SR=272, 0 otherwise)	-1.110	0.306	-3.618
SRN290	SR290 Dummy (1 if SR=290, 0 otherwise)	-1.949	0.156	-12.527
SRN302	SR302 Dummy (1 if SR=302, 0 otherwise)	-0.545	0.264	-2.061
SRN503	SR503 Dummy (1 if SR=503, 0 otherwise)	0.423	0.128	3.31
SRN504	SR504 Dummy (1 if SR=504, 0 otherwise)	-0.511	0.129	-3.946
SRN507	SR507 Dummy (1 if SR=507, 0 otherwise)	0.756	0.247	3.064
SRN539	SR539 Dummy (1 if SR=539, 0 otherwise)	-1.281	0.174	-7.382
SR26022	SR260 & SR22 Dummy (1 if SR=260 or 22, 0 otherwise)	-0.857	0.263	-3.255
SRN706	SR706 Dummy (1 if SR=706, 0 otherwise)	0.544	0.139	3.92
SRN821	SR821 Dummy (1 if SR=821, 0 otherwise)	-0.336	0.159	-2.11
SR108109	SR108 & SR109 Dummy (1 if SR=108 or 109, 0 otherwise)	0.346	0.147	2.358
SR160544	SR160 & SR544 & SR274 Dummy (1 if SR=160 or 544 or 274, 0 otherwise)	-1.490	0.389	-3.832
SR432532	SR432 & SR532 Dummy (1 if SR=432 or 532, 0 otherwise)	0.772	0.284	2.717
SR123169	SR123 & SR169 Dummy (1 if SR=123 or 169, 0 otherwise)	-0.571	0.128	-4.474
SR261142	SR261 & SR142 Dummy (1 if SR=261 or 142, 0 otherwise)	-0.772	0.172	-4.493
Alpha		56.620	0.889	63.708
Number of obs = 426546 Chi squared = 98171.29 Prob>chi2=0.000				
Restricted LL = -116263.0 Log likelihood = -62325.90				
Pseudo R^2 = 0.4405795				

Table D.51: SPF with LNADT, Length Offset and Roadway Geometrics: High Injury (injury/non injury>1) Crash Type

Variable	Description	Coeff.	S.E.	t-stat
Constant		-3.828	0.111	-34.350
LNADT	Log(AADT)	0.811	0.017	48.786
LENGTH	Segment Length	1.000	(Fixed Parameter)	
NLANEI	Number of lanes Increasing	-2.906	0.196	-14.856
NLANED	Number of lanes Decreasing	-2.550	0.199	-12.798
HCANG1	Horizontal Curve Central angle	0.001	0.000	3.622
A1	Algebraic difference in gradients	-0.031	0.006	-5.179
MK1	Rate of vertical curvature/5280	-0.363	0.081	-4.479
Alpha		47.612	0.725	65.665
Number of obs = 426546 Chi squared = 91463.50 Prob>chi2=0.000				
Restricted LL = -116263.0 Log likelihood = -61095.48				
Pseudo R^2 = 0.4280908				

Table D.52: SPF with LNADT, Length Offset, Roadway Geometrics and Route Dummies: High Injury (injury/non injury>1) Crash Type

Variable	Description	Coeff.	S.E.	t-stat
Constant		-3.552	0.120	-29.655
LNADT	Log(AADT)	0.755	0.018	41.983
LENGTH	Segment Length	1.000	(Fixed Parameter)	
NLANEI	Number of lanes Increasing	-2.810	0.190	-14.771
NLANED	Number of lanes Decreasing	-2.516	0.193	-13.002
HCANG1	Horizontal Curve Central angle	0.000	0.000	3.097
A1	Algebraic difference in gradients	-0.029	0.006	-4.714
MK1	Rate of vertical curvature/5280	-0.396	0.074	-5.347
SRN3	SR3 Dummy (1 if SR=3, 0 otherwise)	0.471	0.180	2.613
SRN7	SR7 Dummy (1 if SR=7, 0 otherwise)	0.348	0.101	3.439
SRN21	SR21 Dummy (1 if SR=21, 0 otherwise)	-0.654	0.083	-7.879
SRN23	SR23 Dummy (1 if SR=23, 0 otherwise)	-0.575	0.191	-3.012
SRN26	SR26 Dummy (1 if SR=26, 0 otherwise)	0.794	0.124	6.421
SRN31	SR31 Dummy (1 if SR=31, 0 otherwise)	-0.494	0.180	-2.752
SRN97	SR97 Dummy (1 if SR=97, 0 otherwise)	0.312	0.074	4.223
SRN129	SR129 Dummy (1 if SR=129, 0 otherwise)	-0.639	0.158	-4.039
SRN195	SR195 Dummy (1 if SR=195, 0 otherwise)	0.301	0.137	2.187
SRN206	SR206 Dummy (1 if SR=206, 0 otherwise)	0.562	0.121	4.655
SRN211	SR211 Dummy (1 if SR=211, 0 otherwise)	0.665	0.253	2.625
SRN272	SR272 Dummy (1 if SR=272, 0 otherwise)	-0.690	0.296	-2.336
SRN290	SR290 Dummy (1 if SR=290, 0 otherwise)	-1.384	0.243	-5.692
SRN302	SR302 Dummy (1 if SR=302, 0 otherwise)	-0.789	0.233	-3.386
SRN503	SR503 Dummy (1 if SR=503, 0 otherwise)	0.419	0.122	3.420

Table D.52 (continued): SPF with LNADT, Length Offset, Roadway Geometrics and Route Dummies: High Injury (injury/non injury>1) Crash Type

Variable	Description	Coeff.	S.E.	t-stat
SRN504	SR504 Dummy (1 if SR=504, 0 otherwise)	-0.500	0.119	-4.197
SRN706	SR706 Dummy (1 if SR=706, 0 otherwise)	0.437	0.128	3.401
SR160544	SR160 & SR544 & SR274 Dummy (1 if SR=160 or 544 or 274, 0 otherwise)	-1.743	0.372	-4.692
SR123169	SR123 & SR169 Dummy (1 if SR=123 or 169, 0 otherwise)	-0.789	0.155	-5.107
Alpha		46.555	0.730	63.816
Number of obs = 426546 Chi squared = 90179.68 Prob>chi2=0.000				
Restricted LL = -116263.0 Log likelihood = -60943.16				
Pseudo R^2 = 0.4252434				

Table D.53: SPF with LNADT, Length Offset, Roadway Geometrics and Roadside Features: High Injury (injury/non injury>1) Crash Type

Variable	Description	Coeff.	S.E.	t-stat
Constant		-3.750	0.112	-33.526
LNADT	Log(AADT)	0.799	0.016	48.517
LENGTH	Segment Length	1.000	(Fixed Parameter)	
NLANEI	Number of lanes Increasing	-2.898	0.193	-14.996
NLANED	Number of lanes Decreasing	-2.550	0.197	-12.949
HCANG1	Horizontal Curve Central angle	0.001	0.000	4.125
A1	Algebraic difference in gradients	-0.030	0.006	-5.009
MK1	Rate of vertical curvature/5280	-0.353	0.082	-4.316
LGRDRL00	Proportion of Guardrail on a segment is 90-100%	-0.651	0.124	-5.241
LBRDRL60	Proportion of Bridge rail on a segment is 50-60%	4.400	0.693	6.353
LCLVRT40	Proportion of Culvert on a segment is 30-40%	-3.495	1.437	-2.433
LDITCH00	Proportion of Ditch on a segment is 90-100%	-0.528	0.072	-7.328
DCLVERT	Culvert Dummy variable (1 if Culvert exists, 0 otherwise)	0.461	0.149	3.103
LCURB	Curb length on a segment	-0.463	0.190	-2.437
DGRDRAL	Guardrail Dummy variable (1 if Guardrail exists, 0 otherwise)	0.274	0.102	2.690
DMALBOX	Mailbox Dummy variable (1 if Mailbox exists, 0 otherwise)	0.571	0.173	3.298
Alpha		47.062	0.718	65.520
Number of obs = 426546 Chi squared = 90402.02 Prob>chi2=0.000				
Restricted LL = -116263.0 Log likelihood = -61025.57				
Pseudo R^2 = 0.4255151				

Table D.54: SPF with LNADT, Length Offset, Roadway Geometrics, Roadside Features and Route Dummies: High Injury (injury/non injury>1) Crash Type

Variable	Description	Coeff.	S.E.	t-stat
Constant		-3.489	0.120	-29.118
LNADT	Log(AADT)	0.743	0.018	41.853
LENGTH	Segment Length	1.000	(Fixed Parameter)	
NLANEI	Number of lanes Increasing	-2.795	0.188	-14.902
NLANED	Number of lanes Decreasing	-2.513	0.191	-13.161
HCANG1	Horizontal Curve Central angle	0.001	0.000	3.725
A1	Algebraic difference in gradients	-0.028	0.006	-4.509
MK1	Rate of vertical curvature/5280	-0.382	0.075	-5.097
LGRDRL00	Proportion of Guardrail on a segment is 90-100%	-0.679	0.123	-5.505
LBRDRL60	Proportion of Bridge rail on a segment is 50-60%	4.331	0.681	6.357
LCLVRT40	Proportion of Culvert on a segment is 30-40%	-3.497	1.434	-2.439
LDITCH00	Proportion of Ditch on a segment is 90-100%	-0.539	0.073	-7.428
DCLVERT	Culvert Dummy variable (1 if Culvert exists, 0 otherwise)	0.463	0.146	0.146
LCURB	Curb length on a segment	-0.494	0.192	0.192
DGRDRAL	Guardrail Dummy variable (1 if Guardrail exists, 0 otherwise)	0.345	0.101	0.101
DMALBOX	Mailbox Dummy variable (1 if Mailbox exists, 0 otherwise)	0.570	0.173	0.173
SRN3	SR3 Dummy (1 if SR=3, 0 otherwise)	0.458	0.178	0.178
SRN7	SR7 Dummy (1 if SR=7, 0 otherwise)	0.360	0.101	0.101
SRN21	SR21 Dummy (1 if SR=21, 0 otherwise)	-0.665	0.083	0.083
SRN23	SR23 Dummy (1 if SR=23, 0 otherwise)	-0.516	0.188	0.188
SRN26	SR26 Dummy (1 if SR=26, 0 otherwise)	0.819	0.123	0.123
SRN31	SR31 Dummy (1 if SR=31, 0 otherwise)	-0.438	0.175	0.175
SRN97	SR97 Dummy (1 if SR=97, 0 otherwise)	0.327	0.073	0.073
SRN129	SR129 Dummy (1 if SR=129, 0 otherwise)	-0.581	0.161	0.161
SRN195	SR195 Dummy (1 if SR=195, 0 otherwise)	0.319	0.136	0.136
SRN206	SR206 Dummy (1 if SR=206, 0 otherwise)	0.548	0.119	0.119
SRN211	SR211 Dummy (1 if SR=211, 0 otherwise)	0.656	0.252	0.252
SRN272	SR272 Dummy (1 if SR=272, 0 otherwise)	-0.697	0.294	0.294
SRN290	SR290 Dummy (1 if SR=290, 0 otherwise)	-1.353	0.242	0.242
SRN302	SR302 Dummy (1 if SR=302, 0 otherwise)	-0.808	0.230	0.230
SRN503	SR503 Dummy (1 if SR=503, 0 otherwise)	0.435	0.121	0.121
SRN504	SR504 Dummy (1 if SR=504, 0 otherwise)	-0.517	0.118	0.118
SRN706	SR706 Dummy (1 if SR=706, 0 otherwise)	0.450	0.127	0.127
SR108109	SR108 & SR109 Dummy (1 if SR=108 or 109, 0 otherwise)	0.263	0.127	2.074
SR160544	SR160 & SR544 & SR274 Dummy (1 if SR=160 or 544 or 274, 0 otherwise)	-1.717	0.370	-4.643

Table D.54 (continued): SPF with LNADT, Length Offset, Roadway Geometrics, Roadside Features and Route Dummies: High Injury (injury/non injury>1) Crash Type

Variable	Description	Coeff.	S.E.	t-stat
SR123169	SR123 & SR169 Dummy (1 if SR=123 or 169, 0 otherwise)	-0.822	0.158	-5.204
Alpha		45.973	0.722	63.701
Number of obs = 426546 Chi squared = 89139.34 Prob>chi2=0.000				
Restricted LL = -116263.0 Log likelihood = -60867.23				
Pseudo R^2 = 0.4227142				

Table D.55: SPF with LNADT and Length Offset: Just Injury (injury/non injury=1) Crash Type

Variable	Description	Coeff.	S.E.	t-stat
Constant		-10.260	0.333	-30.774
LNADT	Log(AADT)	0.600	0.041	14.654
LENGTH	Segment Length	1.000	(Fixed Parameter)	
Alpha		383.606	18.934	20.260
Number of obs = 426546 Chi squared = 11683.49 Prob>chi2=0.000				
Restricted LL = -15080.28 Log likelihood = -8893.320				
Pseudo R^2 = 0.3964519				

Table D.56: SPF with LNADT, Length Offset and Route Dummies: Just Injury (injury/non injury=1) Crash Type

Variable	Description	Coeff.	S.E.	t-stat
Constant		-9.820	0.349	-28.102
LNADT	Log(AADT)	0.546	0.043	12.743
LENGTH	Segment Length	1.000	(Fixed Parameter)	
SRN3	SR3 Dummy (1 if SR=3, 0 otherwise)	0.675	0.333	2.029
SRN21	SR21 Dummy (1 if SR=21, 0 otherwise)	-0.811	0.383	-2.116
SRN129	SR129 Dummy (1 if SR=129, 0 otherwise)	-1.621	0.599	-2.705
SRN539	SR539 Dummy (1 if SR=539, 0 otherwise)	-1.528	0.543	-2.816
Alpha		377.310	18.712	20.164
Number of obs = 426546 Chi squared = 11613.54 Prob>chi2=0.000				
Restricted LL = -15080.28 Log likelihood = -8882.198				
Pseudo R^2 = 0.3953150				

Table D.57: SPF with LNADT, Length Offset and Roadway Geometrics: Just Injury (injury/non injury=1) Crash Type

Variable	Description	Coeff.	S.E.	t-stat
Constant		-6.591	1.071	-6.155
LNADT	Log(AADT)	0.900	0.046	19.787
LENGTH	Segment Length	1.000	(Fixed Parameter)	
NLANEI	Number of lanes Increasing	-0.942	0.201	-4.694
NLANED	Number of lanes Decreasing	-4.992	1.025	-4.871
MK1	Rate of vertical curvature/5280	-1.849	0.326	-5.676
DGC1	Degree of Curvature	0.023	0.007	3.390
Alpha		292.838	14.838	19.736
Number of obs = 426546 Chi squared = 10906.91 Prob>chi2=0.000				
Restricted LL = -15080.28 Log likelihood = -8678.378				
Pseudo R^2 = 0.3858987				

Table D.58: SPF with LNADT, Length Offset, Roadway Geometrics and Route Dummies: Just Injury (injury/non injury=1) Crash Type

Variable	Description	Coeff.	S.E.	t-stat
Constant		-6.482	1.070	-6.059
LNADT	Log(AADT)	0.880	0.045	19.385
LENGTH	Segment Length	1.000	(Fixed Parameter)	
NLANEI	Number of lanes Increasing	-0.900	0.200	-4.509
NLANED	Number of lanes Decreasing	-4.989	1.024	-4.874
MK1	Rate of vertical curvature/5280	-2.112	0.330	-6.406
DGC1	Degree of Curvature	0.025	0.007	3.509
SRN129	SR129 Dummy (1 if SR=129, 0 otherwise)	-1.418	0.569	-2.492
SRN195	SR195 Dummy (1 if SR=195, 0 otherwise)	0.748	0.333	2.245
Alpha		289.983	14.717	19.704
Number of obs = 426546 Chi squared = 10869.89 Prob>chi2=0.000				
Restricted LL = -15080.28 Log likelihood = -8672.282				
Pseudo R^2 = 0.3852597				

Table D.59: SPF with LNADT, Length Offset, Roadway Geometrics and Roadside Features: Just Injury (injury/non injury=1) Crash Type

Variable	Description	Coeff.	S.E.	t-stat
Constant		-6.614	1.072	-6.169
LNADT	Log(AADT)	0.907	0.046	19.881
LENGTH	Segment Length	1.000	(Fixed Parameter)	
NLANEI	Number of lanes Increasing	-0.967	0.202	-4.797
NLANED	Number of lanes Decreasing	-4.968	1.026	-4.843
MK1	Rate of vertical curvature/5280	-1.863	0.326	-5.713
DGC1	Degree of Curvature	0.023	0.007	3.391
LGRDRL00	Proportion of Guardrail on a segment is 90-100%	-0.772	0.268	-2.882
LTRGRP00	Proportion of Tree group on a segment is 90-100%	-0.965	0.355	-2.717
DCURB	Curb Dummy variable (1 if Curb exists, 0 otherwise)	-1.020	0.439	-2.324
Alpha		288.602	14.656	19.691
Number of obs = 426546 Chi squared = 10867.91 Prob>chi2=0.000				
Restricted LL = -15080.28 Log likelihood = -8668.666				
Pseudo R^2 = 0.3853152				

Table D.60: SPF with LNADT, Length Offset, Roadway Geometrics, Roadside Features and Route Dummies: Just Injury (injury/non injury=1) Crash Type

Variable	Description	Coeff.	S.E.	t-stat
Constant		-6.507	1.071	-6.076
LNADT	Log(AADT)	0.887	0.046	19.476
LENGTH	Segment Length	1.000	(Fixed Parameter)	
NLANEI	Number of lanes Increasing	-0.924	0.201	-4.606
NLANED	Number of lanes Decreasing	-4.969	1.025	-4.850
MK1	Rate of vertical curvature/5280	-2.112	0.330	-6.405
DGC1	Degree of Curvature	0.025	0.007	3.501
LGRDRL00	Proportion of Guardrail on a segment is 90-100%	-0.740	0.268	-2.766
LTRGRP00	Proportion of Tree group on a segment is 90-100%	-0.946	0.355	-2.666
DCURB	Curb Dummy variable (1 if Curb exists, 0 otherwise)	-1.002	0.438	-2.288
SRN129	SR129 Dummy (1 if SR=129, 0 otherwise)	-1.357	0.574	-2.366
SRN195	SR195 Dummy (1 if SR=195, 0 otherwise)	0.714	0.330	2.166
Alpha		286.054	14.551	19.659
Number of obs = 426546 Chi squared = 10833.89 Prob>chi2=0.000				
Restricted LL = -15080.28 Log likelihood = -8663.093				
Pseudo R^2 = 0.3847251				

Table D.61: SPF with LNADT and Length Offset: Low Injury (injury/non injury<1) Crash Type

Variable	Description	Coeff.	S.E.	t-stat
Constant		-7.057	0.095	-74.565
LNADT	Log(AADT)	0.527	0.012	44.372
LENGTH	Segment Length	1.000	(Fixed Parameter)	
Alpha		35.103	0.470	74.706
Number of obs = 426546 Chi squared = 87753.66 Prob>chi2=0.000				
Restricted LL = -124767.8 Log likelihood = -77550.35				
Pseudo R^2 = 0.3613427				

Table D.62: SPF with LNADT, Length Offset and Route Dummies: Low Injury (injury/non injury<1) Crash Type

Variable	Description	Coeff.	S.E.	t-stat
Constant		-6.274	0.100	-62.813
LNADT	Log(AADT)	0.416	0.012	34.051
LENGTH	Segment Length	1.000	(Fixed Parameter)	
SRN3	SR3 Dummy (1 if SR=3, 0 otherwise)	0.737	0.115	6.392
SRN9	SR9 Dummy (1 if SR=9, 0 otherwise)	-0.182	0.079	-2.298
SRN11	SR11 Dummy (1 if SR=11, 0 otherwise)	-0.415	0.095	-4.376
SRN12	SR12 Dummy (1 if SR=12, 0 otherwise)	0.382	0.044	8.703
SRN21	SR21 Dummy (1 if SR=21, 0 otherwise)	-1.449	0.089	-16.334
SRN22	SR22 Dummy (1 if SR=22, 0 otherwise)	0.824	0.255	3.226
SRN23	SR23 Dummy (1 if SR=23, 0 otherwise)	-0.557	0.129	-4.308
SRN25	SR25 Dummy (1 if SR=25, 0 otherwise)	-0.440	0.083	-5.299
SRN26	SR26 Dummy (1 if SR=26, 0 otherwise)	1.059	0.130	8.149
SRN97	SR97 Dummy (1 if SR=97, 0 otherwise)	0.809	0.069	11.645
SRN129	SR129 Dummy (1 if SR=129, 0 otherwise)	-0.926	0.127	-7.289
SRN161	SR161 Dummy (1 if SR=161, 0 otherwise)	-0.586	0.132	-4.440
SRN395	SR395 Dummy (1 if SR=395, 0 otherwise)	0.282	0.057	4.965
SRN501	SR501 Dummy (1 if SR=501, 0 otherwise)	0.423	0.178	2.377
SRN504	SR504 Dummy (1 if SR=504, 0 otherwise)	-0.567	0.095	-5.946
SRN507	SR507 Dummy (1 if SR=507, 0 otherwise)	0.517	0.136	3.786
SRN539	SR539 Dummy (1 if SR=539, 0 otherwise)	-1.686	0.148	-11.424
SRN542	SR542 Dummy (1 if SR=542, 0 otherwise)	0.693	0.063	10.991
SRN970	SR970 Dummy (1 if SR=970, 0 otherwise)	1.401	0.486	2.881
SR432532	SR432 & SR532 Dummy (1 if SR=432 or 532, 0 otherwise)	0.782	0.200	3.904
SR123169	SR123 & SR169 Dummy (1 if SR=123 or 169, 0 otherwise)	-0.839	0.121	-6.953
SR261142	SR261 & SR142 Dummy (1 if SR=261 or 142, 0 otherwise)	-0.622	0.138	-4.521

Table D.62 (continued): SPF with LNADT, Length Offset and Route Dummies: Low Injury (injury/non injury<1) Crash Type

Variable	Description	Coeff.	S.E.	t-stat
SR26022	SR260 & SR22 Dummy (1 if SR=260 or 22, 0 otherwise)	-0.842	0.207	-4.068
SR108109	SR108 & SR109 Dummy (1 if SR=108 or 109, 0 otherwise)	0.368	0.112	3.271
SR534105	SR534 & SR105 Dummy (1 if SR=534 or 105, 0 otherwise)	0.340	0.140	2.433
Alpha		32.593	0.445	73.170
Number of obs = 426546 Chi squared = 84001.09 Prob>chi2=0.000				
Restricted LL = -124767.8 Log likelihood = -76936.00				
Pseudo R^2 = 0.3531341				

Table D.63: SPF with LNADT, Length Offset and Roadway Geometrics: Low Injury (injury/non injury<1) Crash Type

Variable	Description	Coeff.	S.E.	t-stat
Constant		-4.881	0.099	-49.249
LNADT	Log(AADT)	0.790	0.014	57.507
LENGTH	Segment Length	1.000	(Fixed Parameter)	
NLANEI	Number of lanes Increasing	-1.644	0.087	-18.945
NLANED	Number of lanes Decreasing	-2.949	0.096	-30.762
A1	Algebraic difference in gradients	-0.019	0.005	-3.885
MK1	Rate of vertical curvature/5280	-0.248	0.075	-3.326
DGC1	Degree of Curvature	0.009	0.002	5.337
RLNW	Average Lane width	0.042	0.008	5.471
SWR2367	Shoulder width dummy (if shoulder width right is 2-3ft and shoulder width left is 6-7ft, value=1,else=0)	-0.435	0.214	-2.026
SWR4523	Shoulder width dummy (if shoulder width right is 4-5ft and shoulder width left is 2-3ft, value=1,else=0)	-0.297	0.090	-3.281
SWR8901	Shoulder width dummy (if shoulder width right is 8-9ft and shoulder width left is 0-1ft, value=1,else=0)	-0.601	0.287	-2.093
SWR8910	Shoulder width dummy (if shoulder width right is 8-9ft and shoulder width left is >10ft, value=1,else=0)	-0.637	0.236	-2.701

Table D.63 (continued): SPF with LNADT, Length Offset and Roadway Geometrics: Low Injury (injury/non injury<1) Crash Type

Variable	Description	Coeff.	S.E.	t-stat
SWR1023	Shoulder width dummy (if shoulder width right is >10ft and shoulder width left is 2-3ft, value=1,else=0)	-1.165	0.366	-3.180
SWC19	Shoulder width dummy (if shoulder width center is >1ft and <9ft, value=1,else=0)	-3.953	0.532	-7.435
Alpha		27.647	0.378	73.124
Number of obs = 426546 Chi squared = 78427.51 Prob>chi2=0.000				
Restricted LL = -124767.8 Log likelihood = -75318.44				
Pseudo R^2 = 0.3423819				

Table D.64: SPF with LNADT, Length Offset, Roadway Geometrics and Route Dummies: Low Injury (injury/non injury<1) Crash Type

Variable	Description	Coeff.	S.E.	t-stat
Constant		-4.438	0.108	-41.032
LNADT	Log(AADT)	0.730	0.014	52.725
LENGTH	Segment Length	1.000	(Fixed Parameter)	
NLANEI	Number of lanes Increasing	-1.487	0.078	-19.060
NLANED	Number of lanes Decreasing	-2.922	0.099	-29.594
A1	Algebraic difference in gradients	-0.013	0.005	-2.717
MK1	Rate of vertical curvature/5280	-0.346	0.061	-5.709
DGC1	Degree of Curvature	0.010	0.002	5.612
RLNW	Average Lane width	0.018	0.007	2.623
SWR2367	Shoulder width dummy (if shoulder width right is 2-3ft and shoulder width left is 6-7ft, value=1,else=0)	-0.431	0.207	-2.086
SWR4523	Shoulder width dummy (if shoulder width right is 4-5ft and shoulder width left is 2-3ft, value=1,else=0)	-0.272	0.087	-3.131
SWR8910	Shoulder width dummy (if shoulder width right is 8-9ft and shoulder width left is >10ft, value=1,else=0)	-0.549	0.222	-2.471
SWR1023	Shoulder width dummy (if shoulder width right is >10ft and shoulder width left is 2-3ft, value=1,else=0)	-1.074	0.355	-3.021
SWC19	Shoulder width dummy (if shoulder width center is >1ft and <9ft, value=1,else=0)	-3.946	0.510	-7.740
SRN3	SR3 Dummy (1 if SR=3, 0 otherwise)	0.557	0.138	4.030
SRN9	SR9 Dummy (1 if SR=9, 0 otherwise)	-0.335	0.071	-4.694
SRN11	SR11 Dummy (1 if SR=11, 0 otherwise)	-0.487	0.084	-5.782

Table D.64 (continued): SPF with LNADT, Length Offset, Roadway Geometrics and Route Dummies: Low Injury (injury/non injury<1) Crash Type

Variable	Description	Coeff.	S.E.	t-stat
SRN12	SR12 Dummy (1 if SR=12, 0 otherwise)	0.526	0.045	11.640
SRN21	SR21 Dummy (1 if SR=21, 0 otherwise)	-0.966	0.086	-11.279
SRN22	SR22 Dummy (1 if SR=22, 0 otherwise)	0.525	0.249	2.112
SRN25	SR25 Dummy (1 if SR=25, 0 otherwise)	-0.162	0.077	-2.104
SRN26	SR26 Dummy (1 if SR=26, 0 otherwise)	1.117	0.106	10.569
SRN97	SR97 Dummy (1 if SR=97, 0 otherwise)	0.618	0.060	10.295
SRN129	SR129 Dummy (1 if SR=129, 0 otherwise)	-0.633	0.124	-5.084
SRN161	SR161 Dummy (1 if SR=161, 0 otherwise)	-0.565	0.146	-3.860
SRN395	SR395 Dummy (1 if SR=395, 0 otherwise)	0.686	0.088	7.825
SRN504	SR504 Dummy (1 if SR=504, 0 otherwise)	-0.564	0.089	-6.363
SRN542	SR542 Dummy (1 if SR=542, 0 otherwise)	0.718	0.054	13.215
SRN970	SR970 Dummy (1 if SR=970, 0 otherwise)	1.168	0.400	2.922
SR432532	SR432 & SR532 Dummy (1 if SR=432 or 532, 0 otherwise)	0.558	0.248	2.249
SR123169	SR123 & SR169 Dummy (1 if SR=123 or 169, 0 otherwise)	-0.990	0.137	-7.225
SR26022	SR260 & SR22 Dummy (1 if SR=260 or 22, 0 otherwise)	-0.572	0.200	-2.866
SR108109	SR108 & SR109 Dummy (1 if SR=108 or 109, 0 otherwise)	0.227	0.098	2.313
SR534105	SR534 & SR105 Dummy (1 if SR=534 or 105, 0 otherwise)	0.289	0.122	2.367
Alpha		26.101	0.364	71.655
Number of obs = 426546 Chi squared = 75643.63 Prob>chi2=0.000				
Restricted LL = -124767.8 Log likelihood = -74812.90				
Pseudo R^2 = 0.3357918				

Table D.65: SPF with LNADT, Length Offset, Roadway Geometrics and Roadside Features: Low Injury (injury/non injury<1) Crash Type

Variable	Description	Coeff.	S.E.	t-stat
Constant		-4.941	0.100	-49.510
LNADT	Log(AADT)	0.785	0.014	56.654
LENGTH	Segment Length	1.000	(Fixed Parameter)	
NLANEI	Number of lanes Increasing	-1.637	0.085	-19.246
NLANED	Number of lanes Decreasing	-2.917	0.094	-30.947
A1	Algebraic difference in gradients	-0.016	0.005	-3.430
MK1	Rate of vertical curvature/5280	-0.248	0.075	-3.306
DGC1	Degree of Curvature	0.010	0.002	6.012
RLNW	Average Lane width	0.045	0.008	5.989

Table D.65 (continued): SPF with LNADT, Length Offset, Roadway Geometrics and Roadside Features: Low Injury (injury/non injury<1) Crash Type

Variable	Description	Coeff.	S.E.	t-stat
SWR4523	Shoulder width dummy (if shoulder width right is 4-5ft and shoulder width left is 2-3ft, value=1,else=0)	-0.338	0.102	-3.311
SWR8901	Shoulder width dummy (if shoulder width right is 8-9ft and shoulder width left is 0-1ft, value=1,else=0)	-0.669	0.283	-2.367
SWR8910	Shoulder width dummy (if shoulder width right is 8-9ft and shoulder width left is >10ft, value=1,else=0)	-0.626	0.235	-2.668
SWR1023	Shoulder width dummy (if shoulder width right is >10ft and shoulder width left is 2-3ft, value=1,else=0)	-1.118	0.367	-3.048
SWC19	Shoulder width dummy (if shoulder width center is >1ft and <9ft, value=1,else=0)	-3.945	0.528	-7.471
LGRDRL70	Proportion of Guardrail on a segment is 60-70%	-0.739	0.356	-2.077
LGRDRL00	Proportion of Guardrail on a segment is 90-100%	-0.904	0.108	-8.362
LBRDRL00	Proportion of Bridge rail on a segment is 90-100%	-0.421	0.169	-2.487
LTRGRP00	Proportion of Tree group on a segment is 90-100%	-0.567	0.108	-5.249
LDITCH00	Proportion of Ditch on a segment is 90-100%	-0.684	0.083	-8.217
DDITCH	Ditch Dummy variable (1 if Ditch exists, 0 otherwise)	0.509	0.062	8.202
DFENCE	Fence Dummy variable (1 if Fence exists, 0 otherwise)	-0.223	0.068	-3.264
DGRDRAL	Guardrail Dummy variable (1 if Guardrail exists, 0 otherwise)	0.439	0.082	5.383
DMFXOBJ	Fixed Object Dummy variable (1 if Fixed Object exists, 0 otherwise)	0.474	0.098	4.832
Alpha		27.083	0.371	73.076
Number of obs = 426546 Chi squared = 77157.18 Prob>chi2=0.000				
Restricted LL = -124767.8 Log likelihood = -75156.20				
Pseudo R^2 = 0.3391978				

Table D.66: SPF with LNADT, Length Offset, Roadway Geometrics, Roadside Features and Route Dummies: Low Injury (injury/non injury<1) Crash Type

Variable	Description	Coeff.	S.E.	t-stat
Constant		-4.476	0.109	-41.153
LNADT	Log(AADT)	0.727	0.014	52.026
LENGTH	Segment Length	1.000	(Fixed Parameter)	
NLANEI	Number of lanes Increasing	-1.482	0.077	-19.299
NLANED	Number of lanes Decreasing	-2.903	0.098	-29.726
A1	Algebraic difference in gradients	-0.012	0.005	-2.390
MK1	Rate of vertical curvature/5280	-0.341	0.061	-5.559
DGC1	Degree of Curvature	0.011	0.002	6.172
RLNW	Average Lane width	0.020	0.007	2.874
SWR4523	Shoulder width dummy (if shoulder width right is 4-5ft and shoulder width left is 2-3ft, value=1,else=0)	-0.313	0.099	-3.167
SWR8910	Shoulder width dummy (if shoulder width right is 8-9ft and shoulder width left is >10ft, value=1,else=0)	-0.533	0.222	-2.408
SWR1023	Shoulder width dummy (if shoulder width right is >10ft and shoulder width left is 2-3ft, value=1,else=0)	-1.034	0.356	-2.904
SWC19	Shoulder width dummy (if shoulder width center is >1ft and <9ft, value=1,else=0)	-3.934	0.508	-7.744
LGRDRL70	Proportion of Guardrail on a segment is 60-70%	-0.937	0.377	-2.488
LGRDRL00	Proportion of Guardrail on a segment is 90-100%	-0.932	0.107	-8.732
LTRGRP00	Proportion of Tree group on a segment is 90-100%	-0.511	0.105	-4.866
LDITCH00	Proportion of Ditch on a segment is 90-100%	-0.665	0.081	-8.192
DDITCH	Ditch Dummy variable (1 if Ditch exists, 0 otherwise)	0.483	0.060	8.035
DFENCE	Fence Dummy variable (1 if Fence exists, 0 otherwise)	-0.204	0.066	-3.080
DGRDRAL	Guardrail Dummy variable (1 if Guardrail exists, 0 otherwise)	0.465	0.079	5.859
DMFXOBJ	Fixed Object Dummy variable (1 if Fixed Object exists, 0 otherwise)	0.417	0.095	4.387
SRN3	SR3 Dummy (1 if SR=3, 0 otherwise)	0.522	0.138	3.773
SRN9	SR9 Dummy (1 if SR=9, 0 otherwise)	-0.312	0.072	-4.350
SRN11	SR11 Dummy (1 if SR=11, 0 otherwise)	-0.458	0.084	-5.468

Table D.66 (continued): SPF with LNADT, Length Offset, Roadway Geometrics, Roadside Features and Route Dummies: Low Injury (injury/non injury<1) Crash Type

Variable	Description	Coeff.	S.E.	t-stat
SRN12	SR12 Dummy (1 if SR=12, 0 otherwise)	0.517	0.045	11.479
SRN21	SR21 Dummy (1 if SR=21, 0 otherwise)	-0.955	0.086	-11.152
SRN25	SR25 Dummy (1 if SR=25, 0 otherwise)	-0.156	0.077	-2.043
SRN26	SR26 Dummy (1 if SR=26, 0 otherwise)	1.105	0.103	10.756
SRN97	SR97 Dummy (1 if SR=97, 0 otherwise)	0.591	0.059	10.059
SRN129	SR129 Dummy (1 if SR=129, 0 otherwise)	-0.642	0.128	-5.025
SRN161	SR161 Dummy (1 if SR=161, 0 otherwise)	-0.569	0.146	-3.892
SRN395	SR395 Dummy (1 if SR=395, 0 otherwise)	0.690	0.086	8.012
SRN504	SR504 Dummy (1 if SR=504, 0 otherwise)	-0.574	0.089	-6.483
SRN542	SR542 Dummy (1 if SR=542, 0 otherwise)	0.728	0.054	13.527
SRN970	SR970 Dummy (1 if SR=970, 0 otherwise)	1.184	0.393	3.011
SR432532	SR432 & SR532 Dummy (1 if SR=432 or 532, 0 otherwise)	0.560	0.247	2.266
SR123169	SR123 & SR169 Dummy (1 if SR=123 or 169, 0 otherwise)	-0.974	0.139	-7.015
SR26022	SR260 & SR22 Dummy (1 if SR=260 or 22, 0 otherwise)	-0.270	0.114	-2.374
SR534105	SR534 & SR105 Dummy (1 if SR=534 or 105, 0 otherwise)	0.272	0.119	2.283
Alpha		25.630	0.358	71.648
Number of obs = 426546 Chi squared = 74574.52 Prob>chi2=0.000				
Restricted LL = -124767.8 Log likelihood = -74668.25				
Pseudo R^2 = 0.3330543				

Table D.67: SPF with LNADT and Length Offset: Involving one vehicle Crash Type

Variable	Description	Coeff.	S.E.	t-stat
Constant		-4.796	0.081	-59.494
LNADT	Log(AADT)	0.258	0.010	25.135
LENGTH	Segment Length	1.000	(Fixed Parameter)	
Alpha		16.717	0.218	76.749
Number of obs = 426546 Chi squared = 51168.25 Prob>chi2=0.000				
Restricted LL = -122686.0 Log likelihood = -95618.98				
Pseudo R^2 = 0.2110847				

Table D.68: SPF with LNADT, Length Offset and Route Dummies: Involving one vehicle Crash Type

Variable	Description	Coeff.	S.E.	t-stat
Constant		-3.945	0.088	-44.829
LNADT	Log(AADT)	0.143	0.011	12.912
LENGTH	Segment Length	1.000	(Fixed Parameter)	
SRN3	SR3 Dummy (1 if SR=3, 0 otherwise)	0.343	0.089	3.854
SRN11	SR11 Dummy (1 if SR=11, 0 otherwise)	-0.426	0.101	-4.219
SRN12	SR12 Dummy (1 if SR=12, 0 otherwise)	0.290	0.034	8.412
SRN14	SR14 Dummy (1 if SR=14, 0 otherwise)	0.110	0.044	2.485
SRN17	SR17 Dummy (1 if SR=17, 0 otherwise)	0.213	0.060	3.526
SRN18	SR18 Dummy (1 if SR=18, 0 otherwise)	-0.411	0.086	-4.768
SRN21	SR21 Dummy (1 if SR=21, 0 otherwise)	-1.426	0.061	-23.478
SRN22	SR22 Dummy (1 if SR=22, 0 otherwise)	0.554	0.217	2.553
SRN23	SR23 Dummy (1 if SR=23, 0 otherwise)	-0.809	0.104	-7.793
SRN25	SR25 Dummy (1 if SR=25, 0 otherwise)	-0.465	0.061	-7.575
SRN26	SR26 Dummy (1 if SR=26, 0 otherwise)	0.984	0.083	11.924
SRN27	SR27 Dummy (1 if SR=27, 0 otherwise)	-0.371	0.072	-5.152
SRN28	SR28 Dummy (1 if SR=28, 0 otherwise)	0.192	0.061	3.118
SRN31	SR31 Dummy (1 if SR=31, 0 otherwise)	-0.971	0.134	-7.225
SRN97	SR97 Dummy (1 if SR=97, 0 otherwise)	0.886	0.043	20.392
SRN124	SR124 Dummy (1 if SR=124, 0 otherwise)	0.688	0.063	10.964
SRN127	SR127 Dummy (1 if SR=172, 0 otherwise)	-0.667	0.126	-5.270
SRN129	SR129 Dummy (1 if SR=129, 0 otherwise)	-1.115	0.110	-10.124
SRN150	SR150 Dummy (1 if SR=150, 0 otherwise)	-0.416	0.139	-3.000
SRN161	SR161 Dummy (1 if SR=161, 0 otherwise)	-0.246	0.113	-2.184
SRN504	SR504 Dummy (1 if SR=504, 0 otherwise)	-0.534	0.076	-6.985
SRN507	SR507 Dummy (1 if SR=507, 0 otherwise)	0.529	0.114	4.647
SRN539	SR539 Dummy (1 if SR=539, 0 otherwise)	-1.796	0.213	-8.445
SRN542	SR542 Dummy (1 if SR=542, 0 otherwise)	0.315	0.053	5.933
SRN970	SR970 Dummy (1 if SR=970, 0 otherwise)	1.464	0.294	4.987
SR432532	SR432 & SR532 Dummy (1 if SR=432 or 532, 0 otherwise)	-0.903	0.179	-5.029
SR123169	SR123 & SR169 Dummy (1 if SR=123 or 169, 0 otherwise)	-0.974	0.104	-9.355

Table D.68 (continued): SPF with LNADT, Length Offset and Route Dummies: Involving one vehicle Crash Type

Variable	Description	Coeff.	S.E.	t-stat
SR261142	SR261 & SR142 Dummy (1 if SR=261 or 142, 0 otherwise)	-0.979	0.114	-8.605
SR26022	SR260 & SR22 Dummy (1 if SR=260 or 22, 0 otherwise)	-0.806	0.161	-4.990
SR108109	SR108 & SR109 Dummy (1 if SR=108 or 109, 0 otherwise)	0.439	0.076	5.765
SR534105	SR534 & SR105 Dummy (1 if SR=534 or 105, 0 otherwise)	0.288	0.098	2.948
Alpha		14.946	0.201	74.439
Number of obs = 426546 Chi squared = 47635.61 Prob>chi2=0.000				
Restricted LL = -122686.0 Log likelihood = -94475.34				
Pseudo R^2 = 0.2013456				

Table D.69: SPF with LNADT, Length Offset and Roadway Geometrics: Involving one vehicle Crash Type

Variable	Description	Coeff.	S.E.	t-stat
Constant		-0.376	0.623	-0.603
LNADT	Log(AADT)	0.560	0.011	49.486
LENGTH	Segment Length	1.000	(Fixed Parameter)	
NLANEI	Number of lanes Increasing	-3.897	0.175	-22.326
NLANED	Number of lanes Decreasing	-2.293	0.591	-3.878
A1	Algebraic difference in gradients	-0.034	0.004	-8.943
MK1	Rate of vertical curvature/5280	-0.152	0.063	-2.414
DGC1	Degree of Curvature	0.014	0.001	10.240
RLNW	Average Lane width	-0.040	0.008	-4.818
SWR4523	Shoulder width dummy (if shoulder width right is 4-5ft and shoulder width left is 2-3ft, value=1,else=0)	-0.376	0.086	-4.401
SWC19	Shoulder width dummy (if shoulder width center is >1ft and <9ft, value=1,else=0)	-2.292	0.343	-6.691
Alpha		13.579	0.178	76.219
Number of obs = 426546 Chi squared = 46132.91 Prob>chi2=0.000				
Restricted LL = -122686.0 Log likelihood = -92634.87				
Pseudo R^2 = 0.1993621				

Table D.70: SPF with LNADT, Length Offset, Roadway Geometrics and Route Dummies: Involving one vehicle Crash Type

Variable	Description	Coeff.	S.E.	t-stat
Constant		0.332	0.607	0.547
LNADT	Log(AADT)	0.478	0.012	39.527
LENGTH	Segment Length	1.000	(Fixed Parameter)	
NLANEI	Number of lanes Increasing	-3.795	0.183	-20.770
NLANED	Number of lanes Decreasing	-2.051	0.572	-3.588
A1	Algebraic difference in gradients	-0.026	0.004	-6.834
MK1	Rate of vertical curvature/5280	-0.323	0.051	-6.360
DGC1	Degree of Curvature	0.018	0.001	13.023
RLNW	Average Lane width	-0.082	0.007	-11.609
SWR4523	Shoulder width dummy (if shoulder width right is 4-5ft and shoulder width left is 2-3ft, value=1,else=0)	-0.341	0.084	-4.052
SWC19	Shoulder width dummy (if shoulder width center is >1ft and <9ft, value=1,else=0)	-2.154	0.333	-6.460
SRN3	SR3 Dummy (1 if SR=3, 0 otherwise)	0.217	0.106	2.046
SRN11	SR11 Dummy (1 if SR=11, 0 otherwise)	-0.731	0.104	-7.003
SRN12	SR12 Dummy (1 if SR=12, 0 otherwise)	0.362	0.035	10.289
SRN17	SR17 Dummy (1 if SR=17, 0 otherwise)	0.309	0.058	5.312
SRN18	SR18 Dummy (1 if SR=18, 0 otherwise)	0.592	0.255	2.322
SRN21	SR21 Dummy (1 if SR=21, 0 otherwise)	-1.017	0.060	-16.925
SRN23	SR23 Dummy (1 if SR=23, 0 otherwise)	-0.405	0.100	-4.062
SRN25	SR25 Dummy (1 if SR=25, 0 otherwise)	-0.207	0.059	-3.526
SRN26	SR26 Dummy (1 if SR=26, 0 otherwise)	1.044	0.072	14.599
SRN27	SR27 Dummy (1 if SR=27, 0 otherwise)	-0.330	0.073	-4.535
SRN28	SR28 Dummy (1 if SR=28, 0 otherwise)	0.175	0.059	2.988
SRN31	SR31 Dummy (1 if SR=31, 0 otherwise)	-0.732	0.134	-5.448
SRN97	SR97 Dummy (1 if SR=97, 0 otherwise)	0.710	0.040	17.853
SRN124	SR124 Dummy (1 if SR=124, 0 otherwise)	0.747	0.056	13.367
SRN127	SR127 Dummy (1 if SR=172, 0 otherwise)	-0.364	0.121	-2.999
SRN129	SR129 Dummy (1 if SR=129, 0 otherwise)	-0.974	0.105	-9.233
SRN150	SR150 Dummy (1 if SR=150, 0 otherwise)	-0.927	0.132	-7.021
SRN161	SR161 Dummy (1 if SR=161, 0 otherwise)	-0.323	0.126	-2.557
SRN504	SR504 Dummy (1 if SR=504, 0 otherwise)	-0.465	0.077	-6.007
SRN542	SR542 Dummy (1 if SR=542, 0 otherwise)	0.206	0.050	4.132
SRN970	SR970 Dummy (1 if SR=970, 0 otherwise)	1.281	0.259	4.950

Table D.70 (continued): SPF with LNADT, Length Offset, Roadway Geometrics and Route Dummies: Involving one vehicle Crash Type

Variable	Description	Coeff.	S.E.	t-stat
SR432532	SR432 & SR532 Dummy (1 if SR=432 or 532, 0 otherwise)	-0.953	0.211	-4.514
SR123169	SR123 & SR169 Dummy (1 if SR=123 or 169, 0 otherwise)	-1.152	0.115	-9.993
SR261142	SR261 & SR142 Dummy (1 if SR=261 or 142, 0 otherwise)	-0.607	0.110	-5.493
SR26022	SR260 & SR22 Dummy (1 if SR=260 or 22, 0 otherwise)	-0.312	0.101	-3.076
SR108109	SR108 & SR109 Dummy (1 if SR=108 or 109, 0 otherwise)	0.195	0.072	2.694
Alpha		12.520	0.170	73.713
Number of obs = 426546 Chi squared = 43460.61 Prob>chi2=0.000				
Restricted LL = -122686.0 Log likelihood = -91808.09				
Pseudo R^2 = 0.1913917				

Table D.71: SPF with LNADT, Length Offset, Roadway Geometrics and Roadside Features: Involving one vehicle Crash Type

Variable	Description	Coeff.	S.E.	t-stat
Constant		-0.437	0.621	-0.704
LNADT	Log(AADT)	0.555	0.011	49.256
LENGTH	Segment Length	1.000	(Fixed Parameter)	
NLANEI	Number of lanes Increasing	-3.846	0.174	-22.047
NLANED	Number of lanes Decreasing	-2.269	0.588	-3.857
HCANG1	Horizontal Curve Central angle	0.001	0.000	5.796
A1	Algebraic difference in gradients	-0.032	0.004	-8.580
MK1	Rate of vertical curvature/5280	-0.156	0.062	-2.500
DGC1	Degree of Curvature	0.014	0.001	9.657
RLNW	Average Lane width	-0.041	0.008	-4.941
SWR4523	Shoulder width dummy (if shoulder width right is 4-5ft and shoulder width left is 2-3ft, value=1,else=0)	-0.376	0.087	-4.334
SWR8910	Shoulder width dummy (if shoulder width right is 8-9ft and shoulder width left is >10ft, value=1,else=0)	-0.586	0.240	-2.439
SWR1023	Shoulder width dummy (if shoulder width right is >10ft and shoulder width left is 2-3ft, value=1,else=0)	-0.461	0.229	-2.016
SWC19	Shoulder width dummy (if shoulder width center is >1ft and <9ft, value=1,else=0)	-2.282	0.340	-6.719
LGRDRL00	Proportion of Guardrail on a segment is 90-100%	-0.623	0.059	-10.559
LFENCE70	Proportion of Fence on a segment is 60-70%	-1.156	0.437	-2.645
LCLVRT30	Proportion of Culvert on a segment is 20-30%	-4.454	1.061	-4.196
LCLVRT40	Proportion of Culvert on a segment is 30-40%	-2.063	0.735	-2.808

Table D.71 (continued): SPF with LNADT, Length Offset, Roadway Geometrics and Roadside Features: Involving one vehicle Crash Type

Variable	Description	Coeff.	S.E.	t-stat
LCLVRT50	Proportion of Culvert on a segment is 40-50%	-3.344	1.569	-2.131
LCLVRT60	Proportion of Culvert on a segment is 50-60%	-2.487	1.149	-2.165
LCLVRT00	Proportion of Culvert on a segment is 90-100%	-2.240	0.492	-4.550
LTRGRP00	Proportion of Tree group on a segment is 90-100%	-0.603	0.092	-6.585
LDITCH00	Proportion of Ditch on a segment is 90-100%	-0.404	0.052	-7.771
DCABNET	Cabinet Dummy variable (1 if Cabinet exists, 0 otherwise)	-0.545	0.225	-2.423
DCLVERT	Culvert Dummy variable (1 if Culvert exists, 0 otherwise)	0.531	0.099	5.340
DMFXOBJ	Fixed Object Dummy variable (1 if Fixed Object exists, 0 otherwise)	0.257	0.074	3.478
DRDSLP	Roadside slope Dummy variable (1 if Roadside slope exists, 0 otherwise)	0.168	0.033	5.067
LRCHCRP	Rock out cropping length on a segment	-0.700	0.243	-2.885
DTREGRP	Tree group Dummy variable (1 if Tree group exists, 0 otherwise)	0.316	0.061	5.217
Alpha		13.265	0.175	75.962
Number of obs = 426546 Chi squared = 45280.48 Prob>chi2=0.000				
Restricted LL = -122686.0 Log likelihood = -92403.84				
Pseudo R^2 = 0.1967962				

Table D.72: SPF with LNADT, Length Offset, Roadway Geometrics, Roadside Features and Route Dummies: Involving one vehicle Crash Type

Variable	Description	Coeff.	S.E.	t-stat
Constant		0.268	0.602	0.445
LNADT	Log(AADT)	0.476	0.012	39.872
LENGTH	Segment Length	1.000	(Fixed Parameter)	
NLANEI	Number of lanes Increasing	-3.766	0.183	-20.569
NLANED	Number of lanes Decreasing	-2.039	0.567	-3.597
A1	Algebraic difference in gradients	-0.024	0.004	-6.454
MK1	Rate of vertical curvature/5280	-0.322	0.051	-6.335
DGC1	Degree of Curvature	0.020	0.001	13.943
RLNW	Average Lane width	-0.080	0.007	-11.310
SWR4523	Shoulder width dummy (if shoulder width right is 4-5ft and shoulder width left is 2-3ft, value=1,else=0)	-0.332	0.085	-3.888
SWR8910		-0.488	0.223	-2.191
SWC19	Shoulder width dummy (if shoulder width center is >1ft and <9ft, value=1,else=0)	-2.127	0.334	-6.376
LGRDRL00	Proportion of Guardrail on a segment is 90-100%	-0.619	0.060	-10.257
LFENCE70	Proportion of Fence on a segment is 60-70%	-1.069	0.425	-2.517
LCLVRT30	Proportion of Culvert on a segment is 20-30%	-4.194	1.026	-4.086
LCLVRT40	Proportion of Culvert on a segment is 30-40%	-1.859	0.709	-2.624
LCLVRT50	Proportion of Culvert on a segment is 40-50%	-3.108	1.525	-2.037
LCLVRT60	Proportion of Culvert on a segment is 50-60%	-2.458	1.122	-2.190
LCLVRT00	Proportion of Culvert on a segment is 90-100%	-2.197	0.477	-4.604
LTRGRP00	Proportion of Tree group on a segment is 90-100%	-0.539	0.091	-5.934
LDITCH00	Proportion of Ditch on a segment is 90-100%	-0.381	0.053	-7.231
DCABNET	Cabinet Dummy variable (1 if Cabinet exists, 0 otherwise)	-0.487	0.218	-2.235
DCLVERT	Culvert Dummy variable (1 if Culvert exists, 0 otherwise)	0.497	0.097	5.108
DMFXOBJ	Fixed Object Dummy variable (1 if Fixed Object exists, 0 otherwise)	0.276	0.072	3.817
DRDSLP	Roadside slope Dummy variable (1 if Roadside slope exists, 0 otherwise)	0.133	0.034	3.929
LRCHCRP	Rock out cropping length on a segment	-0.727	0.249	-2.923
DTREGRP	Tree group Dummy variable (1 if Tree group exists, 0 otherwise)	0.350	0.060	5.807
SRN11	SR11 Dummy (1 if SR=11, 0 otherwise)	-0.713	0.104	-6.844
SRN12	SR12 Dummy (1 if SR=12, 0 otherwise)	0.342	0.035	9.697
SRN17	SR17 Dummy (1 if SR=17, 0 otherwise)	0.315	0.058	5.450
SRN18	SR18 Dummy (1 if SR=18, 0 otherwise)	0.653	0.245	2.666
SRN21	SR21 Dummy (1 if SR=21, 0 otherwise)	-1.015	0.060	-16.936
SRN23	SR23 Dummy (1 if SR=23, 0 otherwise)	-0.419	0.102	-4.092

Table D.72 (continued): SPF with LNADT, Length Offset, Roadway Geometrics, Roadside Features and Route Dummies: Involving one vehicle Crash Type

Variable	Description	Coeff.	S.E.	t-stat
SRN25	SR25 Dummy (1 if SR=25, 0 otherwise)	-0.209	0.059	-3.567
SRN26	SR26 Dummy (1 if SR=26, 0 otherwise)	1.041	0.070	14.877
SRN27	SR27 Dummy (1 if SR=27, 0 otherwise)	-0.344	0.074	-4.648
SRN28	SR28 Dummy (1 if SR=28, 0 otherwise)	0.165	0.058	2.840
SRN31	SR31 Dummy (1 if SR=31, 0 otherwise)	-0.738	0.137	-5.394
SRN97	SR97 Dummy (1 if SR=97, 0 otherwise)	0.686	0.039	17.384
SRN124	SR124 Dummy (1 if SR=124, 0 otherwise)	0.753	0.055	13.582
SRN127	SR127 Dummy (1 if SR=172, 0 otherwise)	-0.335	0.123	-2.724
SRN129	SR129 Dummy (1 if SR=129, 0 otherwise)	-0.949	0.107	-8.874
SRN150	SR150 Dummy (1 if SR=150, 0 otherwise)	-0.924	0.131	-7.044
SRN161	SR161 Dummy (1 if SR=161, 0 otherwise)	-0.338	0.125	-2.698
SRN504	SR504 Dummy (1 if SR=504, 0 otherwise)	-0.481	0.078	-6.182
SRN542	SR542 Dummy (1 if SR=542, 0 otherwise)	0.232	0.050	4.597
SRN970	SR970 Dummy (1 if SR=970, 0 otherwise)	1.284	0.255	5.046
SR432532	SR432 & SR532 Dummy (1 if SR=432 or 532, 0 otherwise)	-0.933	0.221	-4.222
SR123169	SR123 & SR169 Dummy (1 if SR=123 or 169, 0 otherwise)	-1.139	0.116	-9.818
SR261142	SR261 & SR142 Dummy (1 if SR=261 or 142, 0 otherwise)	-0.602	0.111	-5.399
SR26022	SR260 & SR22 Dummy (1 if SR=260 or 22, 0 otherwise)	-0.354	0.102	-3.483
SR108109	SR108 & SR109 Dummy (1 if SR=108 or 109, 0 otherwise)	0.180	0.072	2.495
Alpha		12.277	0.167	73.731
Number of obs = 426546 Chi squared = 42792.43 Prob>chi2=0.000				
Restricted LL = -122686.0 Log likelihood = -91605.45				
Pseudo R^2 = 0.1893443				

Table D.73: SPF with LNADT and Length Offset: Involving two vehicle Crash Type

Variable	Description	Coeff.	S.E.	t-stat
Constant		-10.087	0.207	-48.769
LNADT	Log(AADT)	0.851	0.027	31.082
LENGTH	Segment Length	1.000	(Fixed Parameter)	
Alpha		110.513	2.362	46.796
Number of obs = 426546 Chi squared = 106225.8 Prob>chi2=0.000				
Restricted LL = -103327.5 Log likelihood = -45246.21				
Pseudo R^2 = 0.5399896				

Table D.74: SPF with LNADT, Length Offset and Route Dummies: Involving two vehicle Crash Type

Variable	Description	Coeff.	S.E.	t-stat
Constant		-9.316	0.229	-40.656
LNADT	Log(AADT)	0.749	0.030	25.323
LENGTH	Segment Length	1.000	(Fixed Parameter)	
SRN3	SR3 Dummy (1 if SR=3, 0 otherwise)	0.789	0.340	2.318
SRN12	SR12 Dummy (1 if SR=12, 0 otherwise)	0.163	0.073	2.242
SRN21	SR21 Dummy (1 if SR=21, 0 otherwise)	-1.394	0.128	-10.896
SRN23	SR23 Dummy (1 if SR=23, 0 otherwise)	-1.300	0.242	-5.379
SRN25	SR25 Dummy (1 if SR=25, 0 otherwise)	-0.531	0.114	-4.649
SRN26	SR26 Dummy (1 if SR=26, 0 otherwise)	0.816	0.206	3.954
SRN31	SR31 Dummy (1 if SR=31, 0 otherwise)	-1.127	0.241	-4.677
SRN97	SR97 Dummy (1 if SR=97, 0 otherwise)	0.476	0.130	3.664
SRN124	SR124 Dummy (1 if SR=124, 0 otherwise)	0.584	0.249	2.350
SRN127	SR127 Dummy (1 if SR=172, 0 otherwise)	-1.434	0.248	-5.783
SRN129	SR129 Dummy (1 if SR=129, 0 otherwise)	-1.215	0.189	-6.424
SRN172	SR172 Dummy (1 if SR=172, 0 otherwise)	-1.858	0.551	-3.374
SRN174	SR174 Dummy (1 if SR=174, 0 otherwise)	-0.776	0.334	-2.325
SRN206	SR206 Dummy (1 if SR=206, 0 otherwise)	0.896	0.211	4.250
SRN504	SR504 Dummy (1 if SR=504, 0 otherwise)	-0.553	0.158	-3.496
SRN542	SR542 Dummy (1 if SR=542, 0 otherwise)	0.768	0.119	6.463
SR123169	SR123 & SR169 Dummy (1 if SR=123 or 169, 0 otherwise)	-0.663	0.255	-2.602
SR261142	SR261 & SR142 Dummy (1 if SR=261 or 142, 0 otherwise)	-0.425	0.203	-2.092
Alpha		106.689	2.404	44.380
Number of obs = 426546 Chi squared = 104233.6 Prob>chi2=0.000				
Restricted LL = -103327.5 Log likelihood = -45073.53				
Pseudo R^2 = 0.5362345				

Table D.75: SPF with LNADT, Length Offset and Roadway Geometrics: Involving two vehicle Crash Type

Variable	Description	Coeff.	S.E.	t-stat
Constant		-7.972	0.187	-42.745
LNADT	Log(AADT)	1.102	0.028	39.830
LENGTH	Segment Length	1.000	(Fixed Parameter)	
NLANEI	Number of lanes Increasing	-1.690	0.183	-9.248
NLANED	Number of lanes Decreasing	-3.090	0.184	-16.752
HCANG1	Horizontal Curve Central angle	-0.001	0.000	-4.022
A1	Algebraic difference in gradients	-0.018	0.009	-2.046
MK1	Rate of vertical curvature/5280	-0.458	0.089	-5.136
DGC1	Degree of Curvature	0.019	0.003	6.514

Table D.75 (continued): SPF with LNADT, Length Offset and Roadway Geometrics: Involving two vehicle Crash Type

Variable	Description	Coeff.	S.E.	t-stat
RLNW	Average Lane width	0.071	0.016	4.441
SWR2367	Shoulder width dummy (if shoulder width right is 2-3ft and shoulder width left is 6-7ft, value=1,else=0)	-0.760	0.356	-2.136
SWR1023	Shoulder width dummy (if shoulder width right is >10ft and shoulder width left is 2-3ft, value=1,else=0)	-2.060	0.718	-2.869
SWC19	Shoulder width dummy (if shoulder width center is >1ft and <9ft, value=1,else=0)	-4.021	0.456	-8.823
Alpha		86.306	1.755	49.184
Number of obs = 426546 Chi squared = 93712.62 Prob>chi2=0.000				
Restricted LL = -103327.5 Log likelihood = -44169.62				
Pseudo R^2 = 0.5147578				

Table D.76: SPF with LNADT, Length Offset, Roadway Geometrics and Route Dummies: Involving two vehicle Crash Type

Variable	Description	Coeff.	S.E.	t-stat
Constant		-7.608	0.210	-36.273
LNADT	Log(AADT)	1.069	0.030	35.109
LENGTH	Segment Length	1.000	(Fixed Parameter)	
NLANEI	Number of lanes Increasing	-1.637	0.167	-9.772
NLANED	Number of lanes Decreasing	-3.145	0.169	-18.566
HCANG1	Horizontal Curve Central angle	-0.001	0.000	-5.430
MK1	Rate of vertical curvature/5280	-0.490	0.080	-6.115
DGC1	Degree of Curvature	0.019	0.003	6.082
RLNW	Average Lane width	0.056	0.017	3.262
SWR2367	Shoulder width dummy (if shoulder width right is 2-3ft and shoulder width left is 6-7ft, value=1,else=0)	-0.738	0.348	-2.120
SWR1023	Shoulder width dummy (if shoulder width right is >10ft and shoulder width left is 2-3ft, value=1,else=0)	-1.969	0.696	-2.827
SWC19	Shoulder width dummy (if shoulder width center is >1ft and <9ft, value=1,else=0)	-3.922	0.442	-8.871
SRN12	SR12 Dummy (1 if SR=12, 0 otherwise)	0.519	0.080	6.494
SRN21	SR21 Dummy (1 if SR=21, 0 otherwise)	-0.859	0.122	-7.066
SRN23	SR23 Dummy (1 if SR=23, 0 otherwise)	-0.867	0.232	-3.732
SRN25	SR25 Dummy (1 if SR=25, 0 otherwise)	-0.231	0.105	-2.190
SRN26	SR26 Dummy (1 if SR=26, 0 otherwise)	0.870	0.165	5.283
SRN31	SR31 Dummy (1 if SR=31, 0 otherwise)	-0.876	0.225	-3.895
SRN97	SR97 Dummy (1 if SR=97, 0 otherwise)	0.338	0.107	3.153
SRN124	SR124 Dummy (1 if SR=124, 0 otherwise)	0.601	0.204	2.949
SRN127	SR127 Dummy (1 if SR=172, 0 otherwise)	-1.184	0.232	-5.106

Table D.76 (continued): SPF with LNADT, Length Offset, Roadway Geometrics and Route Dummies: Involving two vehicle Crash Type

Variable	Description	Coeff.	S.E.	t-stat
SRN129	SR129 Dummy (1 if SR=129, 0 otherwise)	-0.982	0.195	-5.043
SRN172	SR172 Dummy (1 if SR=172, 0 otherwise)	-1.229	0.535	-2.296
SRN206	SR206 Dummy (1 if SR=206, 0 otherwise)	0.985	0.198	4.984
SRN504	SR504 Dummy (1 if SR=504, 0 otherwise)	-0.597	0.137	-4.358
SRN542	SR542 Dummy (1 if SR=542, 0 otherwise)	0.798	0.095	8.378
SR123169	SR123 & SR169 Dummy (1 if SR=123 or 169, 0 otherwise)	-0.874	0.292	-2.991
Alpha		84.357	1.800	46.859
Number of obs = 426546 Chi squared = 93121.72 Prob>chi2=0.000				
Restricted LL = -103327.5 Log likelihood = -44022.57				
Pseudo R^2 = 0.5140108				

Table D.77: SPF with LNADT, Length Offset, Roadway Geometrics and Roadside Features: Involving two vehicle Crash Type

Variable	Description	Coeff.	S.E.	t-stat
Constant		-7.975	0.176	-45.304
LNADT	Log(AADT)	1.099	0.028	39.854
LENGTH	Segment Length	1.000	(Fixed Parameter)	
NLANEI	Number of lanes Increasing	-1.688	0.178	-9.490
NLANED	Number of lanes Decreasing	-3.101	0.172	-18.003
HCANG1	Horizontal Curve Central angle	-0.001	0.000	-3.875
MK1	Rate of vertical curvature/5280	-0.456	0.088	-5.155
DGC1	Degree of Curvature	0.021	0.003	6.998
RLNW	Average Lane width	0.072	0.016	4.590
SWR2367	Shoulder width dummy (if shoulder width right is 2-3ft and shoulder width left is 6-7ft, value=1,else=0)	-0.743	0.357	-2.082
SWR1023	Shoulder width dummy (if shoulder width right is >10ft and shoulder width left is 2-3ft, value=1,else=0)	-2.031	0.721	-2.817
SWC19	Shoulder width dummy (if shoulder width center is >1ft and <9ft, value=1,else=0)	-3.997	0.453	-8.831
LGRDRL00	Proportion of Guardrail on a segment is 90-100%	-0.444	0.106	-4.183
LBRDRL00	Bridge rail Dummy variable (1 if Bridge rail exists, 0 otherwise)	-0.499	0.212	-2.354
LTRGRP00	Proportion of Tree group on a segment is 90-100%	-0.464	0.141	-3.295
LDITCH00	Proportion of Ditch on a segment is 90-100%	-0.854	0.142	-6.015
DDITCH	Ditch Dummy variable (1 if Ditch exists, 0 otherwise)	0.316	0.114	2.766
DFENCE	Fence Dummy variable (1 if Fence exists, 0 otherwise)	-0.321	0.123	-2.616

Table D.77 (continued): SPF with LNADT, Length Offset, Roadway Geometrics and Roadside Features: Involving two vehicle Crash Type

Variable	Description	Coeff.	S.E.	t-stat
DMALBOX	Mailbox Dummy variable (1 if Mailbox exists, 0 otherwise)	0.559	0.244	2.292
DMFXOBJ	Fixed object Dummy variable (1 if Fixed object exists, 0 otherwise)	0.583	0.173	3.369
Alpha		85.100	1.729	49.208
Number of obs = 426546 Chi squared = 92722.16 Prob>chi2=0.000				
Restricted LL = -103327.5 Log likelihood = -44110.13				
Pseudo R^2 = 0.5124402				

Table D.78: SPF with LNADT, Length Offset, Roadway Geometrics, Roadside Features and Route Dummies: Involving two vehicle Crash Type

Variable	Description	Coeff.	S.E.	t-stat
Constant		-7.634	0.210	-36.310
LNADT	Log(AADT)	1.071	0.030	35.446
LENGTH	Segment Length	1.000	(Fixed Parameter)	
NLANEI	Number of lanes Increasing	-1.634	0.166	-9.817
NLANED	Number of lanes Decreasing	-3.133	0.169	-18.554
HCANG1	Horizontal Curve Central angle	-0.001	0.000	-5.217
MK1	Rate of vertical curvature/5280	-0.481	0.081	-5.918
DGC1	Degree of Curvature	0.021	0.003	6.459
RLNW	Average Lane width	0.056	0.017	3.266
SWR2367	Shoulder width dummy (if shoulder width right is 2-3ft and shoulder width left is 6-7ft, value=1,else=0)	-0.707	0.347	-2.034
SWR1023	Shoulder width dummy (if shoulder width right is >10ft and shoulder width left is 2-3ft, value=1,else=0)	-1.953	0.701	-2.785
SWC19	Shoulder width dummy (if shoulder width center is >1ft and <9ft, value=1,else=0)	-3.915	0.441	-8.869
LGRDRL00	Proportion of Guardrail on a segment is 90-100%	-0.432	0.100	-4.330
LTRGRP00	Proportion of Tree group on a segment is 90-100%	-0.437	0.156	-2.809
LDITCH00	Proportion of Ditch on a segment is 90-100%	-0.866	0.147	-5.877
DDITCH	Ditch Dummy variable (1 if Ditch exists, 0 otherwise)	0.393	0.117	3.358
DFENCE	Fence Dummy variable (1 if Fence exists, 0 otherwise)	-0.297	0.129	-2.307
DMFXOBJ	Fixed object Dummy variable (1 if Fixed object exists, 0 otherwise)	0.606	0.183	3.308
SRN12	SR12 Dummy (1 if SR=12, 0 otherwise)	0.496	0.081	6.155
SRN21	SR21 Dummy (1 if SR=21, 0 otherwise)	-0.861	0.121	-7.090
SRN23	SR23 Dummy (1 if SR=23, 0 otherwise)	-0.890	0.243	-3.655
SRN25	SR25 Dummy (1 if SR=25, 0 otherwise)	-0.235	0.112	-2.100
SRN26	SR26 Dummy (1 if SR=26, 0 otherwise)	0.862	0.162	5.323

Table D.78 (continued): SPF with LNADT, Length Offset, Roadway Geometrics, Roadside Features and Route Dummies: Involving two vehicle Crash Type

Variable	Description	Coeff.	S.E.	t-stat
SRN31	SR31 Dummy (1 if SR=31, 0 otherwise)	-0.775	0.244	-3.181
SRN97	SR97 Dummy (1 if SR=97, 0 otherwise)	0.330	0.106	3.109
SRN124	SR124 Dummy (1 if SR=124, 0 otherwise)	0.601	0.202	2.980
SRN127	SR127 Dummy (1 if SR=172, 0 otherwise)	-1.067	0.236	-4.514
SRN129	SR129 Dummy (1 if SR=129, 0 otherwise)	-0.940	0.199	-4.735
SRN172	SR172 Dummy (1 if SR=172, 0 otherwise)	-1.230	0.535	-2.299
SRN206	SR206 Dummy (1 if SR=206, 0 otherwise)	0.945	0.199	4.741
SRN504	SR504 Dummy (1 if SR=504, 0 otherwise)	-0.601	0.136	-4.430
SRN542	SR542 Dummy (1 if SR=542, 0 otherwise)	0.803	0.095	8.438
SR123169	SR123 & SR169 Dummy (1 if SR=123 or 169, 0 otherwise)	-0.839	0.291	-2.882
Alpha		83.288	1.780	46.779
Number of obs = 426546 Chi squared = 92282.71 Prob>chi2=0.000				
Restricted LL = -103327.5 Log likelihood = -43974.23				
Pseudo R^2 = 0.5120242				

Table D.79: SPF with LNADT and Length Offset: Involving three vehicle Crash Type

Variable	Description	Coeff.	S.E.	t-stat
Constant		-14.501	0.638	-22.727
LNADT	Log(AADT)	1.147	0.084	13.649
LENGTH	Segment Length	1.000	(Fixed Parameter)	
Alpha		984.178	54.381	18.098
Number of obs = 426546 Chi squared = 31510.04 Prob>chi2=0.000				
Restricted LL = -24714.50 Log likelihood = -7383.964				
Pseudo R^2 = 0.6808864				

Table D.80: SPF with LNADT, Length Offset and Route Dummies: Involving three vehicle Crash Type

Variable	Description	Coeff.	S.E.	t-stat
Constant		-14.519	0.731	-19.853
LNADT	Log(AADT)	1.146	0.097	11.814
LENGTH	Segment Length	1.000	(Fixed Parameter)	
SRN25	SR25 Dummy (1 if SR=25, 0 otherwise)	-1.504	0.463	-3.246
SRN542	SR542 Dummy (1 if SR=542, 0 otherwise)	0.977	0.325	3.005
SRN706	SR706 Dummy (1 if SR=706, 0 otherwise)	1.673	0.801	2.089
Alpha		968.555	60.534	16.000
Number of obs = 426546 Chi squared = 31388.44 Prob>chi2=0.000				
Restricted LL = -24714.50 Log likelihood = -7373.212				
Pseudo R^2 = 0.6803627				

Table D.81: SPF with LNADT, Length Offset and Roadway Geometrics: Involving three vehicle Crash Type

Variable	Description	Coeff.	S.E.	t-stat
Constant		-14.873	0.606	-24.559
LNADT	Log(AADT)	1.206	0.080	15.065
LENGTH	Segment Length	1.000	(Fixed Parameter)	
MK1	Rate of vertical curvature/5280	-2.297	0.689	-3.334
SWC19	Shoulder width dummy (if shoulder width center is >1ft and <9ft, value=1,else=0)	-4.245	0.222	-19.145
Alpha		903.810	48.419	18.667
Number of obs = 426546 Chi squared = 30647.64 Prob>chi2=0.000				
Restricted LL = -24714.50 Log likelihood = -7343.545				
Pseudo R^2 = 0.6760300				

Table D.82: SPF with LNADT, Length Offset, Roadway Geometrics and Route Dummies: Involving three vehicle Crash Type

Variable	Description	Coeff.	S.E.	t-stat
Constant		-14.891	0.622	-23.937
LNADT	Log(AADT)	1.207	0.082	14.755
LENGTH	Segment Length	1.000	(Fixed Parameter)	
MK1	Rate of vertical curvature/5280	-2.265	0.685	-3.307
SWC19	Shoulder width dummy (if shoulder width center is >1ft and <9ft, value=1,else=0)	-4.236	0.221	-19.144
SRN25	SR25 Dummy (1 if SR=25, 0 otherwise)	-1.517	0.459	-3.304
SRN542	SR542 Dummy (1 if SR=542, 0 otherwise)	0.937	0.303	3.090
Alpha		895.915	48.149	18.607
Number of obs = 426546 Chi squared = 30620.68 Prob>chi2=0.000				
Restricted LL = -24714.50 Log likelihood = -7336.116				
Pseudo R^2 = 0.6760590				

Table D.83: SPF with LNADT, Length Offset, Roadway Geometrics and Roadside Features: Involving three vehicle Crash Type

Variable	Description	Coeff.	S.E.	t-stat
Poisson/NB/Gamma regression model				
Constant		-2.635	0.126	-20.842
LNADT	Log(AADT)	0.189	0.013	14.676
LENGTH	Segment Length	1.000	(Fixed Parameter)	
MK1	Rate of vertical curvature/5280	-0.874	0.348	-2.515
DCLVEND	Culvert end Dummy variable (1 if Culvert end exists, 0 otherwise)	0.122	0.048	2.531
DGRDRAL	Guardrail Dummy variable (1 if Guardrail exists, 0 otherwise)	0.108	0.029	3.695
Dispersion parameter				
Alpha		28.194	2.569	10.975
Zero inflation model				
Tau		-3.948	0.188	-20.946
Number of obs = 426546				
Restricted LL = -24714.50 Log likelihood = -7117.97154				

Table D.84: SPF with LNADT, Length Offset, Roadway Geometrics, Roadside Features and Route Dummies: Involving three vehicle Crash Type

Variable	Description	Coeff.	S.E.	t-stat
Constant		-14.534	0.737	-19.728
LNADT	Log(AADT)	1.153	0.097	11.858
LENGTH	Segment Length	1.000	(Fixed Parameter)	
MK1	Rate of vertical curvature/5280	-2.500	0.689	-3.630
DCLVEND	Culvert end Dummy variable (1 if Culvert end exists, 0 otherwise)	0.594	0.338	1.760
SRN25	SR25 Dummy (1 if SR=25, 0 otherwise)	-1.537	0.463	-3.320
SRN542	SR542 Dummy (1 if SR=542, 0 otherwise)	0.966	0.322	3.002
SRN706	SR706 Dummy (1 if SR=706, 0 otherwise)	1.628	0.793	2.053
Alpha		955.667	57.978	16.483
Number of obs = 426546 Chi squared = 31128.82 Prob>chi2=0.000				
Restricted LL = -24714.50 Log likelihood = -7365.159				
Pseudo R^2 = 0.6787921				

Table D.85: SPF with LNADT and Length Offset: Involving four vehicle Crash Type

Variable	Description	Coeff.	S.E.	t-stat
Poisson/NB/Gamma regression model				
Constant		-4.777	0.135	-35.375
LNADT	Log(AADT)	0.309	0.015	21.037
LENGTH	Segment Length	1.000	(Fixed Parameter)	
Zero inflation model				
Tau		-2.658	0.018	-150.303
Number of obs = 426546				
Restricted LL = -5884.414 Log likelihood = -3401.04240				

Table D.86: SPF with LNADT, Length Offset and Route Dummies: Involving four vehicle Crash Type

Variable	Description	Coeff.	S.E.	t-stat
Poisson/NB/Gamma regression model				
Constant		-4.918	0.164	-30.008
LNADT	Log(AADT)	0.303	0.018	16.765
LENGTH	Segment Length	1.000	(Fixed Parameter)	
SRN3	SR3 Dummy (1 if SR=3, 0 otherwise)	0.310	0.038	8.079
SRN18	SR18 Dummy (1 if SR=18, 0 otherwise)	-0.483	0.157	-3.080
SRN22	SR22 Dummy (1 if SR=22, 0 otherwise)	0.682	0.106	6.428
SRN27	SR27 Dummy (1 if SR=27, 0 otherwise)	0.441	0.078	5.685
SRN104	SR104 Dummy (1 if SR=104, 0 otherwise)	0.733	0.042	17.395
SRN105	SR105 Dummy (1 if SR=105, 0 otherwise)	0.367	0.121	3.038
SRN107	SR107 Dummy (1 if SR=107, 0 otherwise)	0.671	0.160	4.202
SRN109	SR109 Dummy (1 if SR=109, 0 otherwise)	0.599	0.076	7.849
SRN124	SR124 Dummy (1 if SR=124, 0 otherwise)	0.439	0.138	3.191
SRN282	SR282 Dummy (1 if SR=282, 0 otherwise)	0.854	0.124	6.887
SRN305	SR305 Dummy (1 if SR=305, 0 otherwise)	0.643	0.069	9.314
SRN510	SR510 Dummy (1 if SR=510, 0 otherwise)	0.464	0.107	4.327
SRN706	SR706 Dummy (1 if SR=706, 0 otherwise)	0.704	0.092	7.643
SR432532	SR432 & SR532 Dummy (1 if SR=432 or 532, 0 otherwise)	0.952	0.037	25.697
Zero inflation model				
Tau		-2.537	0.018	-141.460
Number of obs = 426546				
Restricted LL = -5884.414 Log likelihood = -3251.95581				

Table D.87: SPF with LNADT, Length Offset and Roadway Geometrics: Involving four vehicle Crash Type

Variable	Description	Coeff.	S.E.	t-stat
Poisson/NB/Gamma regression model				
Constant		-5.802	0.209	-27.735
LNADT	Log(AADT)	0.636	0.017	37.732
LENGTH	Segment Length	1.000	(Fixed Parameter)	
NLANEI	Number of lanes Increasing	-0.877	0.274	-3.196
NLANED	Number of lanes Decreasing	-1.051	0.251	-4.185
A1	Algebraic difference in gradients	0.040	0.005	8.745
DGC1	Degree of Curvature	-0.047	0.009	-5.492
RLNW	Average Lane width	0.007	0.003	2.158
SWR4523	Shoulder width dummy (if shoulder width right is 4-5ft and shoulder width left is 2-3ft, value=1,else=0)	0.288	0.072	3.980
Zero inflation model				
Tau		-2.525	0.039	-64.259
Number of obs = 426546				
Restricted LL = -5884.414 Log likelihood = -3122.23547				

Table D.88: SPF with LNADT, Length Offset, Roadway Geometrics and Route Dummies: Involving four vehicle Crash Type

Variable	Description	Coeff.	S.E.	t-stat
Poisson/NB/Gamma regression model				
Constant		-5.788	0.210	-27.578
LNADT	Log(AADT)	0.652	0.016	40.102
LENGTH	Segment Length	1.000	(Fixed Parameter)	
NLANEI	Number of lanes Increasing	-0.902	0.282	-3.201
NLANED	Number of lanes Decreasing	-1.095	0.258	-4.244
A1	Algebraic difference in gradients	0.040	0.005	8.653
DGC1	Degree of Curvature	-0.047	0.009	-5.507
SWR4523	Shoulder width dummy (if shoulder width right is 4-5ft and shoulder width left is 2-3ft, value=1,else=0)	0.272	0.072	3.760
SRN3	SR3 Dummy (1 if SR=3, 0 otherwise)	0.121	0.038	3.144
SRN124	SR124 Dummy (1 if SR=124, 0 otherwise)	0.551	0.139	3.973
SR123169	SR123 & SR169 Dummy (1 if SR=123 or 169, 0 otherwise)	-0.451	0.138	-3.277
Zero inflation model				
Tau		-2.521	0.040	-62.902
Number of obs = 426546				
Restricted LL = -5884.414 Log likelihood = -3401.04240				

Table D.89: SPF with LNADT, Length Offset, Roadway Geometrics and Roadside Features: Involving four vehicle Crash Type

Variable	Description	Coeff.	S.E.	t-stat
Poisson/NB/Gamma regression model				
Constant		-5.649	0.217	-26.001
LNADT	Log(AADT)	0.653	0.018	36.446
LENGTH	Segment Length	1.000	(Fixed Parameter)	
NLANEI	Number of lanes Increasing	-0.957	0.305	-3.136
NLANED	Number of lanes Decreasing	-1.184	0.278	-4.254
A1	Algebraic difference in gradients	0.040	0.005	8.583
DGC1	Degree of Curvature	-0.042	0.010	-4.324
RLNW	Average Lane width	-0.010	0.004	-2.697
SWR4523	Shoulder width dummy (if shoulder width right is 4-5ft and shoulder width left is 2-3ft, value=1,else=0)	0.337	0.075	4.477
LGRDRL90	Proportion of Guardrail on a segment is 80-90%	0.619	0.126	4.932
LGRDRL00	Proportion of Guardrail on a segment is 90-100%	-0.355	0.092	-3.843
LBRDRL00	Proportion of Bridge rail on a segment is 90-100%	0.388	0.095	4.103
LRDSLP50	Proportion of Roadside slop on a segment is 40-50%	0.624	0.177	3.522
LRDSLP60	Proportion of Roadside slop on a segment is 50-60%	0.451	0.166	2.721
LFENCE20	Proportion of Fence on a segment is 10-20%	4.117	0.579	7.105
DBRDRAL	Bridge rail Dummy variable (1 if Bridge rail exists, 0 otherwise)	0.516	0.085	6.074
DCLVEND	Culvert end Dummy variable (1 if Culvert end exists, 0 otherwise)	0.369	0.042	8.751
DIMPACT	Impact attenuator Dummy variable (1 if Impact attenuator exists, 0 otherwise)	0.742	0.147	5.057
Zero inflation model				
Tau		-2.433	0.042	-57.596
Number of obs = 426546				
Restricted LL = -5884.414 Log likelihood = -3045.31264				

Table D.90: SPF with LNADT, Length Offset, Roadway Geometrics, Roadside Features and Route Dummies: Involving four vehicle Crash Type

Variable	Description	Coeff.	S.E.	t-stat
Poisson/NB/Gamma regression model				
Constant		-5.719	0.248	-23.036
LNADT	Log(AADT)	0.658	0.023	28.284
LENGTH	Segment Length	1.000	(Fixed Parameter)	
NLANEI	Number of lanes Increasing	-0.966	0.353	-2.735
NLANED	Number of lanes Decreasing	-1.333	0.322	-4.145
A1	Algebraic difference in gradients	0.033	0.005	6.187
DGC1	Degree of Curvature	-0.041	0.012	-3.385

Table D.90 (continued): SPF with LNADT, Length Offset, Roadway Geometrics, Roadside Features and Route Dummies: Involving four vehicle Crash Type

Variable	Description	Coeff.	S.E.	t-stat
RLNW	Average Lane width	-0.012	0.004	-2.906
SWR4523	Shoulder width dummy (if shoulder width right is 4-5ft and shoulder width left is 2-3ft, value=1,else=0)	0.427	0.079	5.410
LGRDRL90	Proportion of Guardrail on a segment is 80-90%	0.698	0.126	5.525
LGRDRL00	Proportion of Guardrail on a segment is 90-100%	-0.381	0.097	-3.945
LBRDRL00	Proportion of Bridge rail on a segment is 90-100%	0.537	0.122	4.417
LRDSLP50	Proportion of Roadside slop on a segment is 40-50%	0.724	0.207	3.493
LRDSLP60	Proportion of Roadside slop on a segment is 50-60%	0.497	0.176	2.827
LFENCE20	Proportion of Fence on a segment is 10-20%	4.651	0.615	7.568
DBRDRAL	Bridge rail Dummy variable (1 if Ditch exists, 0 otherwise)	0.435	0.119	3.649
DCLVEND	Culvert end Dummy variable (1 if culvert end exists, 0 otherwise)	0.405	0.046	8.806
DIMPACT	Impact attenuator Dummy variable (1 if culvert end exists, 0 otherwise)	1.031	0.152	6.795
SRN3	SR3 Dummy (1 if SR=3, 0 otherwise)	0.320	0.047	6.748
SRN18	SR18 Dummy (1 if SR=18, 0 otherwise)	-0.347	0.165	-2.107
SRN22	SR22 Dummy (1 if SR=22, 0 otherwise)	0.809	0.116	6.998
SRN27	SR27 Dummy (1 if SR=27, 0 otherwise)	0.485	0.095	5.080
SRN104	SR104 Dummy (1 if SR=104, 0 otherwise)	0.721	0.046	15.634
SRN105	SR105 Dummy (1 if SR=105, 0 otherwise)	0.304	0.146	2.083
SRN107	SR107 Dummy (1 if SR=107, 0 otherwise)	0.795	0.207	3.833
SRN109	SR109 Dummy (1 if SR=109, 0 otherwise)	0.756	0.087	8.649
SRN124	SR124 Dummy (1 if SR=124, 0 otherwise)	0.772	0.143	5.403
SRN282	SR282 Dummy (1 if SR=282, 0 otherwise)	0.811	0.128	6.347
SRN305	SR305 Dummy (1 if SR=305, 0 otherwise)	0.281	0.073	3.851
SRN510	SR510 Dummy (1 if SR=510, 0 otherwise)	0.461	0.129	3.579
SRN706	SR706 Dummy (1 if SR=706, 0 otherwise)	1.037	0.095	10.887
SR432532	SR432 & SR532 Dummy (1 if SR=432 or 532, 0 otherwise)	0.752	0.050	14.949
Zero inflation model				
Tau		-2.319	0.047	-49.393
Number of obs = 426546				
Restricted LL = -5884.414 Log likelihood = -2939.56887				

Table D.91: SPF with LNADT and Length Offset: Rear End Crash Type

Variable	Description	Coeff.	S.E.	t-stat
Constant		-14.776	0.319	-46.388
LNADT	Log(AADT)	1.285	0.041	31.500
LENGTH	Segment Length	1.000	(Fixed Parameter)	
Alpha		246.472	7.324	33.654
Number of obs = 426546 Chi squared = 60599.75 Prob>chi2=0.000				
Restricted LL = -54351.21 Log likelihood = -19455.34				
Pseudo R^2 = 0.6089788				

Table D.92: SPF with LNADT, Length Offset and Route Dummies: Rear End Crash Type

Variable	Description	Coeff.	S.E.	t-stat
Constant		-14.451	0.328	-44.062
LNADT	Log(AADT)	1.249	0.042	29.767
LENGTH	Segment Length	1.000	(Fixed Parameter)	
SRN12	SR12 Dummy (1 if SR=12, 0 otherwise)	-0.279	0.113	-2.464
SRN21	SR21 Dummy (1 if SR=21, 0 otherwise)	-1.764	0.427	-4.130
SRN25	SR25 Dummy (1 if SR=25, 0 otherwise)	-1.407	0.301	-4.670
SRN504	SR504 Dummy (1 if SR=504, 0 otherwise)	-0.793	0.275	-2.885
SRN542	SR542 Dummy (1 if SR=542, 0 otherwise)	0.624	0.116	5.377
Alpha		243.941	7.544	32.337
Number of obs = 426546 Chi squared = 60309.37 Prob>chi2=0.000				
Restricted LL = -54351.21 Log likelihood = -19429.12				
Pseudo R^2 = 0.6081559				

Table D.93: SPF with LNADT, Length Offset and Roadway Geometrics: Rear End Crash Type

Variable	Description	Coeff.	S.E.	t-stat
Constant		-12.289	0.256	-48.089
LNADT	Log(AADT)	1.523	0.038	40.048
LENGTH	Segment Length	1.000	(Fixed Parameter)	
NLANEI	Number of lanes Increasing	-1.614	0.430	-3.757
NLANED	Number of lanes Decreasing	-3.322	0.426	-7.793
HCANG1	Horizontal Curve Central angle	-0.002	0.000	-5.853
MK1	Rate of vertical curvature/5280	-0.692	0.162	-4.266
DGC1	Degree of Curvature	-0.041	0.006	-6.783
RLNW	Average Lane width	0.069	0.021	3.285
SWR2367	Shoulder width dummy (if shoulder width right is 2-3ft and shoulder width left is 6-7ft, value=1,else=0)	-1.155	0.517	-2.236
SWR1045	Shoulder width dummy (if shoulder width right is >10ft and shoulder width left is 4-5ft, value=1,else=0)	-2.156	1.019	-2.116

Table D.93 (continued): SPF with LNADT, Length Offset and Roadway Geometrics: Rear End Crash Type

Variable	Description	Coeff.	S.E.	t-stat
SWC19	Shoulder width dummy (if shoulder width center is >1ft and <9ft, value=1,else=0)	-2.330	0.266	-8.774
Alpha				
Number of obs = 426546 Chi squared = 50794.39 Prob>chi2=0.000				
Restricted LL = -54351.21 Log likelihood = -18899.22				
Pseudo R^2 = 0.5733466				

Table D.94: SPF with LNADT, Length Offset, Roadway Geometrics and Route Dummies: Rear End Crash Type

Variable	Description	Coeff.	S.E.	t-stat
Constant		-12.096	0.286	-42.252
LNADT	Log(AADT)	1.498	0.039	37.994
LENGTH	Segment Length	1.000	(Fixed Parameter)	
NLANEI	Number of lanes Increasing	-1.626	0.411	-3.953
NLANED	Number of lanes Decreasing	-3.341	0.413	-8.081
HCANG1	Horizontal Curve Central angle	-0.002	0.000	-6.063
MK1	Rate of vertical curvature/5280	-0.670	0.164	-4.088
DGC1	Degree of Curvature	-0.040	0.006	-6.493
RLNW	Average Lane width	0.071	0.023	3.146
SWR2367	Shoulder width dummy (if shoulder width right is 2-3ft and shoulder width left is 6-7ft, value=1,else=0)	-1.181	0.514	-2.298
SWC19	Shoulder width dummy (if shoulder width center is >1ft and <9ft, value=1,else=0)	-2.299	0.266	-8.644
SRN12	SR12 Dummy (1 if SR=12, 0 otherwise)	0.246	0.115	2.140
SRN21	SR21 Dummy (1 if SR=21, 0 otherwise)	-1.313	0.414	-3.170
SRN25	SR25 Dummy (1 if SR=25, 0 otherwise)	-1.160	0.287	-4.045
SRN504	SR504 Dummy (1 if SR=504, 0 otherwise)	-0.896	0.251	-3.574
SRN542	SR542 Dummy (1 if SR=542, 0 otherwise)	0.712	0.100	7.126
Alpha				
Number of obs = 426546 Chi squared = 50800.90 Prob>chi2=0.000				
Restricted LL = -54351.21 Log likelihood = -18879.31				
Pseudo R^2 = 0.5736357				

Table D.95: SPF with LNADT, Length Offset, Roadway Geometrics and Roadside Features: Rear End Crash Type

Variable	Description	Coeff.	S.E.	t-stat
Constant		-12.276	0.258	-47.593
LNADT	Log(AADT)	1.532	0.038	39.818
LENGTH	Segment Length	1.000	(Fixed Parameter)	
NLANEI	Number of lanes Increasing	-1.640	0.431	-3.803
NLANED	Number of lanes Decreasing	-3.325	0.428	-7.776
HCANG1	Horizontal Curve Central angle	-0.002	0.000	-5.713
MK1	Rate of vertical curvature/5280	-0.651	0.163	-3.988
DGC1	Degree of Curvature	-0.041	0.006	-6.854
RLNW	Average Lane width	0.067	0.021	3.180
SWR2367	Shoulder width dummy (if shoulder width right is 2-3ft and shoulder width left is 6-7ft, value=1,else=0)	-1.180	0.516	-2.289
SWR1045	Shoulder width dummy (if shoulder width right is >10ft and shoulder width left is 4-5ft, value=1,else=0)	-2.186	1.017	-2.150
SWC19	Shoulder width dummy (if shoulder width center is >1ft and <9ft, value=1,else=0)	-2.348	0.266	-8.833
LGRDRL00	Proportion of Guardrail on a segment is 90-100%	-0.946	0.207	-4.566
DCLVERT	Culvert Dummy variable (1 if Culvert exists, 0 otherwise)	0.859	0.188	4.574
LRDSLP	Roadside slope length on a segment	-0.425	0.105	-4.069
Alpha		170.883	4.821	35.445
Number of obs = 426546 Chi squared = 50410.08 Prob>chi2=0.000				
Restricted LL = -54351.21 Log likelihood = -18870.62				
Pseudo R^2 = 0.5718585				

Table D.96: SPF with LNADT, Length Offset, Roadway Geometrics, Roadside Features and Route Dummies: Rear End Crash Type

Variable	Description	Coeff.	S.E.	t-stat
Constant		-12.058	0.286	-42.154
LNADT	Log(AADT)	1.507	0.040	37.811
LENGTH	Segment Length	1.000	(Fixed Parameter)	
NLANEI	Number of lanes Increasing	-1.650	0.412	-4.005
NLANED	Number of lanes Decreasing	-3.350	0.414	-8.091
HCANG1	Horizontal Curve Central angle	-0.002	0.000	-6.018
MK1	Rate of vertical curvature/5280	-0.636	0.165	-3.859
DGC1	Degree of Curvature	-0.040	0.006	-6.514
RLNW	Average Lane width	0.068	0.023	2.999
SWR2367	Shoulder width dummy (if shoulder width right is 2-3ft and shoulder width left is 6-7ft, value=1,else=0)	-1.205	0.514	-2.346
SWC19	Shoulder width dummy (if shoulder width center is >1ft and <9ft, value=1,else=0)	-2.314	0.267	-8.676

Table D.96 (continued): SPF with LNADT, Length Offset, Roadway Geometrics, Roadside Features and Route Dummies: Rear End Crash Type

Variable	Description	Coeff.	S.E.	t-stat
LGRDRL00	Proportion of Guardrail on a segment is 90-100%	-0.972	0.214	-4.545
DCLVERT	Culvert Dummy variable (1 if Culvert exists, 0 otherwise)	0.785	0.227	3.465
LRDSLP	Roadside slope length on a segment	-0.402	0.106	-3.797
SRN12	SR12 Dummy (1 if SR=12, 0 otherwise)	0.273	0.116	2.359
SRN21	SR21 Dummy (1 if SR=21, 0 otherwise)	-1.335	0.414	-3.226
SRN25	SR25 Dummy (1 if SR=25, 0 otherwise)	-1.138	0.285	-3.991
SRN504	SR504 Dummy (1 if SR=504, 0 otherwise)	-0.919	0.251	-3.668
SRN542	SR542 Dummy (1 if SR=542, 0 otherwise)	0.618	0.104	5.962
Alpha		170.215	4.955	34.355
Number of obs = 426546 Chi squared = 50420.76 Prob>chi2=0.000				
Restricted LL = -54351.21 Log likelihood = -18851.89				
Pseudo R^2 = 0.5721534				

Table D.97: SPF with LNADT and Length Offset: Same Direction Sideswipe Crash Type

Variable	Description	Coeff.	S.E.	t-stat
Constant		-12.815	0.956	-13.404
LNADT	Log(AADT)	0.836	0.125	6.668
LENGTH	Segment Length	1.000	(Fixed Parameter)	
Alpha		1672.720	153.105	10.925
Number of obs = 426546 Chi squared = 10348.26 Prob>chi2=0.000				
Restricted LL = -9338.788 Log likelihood = -3885.271				
Pseudo R2=0.5711338				

Table D.98: SPF with LNADT, Length Offset and Route Dummy Variables: Same Direction Sideswipe Crash Type (ZIP)

Variable	Description	Coeff.	S.E.	t-stat
Poisson/NB/Gamma regression model				
Constant		-3.111	0.079	-39.318
LNADT	Log(AADT)	0.163	0.009	17.793
LENGTH	Segment Length	1.000	(Fixed Parameter)	
SRN26	SR26 Dummy (1 if SR=262, 0 otherwise)	0.277	0.046	6.020
SRN97	SR97 Dummy (1 if SR=972, 0 otherwise)	0.230	0.026	8.708
SRN542	SR542 Dummy (1 if SR=542, 0 otherwise)	0.280	0.049	5.716
Zero inflation model				
Tau		-2.998	0.017	-179.909
Number of obs = 426546				
Restricted LL = -9338.788 Log likelihood = -5895.10297				

Table D.99: SPF with LNADT, Length Offset, and Roadway Variables: Same Direction Sideswipe Crash Type

Variable	Description	Coeff.	S.E.	t-stat
Constant		-9.448	0.746	-12.661
LNADT	Log(AADT)	1.095	0.113	9.682
LENGTH	Segment Length	1.000	(Fixed Parameter)	
NLANEI	Number of lanes Increasing	-5.294	0.456	-11.600
Alpha		1322.951	110.892	11.930
Number of obs = 426546 Chi squared = 9733.110 Prob>chi2=0.000				
Restricted LL = -9338.788 Log likelihood = -3822.754				
Pseudo R2=0.5600624				

Table D.100: SPF with LNADT, Length Offset, Route Dummy Variables and Roadway Variables: Same Direction Sideswipe Crash Type

Variable	Description	Coeff.	S.E.	t-stat
Constant		-9.313	0.752	-12.389
LNADT	Log(AADT)	1.078	0.114	9.448
LENGTH	Segment Length	1.000	(Fixed Parameter)	
NLANEI	Number of lanes Increasing	-5.273	0.457	-11.530
SRN112	SR112 Dummy (1 if SR=112, 0 otherwise)	-1.742	0.627	-2.780
Alpha		1311.616	110.592	11.860
Number of obs = 426546 Chi squared = 9721.077 Prob>chi2=0.000				
Restricted LL = -9338.788 Log likelihood = -3819.817				
Pseudo R2=0.5599469				

Table D.101: SPF with LNADT, Length Offset, Roadside Variables and Roadway Variables: Same Direction Sideswipe Crash Type

Variable	Description	Coeff.	S.E.	t-stat
Constant		-9.788	0.904	-10.826
LNADT	Log(AADT)	1.140	0.140	8.158
LENGTH	Segment Length	1.000	(Fixed Parameter)	
NLANEI	Number of lanes Increasing	-5.358	0.474	-11.307
DDITCH	Ditch Dummy variable (1 if Ditch exists, 0 otherwise)	1.347	0.424	3.175
LDITCH00	Proportion of Ditch on a segment is 90-100%	-1.615	0.531	-3.041
DPDSTAL	Pedstal Dummy variable (1 if Pedstal exists, 0 otherwise)	-1.347	0.619	-2.176
Alpha		1293.150	109.982	11.758
Number of obs = 426546 Chi squared = 9701.042 Prob>chi2=0.000				
Restricted LL = -9338.788 Log likelihood = -3812.919				
Pseudo R2=0.5598839				

Table D.102: SPF with LNADT, Length Offset, Roadside Variables, Roadway Variables, and Route Dummy Variables: Same Direction Sideswipe Crash Type

Variable	Description	Coeff.	S.E.	t-stat
Constant		-9.647	0.911	-10.592
LNADT	Log(AADT)	1.122	0.141	7.969
LENGTH	Segment Length	1.000	(Fixed Parameter)	
NLANEI	Number of lanes Increasing	-5.335	0.475	-11.234
DDITCH	Ditch Dummy variable (1 if Ditch exists, 0 otherwise)	1.315	0.425	3.090
LDITCH00	Proportion of Ditch on a segment is 90-100%	-1.604	0.530	-3.027
DPDSTAL	Pedstal Dummy variable (1 if Pedstal exists, 0 otherwise)	-1.338	0.616	-2.173
SRN122	SR112 Dummy (1 if SR=112, 0 otherwise)	-1.663	0.626	-2.659
Alpha		1282.526	109.808	11.680
Number of obs = 426546 Chi squared = 9689.020 Prob>chi2=0.000				
Restricted LL = -9338.788 Log likelihood = -3810.248				
Pseudo R2=0.5597511				

Table D.103: All Other Routes: LNADT, Length Offset, Roadway Characteristics, and Roadside Features

Variable	Description	Coeff.	S.E.	t-stat
Constant		-5.302	0.077	-68.943
LNADT	Log(AADT)	0.881	0.012	72.806
LENGTH	Segment Length	1.000	(Fixed Parameter)	
NLANEI	Number of lanes Increasing	-4.213	0.056	-75.497
HCANG1	Horizontal Curve Central angle	0.000	0.000	-3.205
A1	Algebraic difference in gradients	-0.034	0.004	-8.629
K1	Rate of vertical curvature	0.000	0.1D-04	-14.921
DGC1	Degree of Curvature	0.010	0.002	5.083
RLNW	Average Lane width	0.061	0.005	13.245
SWR4501	Shoulder width dummy (if shoulder width right is 4-5ft and shoulder width left is 0-1ft, value=1,else=0)	-0.440	0.207	-2.122
SWR4523	Shoulder width dummy (if shoulder width right is 4-5ft and shoulder width left is 2-3ft, value=1,else=0)	-0.517	0.069	-7.474
SWR1001	Shoulder width dummy (if shoulder width right is >10ft and shoulder width left is 0-1ft, value=1,else=0)	-2.180	0.420	-5.190
SWR1045	Shoulder width dummy (if shoulder width right is >10ft and shoulder width left is 4-5ft, value=1,else=0)	0.607	0.196	3.097
SWC19	Shoulder width dummy (if shoulder width center is >1ft and <9ft, value=1,else=0)	-2.995	0.158	-18.983

Table D.103 (continued): All other routes: LNADT, Length Offset, Roadway Characteristics, and Roadside Features

Variable	Description	Coeff.	S.E.	t-stat
DCLVERT	Culvert Dummy variable (1 if Culvert exists, 0 otherwise)	0.330	0.095	3.487
LCURB00	Curb length on a segment between 90-100%	-0.599	0.137	-4.384
LTREG00	Tree group length on a segment between 90-100%	-0.316	0.092	-3.445
DCLVEND	Culvert end Dummy variable (1 if Culvert end exists, 0 otherwise)	0.215	0.085	2.519
DDITCH	Ditch Dummy variable (1 if Culvert exists, 0 otherwise)	0.347	0.066	5.227
LDITCH50	Ditch length on a segment between 40-50%	-0.812	0.401	-2.025
LDITCH00	Ditch length on a segment between 90-100%	-0.725	0.099	-7.350
DFENCE	Fence Dummy variable (1 if Fence exists, 0 otherwise)	0.481	0.178	2.692
LFENCE	Fence length on a segment	-0.732	0.217	-3.376
DGRDRAL	Guardrail Dummy variable (1 if Guardrail exists, 0 otherwise)	0.273	0.077	3.518
LGRDRL00	Guard rail length on a segment between 90-100%	-0.615	0.107	-5.753
LRDSLP00	Roadside slope length on a segment between 90-100%	-0.312	0.060	-5.200
Alpha		14.557	0.159	91.777
Number of obs = 263349 Chi squared = 130821.7 Prob>chi2=0.000				
Restricted LL = -195600.4 Log likelihood = -96337.44				
Pseudo R2 =0.4043990				

Table D.104: SPF with LNADT and Length Offset: Same Direction Turning Crash Type

Variable	Description	Coeff.	S.E.	t-stat
Constant		-10.249	1.542	-6.645
LNADT	Log(AADT)	0.442	0.207	2.133
LENGTH	Segment Length	1.000	(Fixed Parameter)	
Alpha		4046.449	624.777	6.477
Number of obs = 426546 Chi squared = 5743.487 Prob>chi2=0.000				
Restricted LL = -4946.920 Log likelihood = -2032.725				
Pseudo R2=0.5855361				

Table D.105: SPF with LNADT, Length Offset and Route Dummy Variables: Same Direction Turning Crash Type (ZIP)

Variable	Description	Coeff.	S.E.	t-stat
Poisson/NB/Gamma regression model				
Constant		-3.144	0.132	-23.736
LNADT	Log(AADT)	0.098	0.016	6.054
LENGTH	Segment Length	1.000	(Fixed Parameter)	
SRN7	SR7 Dummy (1 if SR=7, 0 otherwise)	0.295	0.064	4.626
SRN155	SR155 Dummy (1 if SR=155, 0 otherwise)	0.237	0.064	3.697
Zero inflation model				
Tau		-2.227	0.017	-129.121
Number of obs = 426546 Prob>chi2=0.000				
Restricted LL = -4946.920 Log likelihood = -3391.64830				

Table D.106: SPF with LNADT, Length Offset and Roadway Variables: Same Direction Turning Crash Type

Variable	Description	Coeff.	S.E.	t-stat
Constant		-7.628	1.073	-7.111
LNADT	Log(AADT)	0.680	0.211	3.225
LENGTH	Segment Length	1.000	(Fixed Parameter)	
NLANEI	Number of lanes Increasing	-4.218	0.758	-5.568
HCANG1	Horizontal Curve Central angle	-0.004	0.002	-2.520
DGC1	Degree of Curvature	-0.034	0.011	-3.203
Alpha		3354.299	478.071	7.016
Number of obs = 426546 Chi squared = 5520.717 Prob>chi2=0.000				
Restricted LL = -4946.920 Log likelihood = -2007.086				
Pseudo R2=0.5790017				

Table D.107: SPF with LNADT, Length Offset, Roadway and Route Dummy Variables: Same Direction Turning Crash type (ZIP)

Variable	Description	Coeff.	S.E.	t-stat
Poisson/NB/Gamma regression model				
Constant		-2.656	0.221	-12.015
LNADT	Log(AADT)	0.181	0.016	11.209
LENGTH	Segment Length	1.000	(Fixed Parameter)	
NLANEI	Number of lanes Increasing	-1.077	0.196	-5.491
HCANG1	Horizontal Curve Central angle	-0.001	0.000	-2.060
DGC1	Degree of Curvature	-0.030	0.004	-8.175
SRN7	SR7 Dummy (1 if SR=7, 0 otherwise)	0.258	0.064	4.007
SRN17	SR17 Dummy (1 if SR=17, 0 otherwise)	-0.503	0.246	-2.044
Zero inflation model				
Tau		-2.177	0.017	-126.452
Number of obs = 426546				
Restricted LL = -4946.920 Log likelihood = -3327.90330				

Table D.108: SPF with LNADT, Length Offset, Roadway, and Roadside Variables: Same Direction Turning Crash Type

Variable	Description	Coeff.	S.E.	t-stat
Constant		-7.668	1.073	-7.145
LNADT	Log(AADT)	0.692	0.212	3.269
LENGTH	Segment Length	1.000	(Fixed Parameter)	
NLANEI	Number of lanes Increasing	-4.245	0.761	-5.577
HCANG1	Horizontal Curve Central angle	-0.004	0.002	-2.521
DGC1	Degree of Curvature	-0.034	0.011	-3.171
LGRDRL00	Proportion of Guardrail on a segment is 90-100%	-2.218	0.974	-2.277
Alpha		3296.965	468.514	7.037
Number of obs = 426546 Chi squared = 5503.899 Prob>chi2=0.000				
Restricted LL = -4946.920 Log likelihood = -2004.405				
Pseudo R2=0.5785838				

Table D.109: SPF with LNADT, Length Offset, Roadway, Roadside, and Route Dummy Variables: Same Direction Turning Crash type

Variable	Description	Coeff.	S.E.	t-stat
Constant		-2.791	0.229	-12.178
LNADT	Log(AADT)	0.196	0.017	11.415
LENGTH	Segment Length	1.000	(Fixed Parameter)	
NLANEI	Number of lanes Increasing	-1.095	0.204	-5.378
HCANG1	Horizontal Curve Central angle	-0.001	0.000	-2.250
DGC1	Degree of Curvature	-0.028	0.004	-7.608
LGRDRL00	Proportion of Guardrail on a segment is 90-100%	-0.557	0.245	-2.278
SRN7	SR7 Dummy (1 if SR=7, 0 otherwise)	0.274	0.065	4.225
SRN12	SR12 Dummy (1 if SR=12, 0 otherwise)	0.125	0.055	2.293
SRN155	SR155 Dummy (1 if SR=155, 0 otherwise)	0.256	0.065	3.925
SRN231	SR231 Dummy (1 if SR=231, 0 otherwise)	0.394	0.091	4.335
Alpha		-2.166	0.017	-125.616
Number of obs = 426546 Prob>chi2=0.000				
Restricted LL = -4946.920 Log likelihood = -3320.20437				

Table D.110: SPF with LNADT and Length Offset: Same Direction Others Crash Type

Variable	Description	Coeff.	S.E.	t-stat
Constant		-12.016	0.970	-12.385
LNADT	Log(AADT)	0.768	0.129	5.929
LENGTH	Segment Length	1.000	(Fixed Parameter)	
Alpha		1463.171	136.987	10.681
Number of obs = 426546 Chi squared = 12455.92 Prob>chi2=0.000				
Restricted LL = -11132.45 Log likelihood = -4636.476				
Pseudo R2=0.5732429				

Table D.111: SPF with LNADT, Length Offset, and Route Dummy Variables: Same Direction Others Crash Type (ZIP)

Variable	Description	Coeff.	S.E.	t-stat
Poisson/NB/Gamma regression model				
Constant		-2.769	0.071	-38.744
LNADT	Log(AADT)	0.135	0.008	16.291
LENGTH	Segment Length	1.000	(Fixed Parameter)	
SRN12	SR12 Dummy (1 if SR=12, 0 otherwise)	0.115	0.025	4.583
SRN17	SR17 Dummy (1 if SR=17, 0 otherwise)	0.203	0.042	4.857
SRN26	SR26 Dummy (1 if SR=26, 0 otherwise)	0.306	0.040	7.697
SRN28	SR28 Dummy (1 if SR=28, 0 otherwise)	0.235	0.040	5.845
SRN97	SR97 Dummy (1 if SR=97, 0 otherwise)	0.219	0.025	8.815
SRN542	SR542 Dummy (1 if SR=542, 0 otherwise)	0.319	0.036	8.891
Zero inflation model				
Tau		-3.228	0.017	-194.936
Number of obs = 426546				
Restricted LL = -11132.45 Log likelihood = -6898.33656				

Table D.112: SPF with LNADT, Length Offset, and Roadway Variables: Same Direction Others Crash Type

Variable	Description	Coeff.	S.E.	t-stat
Constant		-8.031	0.717	-11.196
LNADT	Log(AADT)	1.017	0.127	8.003
LENGTH	Segment Length	1.000	(Fixed Parameter)	
NLANEI	Number of lanes Increasing	-5.769	0.507	-11.386
DGC1	Degree of Curvature	-0.036	0.016	-2.297
Alpha		1165.246	100.460	11.599
Number of obs = 426546 Chi squared = 11784.87 Prob>chi2=0.000				
Restricted LL = -11132.45 Log likelihood = -4557.972				
Pseudo R2=0.5638474				

Table D.113: SPF with LNADT, Length Offset, Roadway, and Route Dummy Variables: Same Direction Others Crash Type

Variable	Description	Coeff.	S.E.	t-stat
Constant		-9.071	0.833	-10.889
LNADT	Log(AADT)	1.136	0.133	8.525
LENGTH	Segment Length	1.000	(Fixed Parameter)	
NLANEI	Number of lanes Increasing	-5.988	0.611	-9.805
SRN12	SR12 Dummy (1 if SR=12, 0 otherwise)	0.848	0.330	2.572
SRN17	SR17 Dummy (1 if SR=17, 0 otherwise)	1.078	0.527	2.048
SRN26	SR26 Dummy (1 if SR=26, 0 otherwise)	1.881	0.824	2.283
SRN28	SR28 Dummy (1 if SR=28, 0 otherwise)	1.617	0.552	2.930
SRN410	SR410 Dummy (1 if SR=410, 0 otherwise)	0.908	0.369	2.458
SRN542	SR542 Dummy (1 if SR=542, 0 otherwise)	1.217	0.444	2.740
Alpha		1094.489	94.567	11.574
Number of obs = 426546 Chi squared = 11654.02 Prob>chi2=0.000				
Restricted LL = -11132.45 Log likelihood = -4531.545				
Pseudo R2=0.5625311				

Table D.114: SPF with LNADT, Length Offset, Roadway, and Roadside Variables: Same Direction Others Crash Type

Variable	Description	Coeff.	S.E.	t-stat
Constant		-8.064	0.719	-11.209
LNADT	Log(AADT)	1.029	0.128	8.038
LENGTH	Segment Length	1.000	(Fixed Parameter)	
NLANEI	Number of lanes Increasing	-5.810	0.509	-11.425
DGC1	Degree of Curvature	-0.036	0.016	-2.307
LTREG00	Proportion of Tree group on a segment is 90-100%	-2.419	0.980	-2.468
Alpha		1152.323	99.270	11.608
Number of obs = 426546 Chi squared = 11765.24 Prob>chi2=0.000				
Restricted LL = -11132.45 Log likelihood = -4552.872				
Pseudo R2=0.5637127				

Table D.115: SPF with LNADT, Length Offset, Roadway, Roadside and Route Dummy Variables: Same Direction Others Crash type

Variable	Description	Coeff.	S.E.	t-stat
Constant		-9.106	0.837	-10.877
LNADT	Log(AADT)	1.148	0.135	8.529
LENGTH	Segment Length	1.000	(Fixed Parameter)	
NLANEI	Number of lanes Increasing	-6.026	0.612	-9.851
LTREG00	Proportion of Tree group on a segment is 90-100%	-2.307	0.959	-2.405
SRN12	SR12 Dummy (1 if SR=12, 0 otherwise)	0.840	0.329	2.552
SRN17	SR17 Dummy (1 if SR=17, 0 otherwise)	1.064	0.521	2.041
SRN26	SR26 Dummy (1 if SR=26, 0 otherwise)	1.869	0.815	2.293
SRN28	SR28 Dummy (1 if SR=28, 0 otherwise)	1.608	0.546	2.945
SRN410	SR410 Dummy (1 if SR=410, 0 otherwise)	0.913	0.370	2.468
SRN542	SR542 Dummy (1 if SR=542, 0 otherwise)	1.204	0.441	2.733
Alpha		1282.526	109.808	11.680
Number of obs = 426546 Chi squared = 11638.21 Prob>chi2=0.000				
Restricted LL = -11132.45 Log likelihood = -4526.843				
Pseudo R2=0.5624527				

Table D.116: SPF with LNADT and Length Offset: Head on Crash Type

Variable	Description	Coeff.	S.E.	t-stat
Constant		-11.476	0.901	-12.744
LNADT	Log(AADT)	0.723	0.119	6.091
LENGTH	Segment Length	1.000	(Fixed Parameter)	
Alpha		1606.165	123.858	12.968
Number of obs = 426546 Chi squared = 14756.86 Prob>chi2=0.000				
Restricted LL = -12420.99 Log likelihood = -4839.683				
Pseudo R2=0.6038927				

Table D.117: SPF with LNADT, Length Offset, and Route Dummy Variables: Head on Crash Type (ZIP)

Variable	Description	Coeff.	S.E.	t-stat
Poisson/NB/Gamma regression model				
Constant		-2.391	0.068	-35.266
LNADT	Log(AADT)	0.102	0.008	12.663
LENGTH	Segment Length	1.000	(Fixed Parameter)	
SRN7	SR7Dummy (1 if SR=124, 0 otherwise)	0.314	0.031	10.147
SRN18	SR18 Dummy (1 if SR=124, 0 otherwise)	-0.277	0.085	-3.264
SRN21	SR21 Dummy (1 if SR=124, 0 otherwise)	-0.274	0.117	-2.348
SRN97	SR97 Dummy (1 if SR=124, 0 otherwise)	0.219	0.021	10.357
SRN195	SR195 Dummy (1 if SR=124, 0 otherwise)	0.285	0.025	11.612
SRN231	SR231 Dummy (1 if SR=124, 0 otherwise)	-0.317	0.190	-1.665
SRN241	SR241 Dummy (1 if SR=124, 0 otherwise)	0.207	0.076	2.716
SRN542	SR542 Dummy (1 if SR=124, 0 otherwise)	0.269	0.036	7.468
Zero inflation model				
Tau		-3.418	0.016	-208.097
Number of obs = 426546				
Restricted LL = -12420.99 Log likelihood = -7628.75865				

Table D.118: SPF with LNADT, Length Offset, and Roadway Variables: Head on Crash Type

Variable	Description	Coeff.	S.E.	t-stat
Constant		-11.974	0.910	-13.155
LNADT	Log(AADT)	0.768	0.118	6.490
LENGTH	Segment Length	1.000	(Fixed Parameter)	
DGC1	Degree of Curvature	0.050	0.019	2.576
Alpha		1567.139	119.237	13.143
Number of obs = 426546 Chi squared = 14705.23 Prob>chi2=0.000				
Restricted LL = -12420.99 Log likelihood = -4830.668				
Pseudo R2=0.6035002				

Table D.119: SPF with LNADT, Length Offset, Roadway, and Route Dummy Variables: Head on Crash Type

Variable	Description	Coeff.	S.E.	t-stat
Constant		-11.490	0.948	-12.119
LNADT	Log(AADT)	0.714	0.122	5.836
LENGTH	Segment Length	1.000	(Fixed Parameter)	
DGC1	Degree of Curvature	0.047	0.020	2.372
SRN18	SR18 Dummy (1 if SR=124, 0 otherwise)	-1.601	0.731	-2.190
SRN21	SR21 Dummy (1 if SR=124, 0 otherwise)	-1.262	0.457	-2.764
SRN231	SR231Dummy (1 if SR=124, 0 otherwise)	-1.610	0.761	-2.110
SRN504	SR504 Dummy (1 if SR=124, 0 otherwise)	-2.175	1.029	-2.113
Alpha		1533.435	118.074	12.987
Number of obs = 426546 Chi squared = 14622.46 Prob>chi2=0.000				
Restricted LL = -12420.99 Log likelihood = -4821.826				
Pseudo R2=0.6025877				

Table D.120: SPF with LNADT, Length Offset, Roadway, and Roadside Variables: Head on Crash Type

Variable	Description	Coeff.	S.E.	t-stat
Constant		-12.072	0.913	-13.217
LNADT	Log(AADT)	0.782	0.119	6.579
LENGTH	Segment Length	1.000	(Fixed Parameter)	
DGC1	Degree of Curvature	0.050	0.019	2.622
DDRGLET	Drainage inlet Dummy variable (1 if Drainage inlet exists, 0 otherwise)	-2.037	0.692	-2.944
Alpha		1553.255	118.170	13.144
Number of obs = 426546 Chi squared = 14677.08 Prob>chi2=0.000				
Restricted LL = -12420.99 Log likelihood = -4827.444				
Pseudo R2=0.6032014				

Table D.121: SPF with LNADT, Length Offset, Roadway, Roadside, and Route Dummy Variables: Head-On Crash Type

Variable	Description	Coeff.	S.E.	t-stat
Constant		-11.426	0.944	-12.109
LNADT	Log(AADT)	0.707	0.122	5.804
LENGTH	Segment Length	1.000	(Fixed Parameter)	
DGC1	Degree of Curvature	0.048	0.020	2.403
DDRGLET	Drainage inlet Dummy variable (1 if Drainage inlet exists, 0 otherwise)	-1.994	0.686	-2.907
SRN21	SR21 Dummy (1 if SR=21, 0 otherwise)	-1.279	0.456	-2.808
SRN231	SR231Dummy (1 if SR=231, 0 otherwise)	-1.621	0.760	-2.133
SRN504	SR504 Dummy (1 if SR=504, 0 otherwise)	-2.174	1.026	-2.120
Alpha		1527.571	117.825	12.965
Number of obs = 426546 Chi squared = 14615.98 Prob>chi2=0.000				
Restricted LL = -12420.99 Log likelihood = -4820.279				
Pseudo R2=0.6025583				

Table D.122: SPF with LNADT and Length Offset: Opposite Direction Sideswipe Type

Variable	Description	Coeff.	S.E.	t-stat
Constant		-10.342	0.649	-15.937
LNADT	Log(AADT)	0.627	0.087	7.171
LENGTH	Segment Length	1.000	(Fixed Parameter)	
Alpha		1035.441	76.654	13.508
Number of obs = 426546 Chi squared = 19763.12 Prob>chi2=0.000				
Restricted LL = -17171.60 Log likelihood = -6978.225				
Pseudo R2=0.5861024				

Table D.123: SPF with LNADT, Length Offset and Route Dummy Variables: Opposite Direction Sideswipe Type

Variable	Description	Coeff.	S.E.	t-stat
Constant		-9.694	0.694	-13.978
LNADT	Log(AADT)	0.553	0.092	5.993
LENGTH	Segment Length	1.000	(Fixed Parameter)	
SRN21	SR21 Dummy (1 if SR=21, 0 otherwise)	-1.771	0.392	-4.522
SRN410	SR410 Dummy (1 if SR=410, 0 otherwise)	-0.810	0.350	-2.314
SRN504	SR504 Dummy (1 if SR=504, 0 otherwise)	-1.812	0.727	-2.493
SRN821	SR821Dummy (1 if SR=821, 0 otherwise)	-1.764	0.826	-2.135
Alpha		1012.282	76.074	13.307
Number of obs = 426546 Chi squared = 19652.05 Prob>chi2=0.000				
Restricted LL = -17171.60 Log likelihood = -6964.409				
Pseudo R2=0.5852156				

Table D.124: SPF with LNADT, Length Offset and Roadway Variables: Opposite Direction Sideswipe Type

Variable	Description	Coeff.	S.E.	t-stat
Constant		-6.225	0.668	-9.316
LNADT	Log(AADT)	0.914	0.084	10.845
LENGTH	Segment Length	1.000	(Fixed Parameter)	
NLANEI	Number of lanes Increasing	-6.385	0.562	-11.359
DGC1	Degree of Curvature	0.047	0.014	3.330
Alpha		829.072	58.088	14.273
Number of obs = 426546 Chi squared = 18803.25 Prob>chi2=0.000				
Restricted LL = -17171.60 Log likelihood = -6855.185				
Pseudo R2=0.5783192				

Table D.125: SPF with LNADT, Length Offset, Roadway, and Route Dummy Variables: Opposite Direction Sideswipe Type

Variable	Description	Coeff.	S.E.	t-stat
Constant		-6.553	0.736	-8.905
LNADT	Log(AADT)	0.962	0.097	9.929
LENGTH	Segment Length	1.000	(Fixed Parameter)	
NLANEI	Number of lanes Increasing	-6.472	0.565	-11.448
DGC1	Degree of Curvature	0.044	0.015	2.982
SRN11	SR11 Dummy (1 if SR=11, 0 otherwise)	-1.389	0.669	-2.076
SRN21	SR21 Dummy (1 if SR=21, 0 otherwise)	-1.027	0.377	-2.724
SRN112	SR112 Dummy (1 if SR=112, 0 otherwise)	0.820	0.364	2.251
SRN206	SR206 Dummy (1 if SR=206, 0 otherwise)	1.755	0.849	2.067
SRN504	SR504 Dummy (1 if SR=504, 0 otherwise)	-1.851	0.794	-2.330
SRN542	SR542 Dummy (1 if SR=542, 0 otherwise)	1.111	0.373	2.977
SRN821	SR821 Dummy (1 if SR=821, 0 otherwise)	-1.553	0.773	-2.010
Alpha		797.372	55.908	14.262
Number of obs = 426546 Chi squared = 18695.93 Prob>chi2=0.000				
Restricted LL = -17171.60 Log likelihood = -6829.674				
Pseudo R2=0.5778324				

Table D.126: SPF with LNADT, Length Offset, Roadway, and Roadside Variables: Opposite Direction Sideswipe Type

Variable	Description	Coeff.	S.E.	t-stat
Constant		-6.149	0.679	-9.051
LNADT	Log(AADT)	0.895	0.085	10.476
LENGTH	Segment Length	1.000	(Fixed Parameter)	
NLANEI	Number of lanes Increasing	-6.324	0.561	-11.264
DGC1	Degree of Curvature	0.047	0.014	3.367
DDITCH	Ditch Dummy variable (1 if Ditch exists, 0 otherwise)	0.743	0.324	2.295
LDITCH00	Proportion of Ditch on a segment is 90-100%	-1.219	0.411	-2.964
LFENCE	Fence length on a segment	-1.287	0.372	-3.463
Alpha		815.221	57.486	14.180
Number of obs = 426546 Chi squared = 18683.08 Prob>chi2=0.000				
Restricted LL = -17171.60 Log likelihood = -6847.998				
Pseudo R2=0.5770110				

Table D.127: SPF with LNADT, Length Offset, Roadway, Roadside, and Route Dummy Variables: Opposite Direction Sideswipe Type

Variable	Description	Coeff.	S.E.	t-stat
Constant		-6.162	0.726	-8.487
LNADT	Log(AADT)	0.897	0.094	9.588
LENGTH	Segment Length	1.000	(Fixed Parameter)	
NLANEI	Number of lanes Increasing	-6.329	0.563	-11.236
DGC1	Degree of Curvature	0.045	0.015	2.991
DDITCH	Ditch Dummy variable (1 if Ditch exists, 0 otherwise)	0.763	0.319	2.394
LDITCH00	Proportion of Ditch on a segment is 90-100%	-1.217	0.405	-3.006
LFENCE	Fence length on a segment	-1.288	0.373	-3.450
SRN11	SR11 Dummy (1 if SR=11, 0 otherwise)	-1.403	0.662	-2.121
SRN21	SR21 Dummy (1 if SR=21, 0 otherwise)	-1.173	0.377	-3.111
SRN106	SR106 Dummy (1 if SR=106, 0 otherwise)	-1.509	0.747	-2.020
SRN112	SR112 Dummy (1 if SR=112 0 otherwise)	0.744	0.363	2.053
SRN504	SR504 Dummy (1 if SR=504, 0 otherwise)	-1.853	0.763	-2.430
SRN542	SR542 Dummy (1 if SR=542, 0 otherwise)	1.046	0.377	2.778
SRN821	SR821 Dummy (1 if SR=821, 0 otherwise)	-1.613	0.771	-2.093
Alpha		787.676	56.087	14.044
Number of obs = 426546 Chi squared = 18580.01 Prob>chi2=0.000				
Restricted LL = -17171.60 Log likelihood = -6825.406				
Pseudo R2=0.5764672				

Table D.128: SPF with LNADT and Length Offset: Opposite Direction Others Type

Variable	Description	Coeff.	S.E.	t-stat
Constant		-10.390	0.665	-15.625
LNADT	Log(AADT)	0.639	0.090	7.131
LENGTH	Segment Length	1.000	(Fixed Parameter)	
Alpha		942.737	60.592	15.559
Number of obs = 426546 Chi squared = 19873.22 Prob>chi2=0.000				
Restricted LL = -17671.54 Log likelihood = -7392.733				
Pseudo R2=0.5733979				

Table D.129: SPF with LNADT, Length Offset, and Route Dummy Variables: Opposite Direction Others Type

Variable	Description	Coeff.	S.E.	t-stat
Constant		-10.232	0.677	-15.106
LNADT	Log(AADT)	0.615	0.090	6.819
LENGTH	Segment Length	1.000	(Fixed Parameter)	
SRN12	SR12 Dummy (1 if SR=12, 0 otherwise)	0.476	0.180	2.641
SRN21	SR21 Dummy (1 if SR=21, 0 otherwise)	-2.871	0.698	-4.112
SRN27	SR27 Dummy (1 if SR=27, 0 otherwise)	-1.045	0.507	-2.061
SRN155	SR155 Dummy (1 if SR=155, 0 otherwise)	-0.928	0.395	-2.350
SRN542	SR542 Dummy (1 if SR=542, 0 otherwise)	1.235	0.429	2.875
SRN821	SR821 Dummy (1 if SR=821, 0 otherwise)	-1.646	0.776	-2.121
Alpha		906.019	62.097	14.590
Number of obs = 426546 Chi squared = 19736.18 Prob>chi2=0.000				
Restricted LL = -17671.54 Log likelihood = -7362.067				
Pseudo R2=0.5727220				

Table D.130: SPF with LNADT, Length Offset, and Roadway Variables: Opposite Direction Others Type

Variable	Description	Coeff.	S.E.	t-stat
Constant		-6.735	0.668	-10.080
LNADT	Log(AADT)	1.004	0.088	11.454
LENGTH	Segment Length	1.000	(Fixed Parameter)	
NLANEI	Number of lanes Increasing	-6.542	0.572	-11.436
MK1	Rate of vertical curvature/5280	-3.302	0.931	-3.547
DGC1	Degree of Curvature	0.060	0.009	6.853
SWR4523	Shoulder width dummy (if shoulder width right is 4-5ft and shoulder width left is 2-3ft, value=1,else=0)	1.086	0.369	2.939
Alpha		722.447	46.326	15.595
Number of obs = 426546 Chi squared = 18740.77 Prob>chi2=0.000				
Restricted LL = -17671.54 Log likelihood = -7231.360				
Pseudo R2=0.5644216				

Table D.131: SPF with LNADT, Length Offset, Roadway, and Route Dummy Variables: Opposite Direction Others Type

Variable	Description	Coeff.	S.E.	t-stat
Constant		-6.621	0.723	-9.159
LNADT	Log(AADT)	0.988	0.088	11.179
LENGTH	Segment Length	1.000	(Fixed Parameter)	
NLANEI	Number of lanes Increasing	-6.567	0.611	-10.739
MK1	Rate of vertical curvature/5280	-3.701	1.016	-3.642
DGC1	Degree of Curvature	0.051	0.011	4.502
SWR4523	Shoulder width dummy (if shoulder width right is 4-5ft and shoulder width left is 2-3ft, value=1,else=0)	1.070	0.344	3.111
SRN12	SR12 Dummy (1 if SR=12, 0 otherwise)	0.616	0.224	2.751
SRN21	SR21 Dummy (1 if SR=21, 0 otherwise)	-2.359	0.689	-3.423
SRN27	SR27 Dummy (1 if SR=27, 0 otherwise)	-1.056	0.505	-2.090
SRN124	SR124 Dummy (1 if SR=124, 0 otherwise)	1.126	0.529	2.129
SRN155	SR155 Dummy (1 if SR=155, 0 otherwise)	-0.720	0.340	-2.118
SRN302	SR302 Dummy (1 if SR=302, 0 otherwise)	-2.246	1.104	-2.035
SRN503	SR503 Dummy (1 if SR=503, 0 otherwise)	0.940	0.465	2.023
SRN542	SR542 Dummy (1 if SR=542, 0 otherwise)	1.076	0.345	3.115
SRN821	SR821 Dummy (1 if SR=821, 0 otherwise)	-1.524	0.747	-2.039
Alpha		692.099	46.840	14.776
Number of obs = 426546 Chi squared = 18598.61 Prob>chi2=0.000				
Restricted LL = -17671.54 Log likelihood = -7198.563				
Pseudo R2=0.5636670				

Table D.132: SPF with LNADT, Length Offset, Roadway, and Roadside Variables: Opposite Direction Others Type (ZIP)

Variable	Description	Coeff.	S.E.	t-stat
Poisson/NB/Gamma regression model				
Constant		-1.980	0.133	-14.933
LNADT	Log(AADT)	0.191	0.006	32.245
LENGTH	Segment Length	1.000	(Fixed Parameter)	
NLANEI	Number of lanes Increasing	-0.856	0.123	-6.942
MK1	Rate of vertical curvature/5280	-0.434	0.122	-3.551
DGC1	Degree of Curvature	0.009	0.001	13.546
SWR4523	Shoulder width dummy (if shoulder width right is 4-5ft and shoulder width left is 2-3ft, value=1,else=0)	0.086	0.031	2.751
DGRDRAL	Guardrail Dummy variable (1 if Guardrail exists, 0 otherwise)	0.069	0.018	3.931
Zero inflation model				
Zip Tau		-3.874	0.016	-239.116
Number of obs = 426546				
Restricted LL = -17671.54 Log likelihood = -10379.16782				

Table D.133: SPF with LNADT, Length Offset, Roadway, Roadside and Route Dummy Variables: Opposite Direction Others Type

Variable	Description	Coeff.	S.E.	t-stat
Constant		-6.515	0.726	-8.978
LNADT	Log(AADT)	0.977	0.089	11.012
LENGTH	Segment Length	1.000	(Fixed Parameter)	
NLANEI	Number of lanes Increasing	-6.540	0.613	-10.673
MK1	Rate of vertical curvature/5280	-3.669	0.995	-3.688
DGC1	Degree of Curvature	0.050	0.011	4.412
SWR4523	Shoulder width dummy (if shoulder width right is 4-5ft and shoulder width left is 2-3ft, value=1,else=0)	1.032	0.346	2.982
LFENCE	Fence length on a segment	-0.904	0.385	-2.349
SRN12	SR12 Dummy (1 if SR=12, 0 otherwise)	0.590	0.226	2.613
SRN21	SR21 Dummy (1 if SR=21, 0 otherwise)	-2.414	0.688	-3.509
SRN27	SR27 Dummy (1 if SR=27, 0 otherwise)	-1.083	0.507	-2.136
SRN124	SR124 Dummy (1 if SR=124, 0 otherwise)	1.079	0.530	2.038
SRN155	SR155 Dummy (1 if SR=155, 0 otherwise)	-0.765	0.340	-2.251
SRN302	SR302 Dummy (1 if SR=302, 0 otherwise)	-2.266	1.107	-2.047
SRN542	SR542 Dummy (1 if SR=542, 0 otherwise)	1.033	0.346	2.984
SRN821	SR821 Dummy (1 if SR=821, 0 otherwise)	-1.569	0.747	-2.100
Alpha		692.295	46.620	14.850
Number of obs = 426546 Chi squared = 18579.33 Prob>chi2=0.000				
Restricted LL = -17171.60 Log likelihood = -7199.535				
Pseudo R2=0.5633788				

Table D.134: SPF with LNADT and Length Offset: Fixed Object Type

Variable	Description	Coeff.	S.E.	t-stat
Constant		-5.559	0.104	-53.523
LNADT	Log(AADT)	0.278	0.013	21.187
LENGTH	Segment Length	1.000	(Fixed Parameter)	
Alpha		27.176	0.487	55.811
Number of obs = 426546 Chi squared = 30030.93 Prob>chi2=0.000				
Restricted LL = -75955.47 Log likelihood = -60153.69				
Pseudo R2=0.1997557				

Table D.135: SPF with LNADT, Length Offset, and Route Dummy Variables: Fixed Object Type

Variable	Description	Coeff.	S.E.	t-stat
Constant		-4.177	0.117	-35.606
LNADT	Log(AADT)	0.100	0.015	6.890
LENGTH	Segment Length	1.000	(Fixed Parameter)	
SRN3	SR3 Dummy (1 if SR=3, 0 otherwise)	0.565	0.114	4.935
SRN6	SR6 Dummy (1 if SR=6, 0 otherwise)	0.306	0.098	3.127
SRN7	SR7 Dummy (1 if SR=7, 0 otherwise)	0.253	0.083	3.040
SRN9	SR9 Dummy (1 if SR=9, 0 otherwise)	0.240	0.081	2.963
SRN12	SR12 Dummy (1 if SR=12, 0 otherwise)	0.180	0.044	4.111
SRN21	SR21 Dummy (1 if SR=21, 0 otherwise)	-1.680	0.083	-20.350
SRN22	SR22 Dummy (1 if SR=22, 0 otherwise)	-0.582	0.208	-2.802
SRN23	SR23 Dummy (1 if SR=23, 0 otherwise)	-1.243	0.152	-8.189
SRN25	SR25 Dummy (1 if SR=25, 0 otherwise)	-0.505	0.080	-6.298
SRN26	SR26 Dummy (1 if SR=26, 0 otherwise)	0.627	0.102	6.171
SRN27	SR27 Dummy (1 if SR=27, 0 otherwise)	-0.629	0.097	-6.517
SRN28	SR28 Dummy (1 if SR=28, 0 otherwise)	-0.218	0.089	-2.433
SRN31	SR31 Dummy (1 if SR=31, 0 otherwise)	-1.122	0.178	-6.301
SRN97	SR97 Dummy (1 if SR=97, 0 otherwise)	0.657	0.053	12.417
SRN104	SR104 Dummy (1 if SR=104, 0 otherwise)	0.676	0.181	3.738
SRN105	SR105 Dummy (1 if SR=105, 0 otherwise)	0.470	0.134	3.517
SRN106	SR106 Dummy (1 if SR=106, 0 otherwise)	0.467	0.142	3.299
SRN108	SR108 Dummy (1 if SR=108, 0 otherwise)	0.586	0.244	2.401
SRN109	SR109 Dummy (1 if SR=109, 0 otherwise)	0.543	0.109	4.965
SRN127	SR127 Dummy (1 if SR=127, 0 otherwise)	-0.573	0.150	-3.818
SRN129	SR129 Dummy (1 if SR=129, 0 otherwise)	-1.241	0.141	-8.807
SRN172	SR172 Dummy (1 if SR=172, 0 otherwise)	-2.213	0.385	-5.746
SRN174	SR174 Dummy (1 if SR=174, 0 otherwise)	-0.287	0.140	-2.053
SRN195	SR195 Dummy (1 if SR=195, 0 otherwise)	0.504	0.089	5.661
SRN203	SR203 Dummy (1 if SR=203, 0 otherwise)	0.643	0.159	4.054
SRN221	SR221 Dummy (1 if SR=221, 0 otherwise)	-0.513	0.176	-2.910
SRN231	SR231 Dummy (1 if SR=231, 0 otherwise)	-0.692	0.092	-7.560
SRN241	SR241 Dummy (1 if SR=241, 0 otherwise)	1.239	0.217	5.720
SRN243	SR243 Dummy (1 if SR=243, 0 otherwise)	0.450	0.183	2.463
SRN260	SR260 Dummy (1 if SR=260, 0 otherwise)	-0.725	0.212	-3.423
SRN261	SR261 Dummy (1 if SR=261, 0 otherwise)	-1.363	0.166	-8.224
SRN272	SR272 Dummy (1 if SR=272, 0 otherwise)	-0.601	0.191	-3.143
SRN290	SR290 Dummy (1 if SR=290, 0 otherwise)	-3.061	0.742	-4.126
SRN302	SR302 Dummy (1 if SR=302, 0 otherwise)	0.606	0.200	3.026
SRN305	SR305 Dummy (1 if SR=305, 0 otherwise)	-0.966	0.338	-2.862
SRN395	SR395 Dummy (1 if SR=395, 0 otherwise)	-0.586	0.075	-7.849

Table D.135 (continued): SPF with LNADT, Length Offset, and Route Dummy Variables: Fixed Object Type

Variable	Description	Coeff.	S.E.	t-stat
SRN411	SR411 Dummy (1 if SR=411, 0 otherwise)	0.556	0.208	2.666
SRN504	SR504 Dummy (1 if SR=504, 0 otherwise)	-0.549	0.102	-5.372
SRN507	SR507 Dummy (1 if SR=507, 0 otherwise)	0.695	0.139	4.989
SRN508	SR508 Dummy (1 if SR=508, 0 otherwise)	0.384	0.131	2.930
SRN539	SR539 Dummy (1 if SR=539, 0 otherwise)	-1.215	0.238	-5.101
SRN542	SR542 Dummy (1 if SR=5421, 0 otherwise)	0.577	0.070	8.252
SRN821	SR821 Dummy (1 if SR=821, 0 otherwise)	-0.291	0.137	-2.123
SR502730	SR502 & SR730 Dummy (1 if SR=502 or 730, 0 otherwise)	0.687	0.289	2.379
SR432532	SR432 & SR532 Dummy (1 if SR=432 or 532, 0 otherwise)	-0.366	0.179	-2.052
SR123169	SR123 & SR169 Dummy (1 if SR=123 or 169, 0 otherwise)	-0.810	0.132	-6.111
SR24165	SR241 & SR165 Dummy (1 if SR=241 or 165, 0 otherwise)	-0.887	0.138	-6.449
Alpha		24.203	0.442	54.802
Number of obs = 426546 Chi squared = 28282.10 Prob>chi2=0.000				
Restricted LL = -75955.47 Log likelihood = -59432.70				
Pseudo R2=0.1922024				

Table D.136: SPF with LNADT, Length Offset, and Roadway Variables: Fixed Object Type

Variable	Description	Coeff.	S.E.	t-stat
Constant		-1.805	0.213	-8.458
LNADT	Log(AADT)	0.583	0.014	40.532
LENGTH	Segment Length	1.000	(Fixed Parameter)	
NLANEI	Number of lanes Increasing	-5.527	0.190	-29.079
HCANG1	Horizontal Curve Central angle	0.0004	0.0002	2.570
A1	Algebraic difference in gradients	-0.038	0.005	-7.800
MK1	Rate of vertical curvature/5280	-0.513	0.062	-8.214
DGC1	Degree of Curvature	0.027	0.002	12.561
RLNW	Average Lane width	-0.045	0.009	-5.122
SWR4523	Shoulder width dummy (if shoulder width right is 4-5ft and shoulder width left is 2-3ft, value=1,else=0)	-0.323	0.098	-3.289
SWC19	Shoulder width dummy (if shoulder width center is >1ft and <9ft, value=1,else=0)	-2.963	0.482	-6.151
Alpha		21.591	0.388	55.619
Number of obs = 426546 Chi squared = 27563.67 Prob>chi2=0.000				
Restricted LL = -75955.47 Log likelihood = -58338.72				
Pseudo R2=0.1910944				

Table D.137: SPF with LNADT, Length Offset, Roadway, and Route Dummy Variables: Fixed Object Type

Variable	Description	Coeff.	S.E.	t-stat
Constant		-1.049	0.234	-4.480
LNADT	Log(AADT)	0.475	0.015	30.820
LENGTH	Segment Length	1.000	(Fixed Parameter)	
NLANEI	Number of lanes Increasing	-5.235	0.210	-24.967
A1	Algebraic difference in gradients	-0.033	0.005	-6.626
MK1	Rate of vertical curvature/5280	-0.655	0.060	-11.001
DGC1	Degree of Curvature	0.028	0.002	13.298
RLNW	Average Lane width	-0.065	0.009	-7.528
SWR4523	Shoulder width dummy (if shoulder width right is 4-5ft and shoulder width left is 2-3ft, value=1,else=0)	-0.325	0.097	-3.354
SWC19	Shoulder width dummy (if shoulder width center is >1ft and <9ft, value=1,else=0)	-2.872	0.503	-5.704
SRN3	SR3 Dummy (1 if SR=3, 0 otherwise)	0.363	0.135	2.693
SRN7	SR7 Dummy (1 if SR=7, 0 otherwise)	0.175	0.080	2.188
SRN12	SR12 Dummy (1 if SR=12, 0 otherwise)	0.253	0.044	5.689
SRN21	SR21 Dummy (1 if SR=21, 0 otherwise)	-1.176	0.082	-14.367
SRN22	SR22 Dummy (1 if SR=22, 0 otherwise)	-0.484	0.205	-2.360
SRN23	SR23 Dummy (1 if SR=23, 0 otherwise)	-0.749	0.148	-5.052
SRN25	SR25 Dummy (1 if SR=25, 0 otherwise)	-0.186	0.078	-2.384
SRN26	SR26 Dummy (1 if SR=26, 0 otherwise)	0.726	0.090	8.059
SRN27	SR27 Dummy (1 if SR=27, 0 otherwise)	-0.541	0.101	-5.359
SRN28	SR28 Dummy (1 if SR=28, 0 otherwise)	-0.192	0.088	-2.174
SRN31	SR31 Dummy (1 if SR=31, 0 otherwise)	-0.832	0.177	-4.708
SRN97	SR97 Dummy (1 if SR=97, 0 otherwise)	0.486	0.050	9.812
SRN104	SR104 Dummy (1 if SR=104, 0 otherwise)	0.557	0.185	3.010
SRN105	SR105 Dummy (1 if SR=105, 0 otherwise)	0.374	0.123	3.032
SRN106	SR106 Dummy (1 if SR=106, 0 otherwise)	0.277	0.128	2.168
SRN109	SR109 Dummy (1 if SR=109, 0 otherwise)	0.294	0.103	2.850
SRN129	SR129 Dummy (1 if SR=129, 0 otherwise)	-1.104	0.136	-8.108
SRN172	SR172 Dummy (1 if SR=172, 0 otherwise)	-1.486	0.384	-3.872
SRN195	SR195 Dummy (1 if SR=195, 0 otherwise)	0.449	0.091	4.919
SRN221	SR221 Dummy (1 if SR=221, 0 otherwise)	-0.452	0.168	-2.692
SRN231	SR231 Dummy (1 if SR=231, 0 otherwise)	-0.438	0.089	-4.938
SRN241	SR241 Dummy (1 if SR=241, 0 otherwise)	1.152	0.203	5.669
SRN261	SR261 Dummy (1 if SR=261, 0 otherwise)	-0.877	0.161	-5.467
SRN290	SR290 Dummy (1 if SR=290, 0 otherwise)	-2.638	0.771	-3.422
SRN305	SR305 Dummy (1 if SR=305, 0 otherwise)	-1.654	0.326	-5.068
SRN504	SR504 Dummy (1 if SR=504, 0 otherwise)	-0.454	0.103	-4.407
SRN508	SR508 Dummy (1 if SR=508, 0 otherwise)	0.311	0.120	2.589

Table D.137 (continued): SPF with LNADT, Length Offset, Roadway, and Route Dummy Variables: Fixed Object Type

Variable	Description	Coeff.	S.E.	t-stat
SRN542	SR542 Dummy (1 if SR=542, 0 otherwise)	0.472	0.066	7.145
SR432532	SR432 & SR532 Dummy (1 if SR=432 or 532, 0 otherwise)	-0.568	0.198	-2.869
SR123169	SR123 & SR169 Dummy (1 if SR=123 or 169, 0 otherwise)	-1.009	0.150	-6.737
SR24165	SR241 & SR165 Dummy (1 if SR=24 or 165, 0 otherwise)	-0.727	0.135	-5.403
Alpha		20.309	0.371	54.810
Number of obs = 426546 Chi squared = 26578.34 Prob>chi2=0.000				
Restricted LL = -75955.47 Log likelihood = -57941.90				
Pseudo R2=0.1865642				

Table D.138: SPF with LNADT, Length Offset, Roadway, and Roadside Variables: Fixed Object Type

Variable	Description	Coeff.	S.E.	t-stat
Constant		-1.788	0.213	-8.377
LNADT	Log(AADT)	0.563	0.014	39.333
LENGTH	Segment Length	1.000	(Fixed Parameter)	
NLANEI	Number of lanes Increasing	-5.473	0.190	-28.812
HCANG1	Horizontal Curve Central angle	0.0004	0.0002	2.940
A1	Algebraic difference in gradients	-0.037	0.005	-7.676
MK1	Rate of vertical curvature/5280	-0.476	0.063	-7.546
DGC1	Degree of Curvature	0.029	0.002	13.295
RLNW	Average Lane width	-0.042	0.009	-4.748
SWR4523	Shoulder width dummy (if shoulder width right is 4-5ft and shoulder width left is 2-3ft, value=1,else=0)	-0.347	0.110	-3.151
SWC19	Shoulder width dummy (if shoulder width center is >1ft and <9ft, value=1,else=0)	-2.922	0.480	-6.086
DBRDRAL	Bridge rail Dummy variable (1 if Bridge rail exists, 0 otherwise)	-0.321	0.148	-2.170
DBRGSTR	Bridge Structure Dummy variable (1 if Bridge rail exists, 0 otherwise)	0.466	0.226	2.067
DCLVERT	Culvert Dummy variable (1 if Culvert exists, 0 otherwise)	0.655	0.134	4.881
LCLVERT	Culvert length	-1.959	0.451	-4.343
DDITCH	Ditch Dummy variable (1 if Ditch exists, 0 otherwise)	0.186	0.080	2.320
LDITCH00	Proportion of Ditch on a segment is 90-100%	-0.359	0.095	-3.768

Table D.138 (continued): SPF with LNADT, Length Offset, Roadway, and Roadside Variables: Fixed Object Type

Variable	Description	Coeff.	S.E.	t-stat
DDRGLET	Drainage inlet Dummy variable (1 if Drainage inlet exists, 0 otherwise)	0.265	0.102	2.613
DFENCE	Fence Dummy variable (1 if Fence exists, 0 otherwise)	-0.275	0.076	-3.635
DGRDRAL	Guardrail Dummy variable (1 if Guardrail exists, 0 otherwise)	0.511	0.075	6.813
LGRDRL80	Proportion of Guardrail on a segment is 70-80%	-0.921	0.337	-2.736
LGRDRL00	Proportion of Guardrail on a segment is 90-100%	-0.778	0.104	-7.495
DRDAPRC	Road approach Dummy variable (1 if Road approach exists, 0 otherwise)	-0.213	0.081	-2.634
DRDSLP	Road side slope Dummy variable (1 if Road side slope exists, 0 otherwise)	0.321	0.083	3.842
LRDSLP70	Proportion of Guardrail on a segment is 60-70%	-0.441	0.219	-2.014
LRDSLP00	Proportion of Guardrail on a segment is 90-100%	-0.439	0.086	-5.081
LRCHCRP	Rock out cropping length on a segment	-0.634	0.297	-2.132
DTREE	Tree Dummy variable (1 if Tree exists, 0 otherwise)	0.301	0.115	2.623
DTREGRP	Tree group Dummy variable (1 if Tree group exists, 0 otherwise)	0.224	0.084	2.671
LTREG00	Proportion of Tree group on a segment is 90-100%	-0.318	0.123	-2.584
Alpha		20.860	0.376	55.492
Number of obs = 426546 Chi squared = 26824.90 Prob>chi2=0.000				
Restricted LL = -75955.47 Log likelihood = -58157.02				
Pseudo R2=0.1874046				

Table D.139: SPF with LNADT, Length Offset, Roadway, Roadside, and Route Dummy Variables: Fixed Object Type

Variable	Description	Coeff.	S.E.	t-stat
Constant		-0.891	0.235	-3.787
LNADT	Log(AADT)	0.466	0.016	29.534
LENGTH	Segment Length	1.000	(Fixed Parameter)	
NLANEI	Number of lanes Increasing	-5.335	0.210	-25.353
A1	Algebraic difference in gradients	-0.032	0.005	-6.520
MK1	Rate of vertical curvature/5280	-0.632	0.061	-10.418
DGC1	Degree of Curvature	0.032	0.002	14.961
RLNW	Average Lane width	-0.069	0.008	-8.164
SWR4523	Shoulder width dummy (if shoulder width right is 4-5ft and shoulder width left is 2-3ft, value=1,else=0)	-0.354	0.112	-3.166
SWC19	Shoulder width dummy (if shoulder width center is >1ft and <9ft, value=1,else=0)	-2.839	0.503	-5.650
DCLVERT	Culvert Dummy variable (1 if Culvert exists, 0 otherwise)	0.574	0.132	4.352
LCLVERT	Culvert length	-1.996	0.438	-4.563
DDITCH	Ditch Dummy variable (1 if Ditch exists, 0 otherwise)	0.170	0.079	2.145
LDITCH00	Proportion of Ditch on a segment is 90-100%	-0.336	0.095	-3.536
DDRGLET	Drainage inlet Dummy variable (1 if Drainage inlet exists, 0 otherwise)	0.274	0.101	2.706
DFENCE	Fence Dummy variable (1 if Fence exists, 0 otherwise)	-0.226	0.076	-2.989
DGRDRAL	Guardrail Dummy variable (1 if Guardrail exists, 0 otherwise)	0.478	0.075	6.374
LGRDRL80	Proportion of Guardrail on a segment is 70-80%	-0.948	0.345	-2.747
LGRDRL00	Proportion of Guardrail on a segment is 90-100%	-0.751	0.105	-7.133
DRDAPRC	Road approach Dummy variable (1 if Road approach exists, 0 otherwise)	-0.195	0.080	-2.451
DRDSLP	Road side slope Dummy variable (1 if Road side slope exists, 0 otherwise)	0.353	0.083	4.251
LRDSLP70	Proportion of Guardrail on a segment is 60-70%	-0.447	0.212	-2.104
LRDSLP00	Proportion of Guardrail on a segment is 90-100%	-0.466	0.086	-5.416
LRCHCRP	Rock out cropping length on a segment	-0.772	0.314	-2.460
DTREE	Tree Dummy variable (1 if Tree exists, 0 otherwise)	0.256	0.115	2.221

Table D.139 (continued): SPF with LNADT, Length Offset, Roadway, Roadside, and Route Dummy Variables: Fixed Object Type

Variable	Description	Coeff.	S.E.	t-stat
DTREGRP	Tree group Dummy variable (1 if Tree group exists, 0 otherwise)	0.240	0.083	2.902
LTREG00	Proportion of Tree group on a segment is 90-100%	-0.280	0.121	-2.305
SRN3	SR3 Dummy (1 if SR=3, 0 otherwise)	0.329	0.131	2.522
SRN6	SR6 Dummy (1 if SR=6, 0 otherwise)	0.219	0.089	2.457
SRN7	SR7 Dummy (1 if SR=7, 0 otherwise)	0.224	0.079	2.833
SRN11	SR9 Dummy (1 if SR=9, 0 otherwise)	-0.499	0.134	-3.738
SRN12	SR12 Dummy (1 if SR=12, 0 otherwise)	0.291	0.044	6.540
SRN17	SR171 Dummy (1 if SR=17, 0 otherwise)	0.160	0.074	2.153
SRN18	SR18 Dummy (1 if SR=18, 0 otherwise)	0.863	0.322	2.683
SRN21	SR21 Dummy (1 if SR=21, 0 otherwise)	-1.146	0.082	-13.984
SRN22	SR22 Dummy (1 if SR=22, 0 otherwise)	-0.479	0.204	-2.347
SRN23	SR23 Dummy (1 if SR=23, 0 otherwise)	-0.752	0.155	-4.838
SRN25	SR25 Dummy (1 if SR=25, 0 otherwise)	-0.161	0.078	-2.071
SRN26	SR26 Dummy (1 if SR=26, 0 otherwise)	0.765	0.088	8.706
SRN27	SR27 Dummy (1 if SR=27, 0 otherwise)	-0.525	0.103	-5.102
SRN31	SR31 Dummy (1 if SR=31, 0 otherwise)	-0.861	0.183	-4.697
SRN97	SR97 Dummy (1 if SR=97, 0 otherwise)	0.482	0.049	9.767
SRN104	SR104 Dummy (1 if SR=104, 0 otherwise)	0.634	0.179	3.540
SRN105	SR105 Dummy (1 if SR=105, 0 otherwise)	0.337	0.123	2.741
SRN106	SR106 Dummy (1 if SR=106, 0 otherwise)	0.296	0.124	2.374
SRN109	SR109 Dummy (1 if SR=109, 0 otherwise)	0.282	0.101	2.806
SRN129	SR129 Dummy (1 if SR=129, 0 otherwise)	-1.062	0.137	-7.733
SRN150	SR150 Dummy (1 if SR=150, 0 otherwise)	-0.510	0.158	-3.225
SRN172	SR172 Dummy (1 if SR=172, 0 otherwise)	-1.449	0.383	-3.788
SRN195	SR195 Dummy (1 if SR=195, 0 otherwise)	0.518	0.089	5.807
SRN202	SR202 Dummy (1 if SR=202, 0 otherwise)	-0.601	0.148	-4.062
SRN221	SR221Dummy (1 if SR=221, 0 otherwise)	-0.391	0.166	-2.359
SRN231	SR231 Dummy (1 if SR=231, 0 otherwise)	-0.400	0.089	-4.488
SRN241	SR241 Dummy (1 if SR=241, 0 otherwise)	1.218	0.201	6.071
SRN261	SR261 Dummy (1 if SR=261, 0 otherwise)	-0.835	0.160	-5.216
SRN290	SR290 Dummy (1 if SR=290, 0 otherwise)	-2.617	0.787	-3.327
SRN305	SR305 Dummy (1 if SR=305, 0 otherwise)	-1.572	0.322	-4.879
SRN410	SR410 Dummy (1 if SR=410, 0 otherwise)	0.262	0.065	4.057
SRN504	SR504 Dummy (1 if SR=504, 0 otherwise)	-0.432	0.102	-4.231
SRN508	SR508 Dummy (1 if SR=508, 0 otherwise)	0.366	0.118	3.108
SRN542	SR542 Dummy (1 if SR=542, 0 otherwise)	0.494	0.067	7.384

Table D.139 (continued): SPF with LNADT, Length Offset, Roadway, Roadside, and Route Dummy Variables: Fixed Object Type

Variable	Description	Coeff.	S.E.	t-stat
SR502730	SR502 & SR730 Dummy (1 if SR=502 or 730, 0 otherwise)	0.553	0.257	2.154
SR432532	SR432 & SR532 Dummy (1 if SR=432 or 532, 0 otherwise)	-0.592	0.199	-2.978
SR123169	SR123 & SR169 Dummy (1 if SR=123 or 169, 0 otherwise)	-1.037	0.156	-6.667
SR24165	SR24 & SR165 Dummy (1 if SR=24 or 165, 0 otherwise)	-0.704	0.133	-5.274
Alpha		19.461	0.356	54.715
Number of obs = 426546 Chi squared = 25735.37 Prob>chi2=0.000				
Restricted LL = -75955.47 Log likelihood = -57712.43				
Pseudo R2=0.1823132				

Table D.140: SPF with LNADT and Length Offset: Entering at Angle Type

Variable	Description	Coeff.	S.E.	t-stat
Constant		-16.633	1.033	-16.097
LNADT	Log(AADT)	1.234	0.131	9.392
LENGTH	Segment Length	1.000	(Fixed Parameter)	
Alpha		2976.801	257.172	11.575
Number of obs = 426546 Chi squared = 8681.025 Prob>chi2=0.000				
Restricted LL = -7026.559 Log likelihood = -2307.913				
Pseudo R2=0.6528632				

Table D.141: SPF with LNADT, Length Offset, and Route Dummy Variables: Entering at Angle Type

Variable	Description	Coeff.	S.E.	t-stat
Constant		-18.977	1.224	-15.508
LNADT	Log(AADT)	1.489	0.152	9.764
LENGTH	Segment Length	1.000	(Fixed Parameter)	
SRN14	SR14 Dummy (1 if SR=14, 0 otherwise)	-0.951	0.441	-2.158
SRN18	SR18 Dummy (1 if SR=18, 0 otherwise)	-3.526	1.017	-3.468
SRN21	SR21 Dummy (1 if SR=21, 0 otherwise)	1.498	0.554	2.706
SRN26	SR26 Dummy (1 if SR=26, 0 otherwise)	2.709	1.342	2.019
SRN195	SR195 Dummy (1 if SR=195, 0 otherwise)	-2.091	1.014	-2.062
SRN206	SR206 Dummy (1 if SR=206, 0 otherwise)	3.716	1.831	2.029
Alpha		2397.494	257.175	9.322
Number of obs = 426546 Chi squared = 8279.388 Prob>chi2=0.000				
Restricted LL = -75955.47 Log likelihood = -2270.929				
Pseudo R2=0.6457554				

Table D.142: SPF with LNADT, Length Offset, and Roadway Variables: Entering at Angle Type

Variable	Description	Coeff.	S.E.	t-stat
Constant		-20.275	1.319	-15.376
LNADT	Log(AADT)	1.408	0.121	11.657
LENGTH	Segment Length	1.000	(Fixed Parameter)	
NLANEI	Number of lanes Increasing	-4.145	0.569	-7.282
A1	Algebraic difference in gradients	0.099	0.048	2.047
MK1	Rate of vertical curvature/5280	-5.319	2.414	-2.204
DGC1	Degree of Curvature	-0.062	0.022	-2.843
RLNW	Average Lane width	0.554	0.112	4.940
Alpha		2100.478	213.300	9.848
Number of obs = 426546 Chi squared = 7921.966 Prob>chi2=0.000				
Restricted LL = -75955.47 Log likelihood = -2250.484				
Pseudo R2=0.6376888				

Table D.143: SPF with LNADT, Length Offset, Roadway, and Route Dummy Variables: Entering at Angle Type

Variable	Description	Coeff.	S.E.	t-stat
Constant		-22.038	1.304	-16.900
LNADT	Log(AADT)	1.595	0.155	10.292
LENGTH	Segment Length	1.000	(Fixed Parameter)	
NLANEI	Number of lanes Increasing	-4.018	0.557	-7.213
MK1	Rate of vertical curvature/5280	-5.178	2.348	-2.205
DGC1	Degree of Curvature	-0.058	0.024	-2.423
RLNW	Average Lane width	0.566	0.106	5.357
SRN14	SR14 Dummy (1 if SR=14, 0 otherwise)	-1.292	0.455	-2.839
SRN21	SR21 Dummy (1 if SR=21, 0 otherwise)	1.822	0.585	3.113
SRN26	SR26 Dummy (1 if SR=26, 0 otherwise)	2.400	1.163	2.063
SRN97	SR97 Dummy (1 if SR=97, 0 otherwise)	-1.326	0.533	-2.487
SRN195	SR195 Dummy (1 if SR=195, 0 otherwise)	-2.239	1.017	-2.201
Alpha		1887.502	198.109	9.528
Number of obs = 426546 Chi squared = 7786.927 Prob>chi2=0.000				
Restricted LL = -75955.47 Log likelihood = -2230.210				
Pseudo R2=0.6358052				

Table D.144: SPF with LNADT, Length Offset, Roadway, and Roadside Variables: Entering at Angle Type

Variable	Description	Coeff.	S.E.	t-stat
Constant		-20.366	1.332	-15.292
LNADT	Log(AADT)	1.356	0.122	11.146
LENGTH	Segment Length	1.000	(Fixed Parameter)	
NLANEI	Number of lanes Increasing	-4.003	0.557	-7.183
A1	Algebraic difference in gradients	0.099	0.046	2.135
MK1	Rate of vertical curvature/5280	-5.228	2.349	-2.225
DGC1	Degree of Curvature	-0.058	0.020	-2.874
RLNW	Average Lane width	0.576	0.109	5.283
DRDAPRC	Road approach Dummy variable (1 if Road approach exists, 0 otherwise)	1.508	0.735	2.052
Alpha		2015.074	201.809	9.985
Number of obs = 426546 Chi squared = 7729.371 Prob>chi2=0.000				
Restricted LL = -75955.47 Log likelihood = -2244.188				
Pseudo R2=0.6326347				

Table D.145: SPF with LNADT, Length Offset, Roadway, Roadside, and Route Dummy Variables: Entering at Angle Type

Variable	Description	Coeff.	S.E.	t-stat
Constant		-22.240	1.382	-16.094
LNADT	Log(AADT)	1.553	0.166	9.379
LENGTH	Segment Length	1.000	(Fixed Parameter)	
NLANEI	Number of lanes Increasing	-3.879	0.540	-7.182
MK1	Rate of vertical curvature/5280	-5.236	2.320	-2.257
DGC1	Degree of Curvature	-0.054	0.022	-2.432
RLNW	Average Lane width	0.590	0.100	5.880
DRDAPRC	Road approach Dummy variable (1 if Road approach exists, 0 otherwise)	1.761	0.667	2.642
SRN14	SR14 Dummy (1 if SR=14, 0 otherwise)	-1.202	0.435	-2.766
SRN21	SR21 Dummy (1 if SR=21, 0 otherwise)	1.869	0.613	3.047
SRN26	SR26 Dummy (1 if SR=26, 0 otherwise)	2.497	1.108	2.253
SRN97	SR97 Dummy (1 if SR=97, 0 otherwise)	-1.613	0.613	-2.630
SRN195	SR195 Dummy (1 if SR=195, 0 otherwise)	-2.104	0.988	-2.130
Alpha		1794.824	184.948	9.704
Number of obs = 426546 Chi squared = 7614.518 Prob>chi2=0.000				
Restricted LL = -75955.47 Log likelihood = -2221.267				
Pseudo R2=0.6315406				

Table D.146: SPF with LNADT and Length Offset: Overturn Type

Variable	Description	Coeff.	S.E.	t-stat
Constant		-5.165	0.170	-30.396
LNADT	Log(AADT)	0.110	0.022	5.017
LENGTH	Segment Length	1.000	(Fixed Parameter)	
Alpha		70.568	1.753	40.256
Number of obs = 426546 Chi squared = 16589.72 Prob>chi2=0.000				
Restricted LL = -36223.46 Log likelihood = -27713.77				
Pseudo R2=0.2303575				

Table D.147: SPF with LNADT, Length Offset, and Route Dummy Variables: Overturn Type

Variable	Description	Coeff.	S.E.	t-stat
Constant		-3.625	0.183	-19.760
LNADT	Log(AADT)	-0.092	0.023	-3.960
LENGTH	Segment Length	1.000	(Fixed Parameter)	
SRN11	SR11 Dummy (1 if SR=11, 0 otherwise)	-0.639	0.219	-2.911
SRN17	SR17 Dummy (1 if SR=17, 0 otherwise)	0.607	0.119	5.097
SRN18	SR18 Dummy (1 if SR=18, 0 otherwise)	-0.966	0.241	-4.004
SRN21	SR21 Dummy (1 if SR=21, 0 otherwise)	-1.519	0.112	-13.521
SRN23	SR23 Dummy (1 if SR=23, 0 otherwise)	-0.646	0.181	-3.564
SRN25	SR25 Dummy (1 if SR=25, 0 otherwise)	-0.822	0.136	-6.038
SRN26	SR26 Dummy (1 if SR=26, 0 otherwise)	1.137	0.169	6.728
SRN28	SR28 Dummy (1 if SR=28, 0 otherwise)	0.430	0.113	3.799
SRN31	SR31 Dummy (1 if SR=31, 0 otherwise)	-0.943	0.245	-3.842
SRN97	SR97 Dummy (1 if SR=97, 0 otherwise)	1.008	0.080	12.652
SRN106	SR106 Dummy (1 if SR=106, 0 otherwise)	-0.942	0.202	-4.654
SRN112	SR112 Dummy (1 if SR=112, 0 otherwise)	-0.652	0.117	-5.594
SRN124	SR124 Dummy (1 if SR=124, 0 otherwise)	1.044	0.095	11.010
SRN127	SR127 Dummy (1 if SR=127, 0 otherwise)	-0.922	0.269	-3.430
SRN129	SR129 Dummy (1 if SR=129 0 otherwise)	-1.210	0.246	-4.926
SRN150	SR150 Dummy (1 if SR=150, 0 otherwise)	-1.139	0.468	-2.433
SRN172	SR172 Dummy (1 if SR=172, 0 otherwise)	-0.801	0.288	-2.778
SRN195	SR195 Dummy (1 if SR=195, 0 otherwise)	1.443	0.160	9.043
SRN221	SR221 Dummy (1 if SR=221, 0 otherwise)	0.953	0.293	3.254
SRN231	SR231 Dummy (1 if SR=231, 0 otherwise)	-0.730	0.161	-4.535
SRN241	SR241 Dummy (1 if SR=241 0 otherwise)	3.297	0.525	6.279
SRN243	SR243 Dummy (1 if SR=243, 0 otherwise)	1.395	0.421	3.312
SRN260	SR260 Dummy (1 if SR=260, 0 otherwise)	-0.800	0.281	-2.850
SRN261	SR261 Dummy (1 if SR=261, 0 otherwise)	-0.697	0.213	-3.274
SRN272	SR272 Dummy (1 if SR=272, 0 otherwise)	-1.670	0.354	-4.714
SRN290	SR290 Dummy (1 if SR=290, 0 otherwise)	-1.763	0.569	-3.097

Table D.147 (continued): SPF with LNADT, Length Offset, and Route Dummy Variables: Overturn Type

Variable	Description	Coeff.	S.E.	t-stat
SRN410	SR410 Dummy (1 if SR=410, 0 otherwise)	-0.273	0.100	-2.722
SRN504	SR504 Dummy (1 if SR=504, 0 otherwise)	-0.774	0.146	-5.311
SRN507	SR507 Dummy (1 if SR=504, 0 otherwise)	0.867	0.221	3.917
SRN821	SR821 Dummy (1 if SR=821, 0 otherwise)	-0.710	0.186	-3.820
SR432532	SR432 & SR532 Dummy (1 if SR=432 or 532, 0 otherwise)	-1.549	0.511	-3.029
SR123169	SR123 & SR169 Dummy (1 if SR=123 or 169, 0 otherwise)	-1.397	0.316	-4.414
SR24165	SR24 & SR165 Dummy (1 if SR=24 or 165, 0 otherwise)	-2.270	0.449	-5.051
Alpha		56.704	1.528	37.106
Number of obs = 426546 Chi squared = 15173.04 Prob>chi2=0.000				
Restricted LL = -36223.46 Log likelihood = -27191.99				
Pseudo R2=0.2181382				

Table D.148: SPF with LNADT, Length Offset, and Roadway Variables: Overturn Type

Variable	Description	Coeff.	S.E.	t-stat
Constant		-5.247	0.307	-17.110
LNADT	Log(AADT)	0.242	0.024	10.101
LENGTH	Segment Length	1.000	(Fixed Parameter)	
HCANG1	Horizontal Curve Central angle	0.0011	0.0002	5.380
A1	Algebraic difference in gradients	-0.043	0.008	-5.145
DGC1	Degree of Curvature	0.016	0.003	4.703
RLNW	Average Lane width	-0.081	0.025	-3.216
SWR4523	Shoulder width dummy (if shoulder width right is 4-5ft and shoulder width left is 2-3ft, value=1,else=0)	-0.695	0.214	-3.240
SWR8910	Shoulder width dummy (if shoulder width right is 8-9ft and shoulder width left is >10ft, value=1,else=0)	-1.982	0.478	-4.147
SWR1023	Shoulder width dummy (if shoulder width right is over 10ft and shoulder width left is 2-3ft, value=1,else=0)	-0.554	0.473	-1.170
SWC19	Shoulder width dummy (if shoulder width center is >1ft and <9ft, value=1,else=0)	-5.132	0.505	-10.160
Alpha		65.942	1.705	38.684
Number of obs = 426546 Chi squared = 16273.88 Prob>chi2=0.000				
Restricted LL = -36223.46 Log likelihood = -27475.61				
Pseudo R2=0.2284852				

Table D.149: SPF with LNADT, Length Offset, Roadway, and Route Dummy Variables: Overturn Type

Variable	Description	Coeff.	S.E.	t-stat
Constant		-2.963	0.304	-9.735
LNADT	Log(AADT)	0.080	0.025	3.160
LENGTH	Segment Length	1.000	(Fixed Parameter)	
HCANG1	Horizontal Curve Central angle	0.0005	0.0002	2.666
A1	Algebraic difference in gradients	-0.041	0.009	-4.738
DGC1	Degree of Curvature	0.029	0.004	8.127
RLNW	Average Lane width	-0.177	0.022	-7.953
SWR4523	Shoulder width dummy (if shoulder width right is 4-5ft and shoulder width left is 2-3ft, value=1,else=0)	-0.630	0.196	-3.214
SWR8910	Shoulder width dummy (if shoulder width right is 8-9ft and shoulder width left is >10ft, value=1,else=0)	-1.510	0.471	-3.207
SWC19	Shoulder width dummy (if shoulder width center is >1ft and <9ft, value=1,else=0)	-4.876	0.505	-9.663
SRN11	SR11 Dummy (1 if SR=11, 0 otherwise)	-1.021	0.233	-4.388
SRN17	SR17 Dummy (1 if SR=17, 0 otherwise)	0.709	0.117	6.068
SRN18	SR18 Dummy (1 if SR=18, 0 otherwise)	-0.785	0.264	-2.972
SRN21	SR21 Dummy (1 if SR=21, 0 otherwise)	-1.418	0.116	-12.252
SRN23	SR23 Dummy (1 if SR=23, 0 otherwise)	-0.427	0.181	-2.358
SRN25	SR25 Dummy (1 if SR=25, 0 otherwise)	-0.679	0.136	-5.007
SRN26	SR26 Dummy (1 if SR=26, 0 otherwise)	1.232	0.163	7.569
SRN28	SR28 Dummy (1 if SR=28, 0 otherwise)	0.537	0.112	4.785
SRN31	SR31 Dummy (1 if SR=31, 0 otherwise)	-0.924	0.273	-3.387
SRN97	SR97 Dummy (1 if SR=97, 0 otherwise)	0.989	0.077	12.917
SRN106	SR106 Dummy (1 if SR=106, 0 otherwise)	-1.079	0.199	-5.412
SRN112	SR112 Dummy (1 if SR=112, 0 otherwise)	-0.728	0.116	-6.278
SRN124	SR124 Dummy (1 if SR=124, 0 otherwise)	1.127	0.095	11.849
SRN127	SR127 Dummy (1 if SR=127, 0 otherwise)	-0.659	0.268	-2.461
SRN129	SR129 Dummy (1 if SR=129 0 otherwise)	-1.413	0.241	-5.855
SRN150	SR150 Dummy (1 if SR=150, 0 otherwise)	-1.464	0.476	-3.074
SRN195	SR195 Dummy (1 if SR=195, 0 otherwise)	1.659	0.178	9.340
SRN221	SR221 Dummy (1 if SR=221, 0 otherwise)	1.115	0.283	3.942
SRN231	SR231 Dummy (1 if SR=231, 0 otherwise)	-0.650	0.161	-4.041
SRN241	SR241 Dummy (1 if SR=241 0 otherwise)	3.578	0.519	6.889
SRN243	SR243 Dummy (1 if SR=243, 0 otherwise)	1.447	0.401	3.611
SRN260	SR260 Dummy (1 if SR=260, 0 otherwise)	-0.622	0.282	-2.203
SRN261	SR261 Dummy (1 if SR=261, 0 otherwise)	-0.667	0.226	-2.949
SRN272	SR272 Dummy (1 if SR=272, 0 otherwise)	-1.760	0.490	-3.592
SRN290	SR290 Dummy (1 if SR=290, 0 otherwise)	-1.815	0.568	-3.197

Table D.149 (continued): SPF with LNADT, Length Offset, Roadway, and Route Dummy Variables: Overturn Type

Variable	Description	Coeff.	S.E.	t-stat
SRN410	SR410 Dummy (1 if SR=410, 0 otherwise)	-0.208	0.100	-2.093
SRN504	SR504 Dummy (1 if SR=504, 0 otherwise)	-0.606	0.150	-4.030
SRN507	SR507 Dummy (1 if SR=504, 0 otherwise)	0.702	0.218	3.221
SRN821	SR821 Dummy (1 if SR=821, 0 otherwise)	-0.721	0.188	-3.840
SR432532	SR432 & SR532 Dummy (1 if SR=432 or 532, 0 otherwise)	-1.653	0.512	-3.229
SR123169	SR123 & SR169 Dummy (1 if SR=432 or 532, 0 otherwise)	-1.553	0.323	-4.814
SR24165	SR24 & SR165 Dummy (1 if SR=432 or 532, 0 otherwise)	-2.417	0.451	-5.359
Alpha		52.811	1.481	35.665
Number of obs = 426546 Chi squared = 14816.28 Prob>chi2=0.000				
Restricted LL = -36223.46 Log likelihood = -26935.62				
Pseudo R2=0.2157055				

Table D.150: SPF with LNADT, Length Offset, Roadway, and Roadside Variables: Overturn Type

Variable	Description	Coeff.	S.E.	t-stat
Constant		-5.421	0.307	-17.657
LNADT	Log(AADT)	0.245	0.024	10.226
LENGTH	Segment Length	1.000	(Fixed Parameter)	
HCANG1	Horizontal Curve Central angle	0.0011	0.0002	5.379
A1	Algebraic difference in gradients	-0.042	0.008	-5.049
DGC1	Degree of Curvature	0.020	0.003	5.863
RLNW	Average Lane width	-0.066	0.025	-2.594
SWR4523	Shoulder width dummy (if shoulder width right is 4-5ft and shoulder width left is 2-3ft, value=1,else=0)	-0.689	0.216	-3.189
SWR8910	Shoulder width dummy (if shoulder width right is 8-9ft and shoulder width left is >10ft, value=1,else=0)	-1.985	0.478	-4.156
SWC19	Shoulder width dummy (if shoulder width center is >1ft and <9ft, value=1,else=0)	-5.127	0.505	-10.149
LBRDRAL	Bridge rail length	-1.976	0.519	-3.810
DCLVERT	Culvert Dummy variable (1 if Culvert exists, 0 otherwise)	0.787	0.257	3.065
LCLVERT	Culvert length	-4.309	1.107	-3.894
DCURB	Curb Dummy variable (1 if Curb exists, 0 otherwise)	-0.890	0.330	-2.694

Table D.150 (continued): SPF with LNADT, Length Offset, Roadway, and Roadside Variables: Overturn Type

Variable	Description	Coeff.	S.E.	t-stat
DDITCH	Ditch Dummy variable (1 if Ditch exists, 0 otherwise)	0.312	0.105	2.967
LDITCH00	Proportion of ditch length on a segment is 100%	-0.760	0.160	-4.740
DDRGLET	Drainage inlet Dummy variable (1 if Drainage inlet exists, 0 otherwise)	-0.540	0.191	-2.826
DGRDRAL	Guard rail Dummy variable (1 if Guard rail exists, 0 otherwise)	0.330	0.158	2.089
LGRDRL40	Proportion of guardrail length on a segment is 30-40%	-2.890	1.297	-2.228
LGRDRL70	Proportion of guardrail length on a segment is 60-70%	-1.344	0.581	-2.314
LGRDRL90	Proportion of guardrail length on a segment is 80-90%	-1.939	0.885	-2.191
LGRDRL00	Proportion of guardrail length on a segment is 90-100%	-1.203	0.214	-5.634
DMFXOBJ	Fixed object Dummy variable (1 if Fixed object exists, 0 otherwise)	0.386	0.148	2.601
LRDSLP00	Proportion of Roadside slope length on a segment is 90-100%	-0.425	0.096	-4.439
Alpha		63.270	1.640	38.578
Number of obs = 426546 Chi squared = 16000.24 Prob>chi2=0.000				
Restricted LL = -36223.46 Log likelihood = -27365.72				
Pseudo R2=0.2262104				

Table D.151: SPF with LNADT, Length Offset, Roadway, Roadside, and Route Dummy Variables: Overturn Type

Variable	Description	Coeff.	S.E.	t-stat
Constant		-3.082	0.306	-10.080
LNADT	Log(AADT)	0.083	0.026	3.265
LENGTH	Segment Length	1.000	(Fixed Parameter)	
HCANG1	Horizontal Curve Central angle	0.0006	0.0002	2.776
A1	Algebraic difference in gradients, percent	-0.040	0.009	-4.592
DGC1	Degree of Curvature	0.031	0.004	8.948
RLNW	Average Lane width	-0.167	0.022	-7.454
SWR4523	Shoulder width dummy (if shoulder width right is 4-5ft and shoulder width left is 2-3ft, value=1,else=0)	-0.615	0.198	-3.104
SWR8910	Shoulder width dummy (if shoulder width right is 8-9ft and shoulder width left is >10ft, value=1,else=0)	-1.512	0.471	-3.213
SWC19	Shoulder width dummy (if shoulder width center is >1ft and <9ft, value=1,else=0)	-4.879	0.505	-9.668
LBRDRAL	Bridge rail length	-1.436	0.540	-2.658
DCLVERT	Culvert Dummy variable (1 if Culvert exists, 0 otherwise)	0.755	0.232	3.255
LCLVERT	Culvert length	-4.072	1.049	-3.882
DCURB	Curb Dummy variable (1 if Curb exists, 0 otherwise)	-0.860	0.316	-2.721
DDITCH	Ditch Dummy variable (1 if Ditch exists, 0 otherwise)	0.254	0.098	2.599
LDITCH00	Proportion of ditch length on a segment is 100%	-0.683	0.151	-4.522
DGRDRAL	Guard rail Dummy variable (1 if Guard rail exists, 0 otherwise)	0.354	0.140	2.530
LGRDRL40|	Proportion of guardrail length on a segment is 30-40%	-2.817	1.206	-2.335
LGRDRL70|	Proportion of guardrail length on a segment is 60-70%	-1.346	0.555	-2.425
LGRDRL90	Proportion of guardrail length on a segment is 80-90%	-1.852	0.851	-2.175
LGRDRL00	Proportion of guardrail length on a segment is 90-100%	-1.181	0.200	-5.913
DMFXOBJ	Fixed object Dummy variable (1 if Fixed object exists, 0 otherwise)	0.488	0.134	3.648
LRDSLP00	Proportion of Roadside slope length on a segment is 90-100%	-0.483	0.094	-5.153

Table D.151 (continued): SPF with LNADT, Length Offset, Roadway, Roadside, and Route Dummy Variables: Overturn Type

Variable	Description	Coeff.	S.E.	t-stat
SRN11	SR11 Dummy (1 if SR=12, 0 otherwise)	-0.964	0.233	-4.134
SRN17	SR17 Dummy (1 if SR=25, 0 otherwise)	0.685	0.115	5.946
SRN18	SR18 Dummy (1 if SR=504, 0 otherwise)	-0.722	0.265	-2.723
SRN21	SR21 Dummy (1 if SR=504, 0 otherwise)	-1.430	0.115	-12.403
SRN23	SR23 Dummy (1 if SR=25, 0 otherwise)	-0.391	0.191	-2.052
SRN25	SR25 Dummy (1 if SR=12, 0 otherwise)	-0.672	0.137	-4.916
SRN26	SR26 Dummy (1 if SR=25, 0 otherwise)	1.221	0.161	7.576
SRN28	SR28 Dummy (1 if SR=504, 0 otherwise)	0.526	0.112	4.703
SRN31	SR31 Dummy (1 if SR=504, 0 otherwise)	-0.828	0.280	-2.959
SRN97	SR97 Dummy (1 if SR=25, 0 otherwise)	1.013	0.077	13.226
SRN106	SR106 Dummy (1 if SR=12, 0 otherwise)	-1.096	0.202	-5.436
SRN112	SR112 Dummy (1 if SR=25, 0 otherwise)	-0.766	0.115	-6.675
SRN124	SR124 Dummy (1 if SR=504, 0 otherwise)	1.106	0.094	11.793
SRN129	SR129 Dummy (1 if SR=25, 0 otherwise)	-1.308	0.249	-5.255
SRN150	SR150 Dummy (1 if SR=12, 0 otherwise)	-1.491	0.474	-3.146
SRN195	SR195 Dummy (1 if SR=504, 0 otherwise)	1.631	0.173	9.428
SRN221	SR221 Dummy (1 if SR=504, 0 otherwise)	1.091	0.276	3.947
SRN231	SR231 Dummy (1 if SR=25, 0 otherwise)	-0.639	0.166	-3.849
SRN241	SR241 Dummy (1 if SR=12, 0 otherwise)	3.591	0.517	6.943
SRN243	SR243 Dummy (1 if SR=25, 0 otherwise)	1.392	0.391	3.560
SRN260	SR260 Dummy (1 if SR=504, 0 otherwise)	-0.633	0.280	-2.262
SRN261	SR261 Dummy (1 if SR=504, 0 otherwise)	-0.666	0.225	-2.960
SRN272	SR272 Dummy (1 if SR=25, 0 otherwise)	-1.807	0.496	-3.645
SRN290	SR290 Dummy (1 if SR=12, 0 otherwise)	-1.834	0.566	-3.241
SRN410	SR410 Dummy (1 if SR=25, 0 otherwise)	-0.208	0.101	-2.062
SRN504	SR504 Dummy (1 if SR=504, 0 otherwise)	-0.638	0.150	-4.260
SRN507	SR507 Dummy (1 if SR=504, 0 otherwise)	0.630	0.218	2.893
SRN821	SR821 Dummy (1 if SR=25, 0 otherwise)	-0.741	0.186	-3.974
SR432532	SR432 & SR532 Dummy (1 if SR=432 or 532, 0 otherwise)	-1.637	0.512	-3.196
SR123169	SR123 & SR169 Dummy (1 if SR=123 or 169, 0 otherwise)	-1.511	0.327	-4.623
SRN24165	SR24 & SR165 Dummy (1 if SR=24 or 165, 0 otherwise)	-2.435	0.450	-5.417
Alpha		51.022	1.431	35.647
Number of obs = 426546 Chi squared = 14623.2 Prob>chi2=0.000				
Restricted LL = -36223.46 Log likelihood = -26837.61				
Pseudo R2=0.2141080				

Table D.152: SPF with LNADT and Length Offset: Animal

Variable	Description	Coeff.	S.E.	t-stat
Constant		-7.237	0.198	-36.600
LNADT	Log(AADT)	0.363	0.025	14.608
LENGTH	Segment Length	1.000	(Fixed Parameter)	
Alpha		81.587	2.347	34.765
Number of obs = 426546 Chi squared = 18859.30 Prob>chi2=0.000				
Restricted LL = -35839.97 Log likelihood = -25878.60				
Pseudo R2=0.2670664				

Table D.153: SPF with LNADT, Length Offset, and Route Dummy Variables: Animal

Variable	Description	Coeff.	S.E.	t-stat
Constant		-6.616	0.196	-33.789
LNADT	Log(AADT)	0.256	0.024	10.593
LENGTH	Segment Length	1.000	(Fixed Parameter)	
SRN3	SR3 Dummy (1 if SR=3, 0 otherwise)	0.454	0.172	2.633
SRN6	SR6 Dummy (1 if SR=6, 0 otherwise)	0.455	0.138	3.286
SRN7	SR7 Dummy (1 if SR=7, 0 otherwise)	-0.745	0.149	-5.008
SRN9	SR9 Dummy (1 if SR=9, 0 otherwise)	-1.128	0.135	-8.338
SRN11	SR11 Dummy (1 if SR=11, 0 otherwise)	-1.497	0.259	-5.774
SRN12	SR12 Dummy (1 if SR=12, 0 otherwise)	0.729	0.072	10.190
SRN14	SR14 Dummy (1 if SR=14, 0 otherwise)	0.200	0.083	2.399
SRN18	SR18 Dummy (1 if SR=18, 0 otherwise)	-1.915	0.308	-6.222
SRN21	SR21 Dummy (1 if SR=21, 0 otherwise)	-1.104	0.146	-7.582
SRN26	SR26 Dummy (1 if SR=26, 0 otherwise)	1.677	0.163	10.311
SRN28	SR28 Dummy (1 if SR=28, 0 otherwise)	0.658	0.116	5.693
SRN31	SR31 Dummy (1 if SR=31, 0 otherwise)	-0.862	0.313	-2.756
SRN97	SR97 Dummy (1 if SR=97, 0 otherwise)	1.344	0.093	14.413
SRN104	SR104 Dummy (1 if SR=104, 0 otherwise)	1.041	0.294	3.540
SRN106	SR106 Dummy (1 if SR=106, 0 otherwise)	-0.573	0.253	-2.260
SRN112	SR112 Dummy (1 if SR=112, 0 otherwise)	-0.969	0.173	-5.592
SRN124	SR124 Dummy (1 if SR=124, 0 otherwise)	1.546	0.203	7.606
SRN127	SR127 Dummy (1 if SR=127, 0 otherwise)	-0.955	0.428	-2.233
SRN129	SR129 Dummy (1 if SR=129, 0 otherwise)	-1.060	0.237	-4.479
SRN150	SR150 Dummy (1 if SR=150, 0 otherwise)	-0.730	0.273	-2.670
SRN153	SR153 Dummy (1 if SR=153, 0 otherwise)	0.451	0.218	2.068
SRN155	SR155 Dummy (1 if SR=155, 0 otherwise)	0.361	0.148	2.441
SRN161	SR161 Dummy (1 if SR=161, 0 otherwise)	-1.268	0.357	-3.550
SRN174	SR174 Dummy (1 if SR=174, 0 otherwise)	0.620	0.261	2.372
SRN195	SR195 Dummy (1 if SR=195, 0 otherwise)	0.615	0.148	4.169
SRN206	SR206 Dummy (1 if SR=206, 0 otherwise)	-0.967	0.412	-2.346

Table D.153 (continued): SPF with LNADT, Length Offset, and Route Dummy Variables: Animal

Variable	Description	Coeff.	S.E.	t-stat
SRN211	SR211 Dummy (1 if SR=211, 0 otherwise)	0.897	0.384	2.335
SRN231	SR231 Dummy (1 if SR=231, 0 otherwise)	-0.568	0.196	-2.893
SRN241	SR241 Dummy (1 if SR=241, 0 otherwise)	1.482	0.448	3.306
SRN243	SR243 Dummy (1 if SR=243, 0 otherwise)	-0.811	0.358	-2.268
SRN260	SR260 Dummy (1 if SR=260, 0 otherwise)	-1.667	0.638	-2.612
SRN261	SR261 Dummy (1 if SR=261, 0 otherwise)	-1.443	0.258	-5.597
SRN290	SR290 Dummy (1 if SR=290, 0 otherwise)	-1.007	0.424	-2.377
SRN395	SR395 Dummy (1 if SR=395, 0 otherwise)	1.109	0.098	11.360
SRN510	SR510 Dummy (1 if SR=510, 0 otherwise)	-2.790	1.067	-2.615
SRN539	SR539 Dummy (1 if SR=539, 0 otherwise)	-3.207	1.041	-3.080
SRN542	SR542 Dummy (1 if SR=542, 0 otherwise)	-0.944	0.165	-5.710
SRN821	SR821 Dummy (1 if SR=821, 0 otherwise)	-0.564	0.226	-2.492
SRN900	SR900 Dummy (1 if SR=900, 0 otherwise)	-1.992	0.465	-4.280
SRN970	SR970 Dummy (1 if SR=970, 0 otherwise)	2.916	0.855	3.411
SR432532	SR432 & SR532 Dummy (1 if SR=432 or 532, 0 otherwise)	-0.822	0.375	-2.189
SR123169	SR123 & SR169 Dummy (1 if SR=123 or 169, 0 otherwise)	-1.075	0.239	-4.492
SR24165	SR24 & SR165 Dummy (1 if SR=24 or 165, 0 otherwise)	-1.707	0.363	-4.698
Alpha		58.095	1.738	33.427
Number of obs = 426546 Chi squared = 16241.67 Prob>chi2=0.000				
Restricted LL = -35839.97 Log likelihood = -25109.02				
Pseudo R2=0.2443837				

Table D.154: SPF with LNADT, Length Offset, and Roadway Variables: Animal

Variable	Description	Coeff.	S.E.	t-stat
Constant		-6.746	0.289	-23.341
LNADT	Log(AADT)	0.442	0.025	17.476
LENGTH	Segment Length	1.000	(Fixed Parameter)	
HCANG1	Horizontal Curve Central angle	0.0022	0.0003	7.213
DGC1	Degree of Curvature	-0.162	0.009	-18.954
RLNW	Average Lane width	-0.081	0.023	-3.589
SWR4501	Shoulder width dummy (if shoulder width right is 4-5ft and shoulder width left is 0-1ft, value=1,else=0)	-1.011	0.463	-2.184
SWR8901	Shoulder width dummy (if shoulder width right is 8-9ft and shoulder width left is 0-1ft, value=1,else=0)	-2.480	0.874	-2.837

Table D.154 (continued): SPF with LNADT, Length Offset, and Roadway Variables: Animal

Variable	Description	Coeff.	S.E.	t-stat
SWC19	Shoulder width dummy (if shoulder width center is >1ft and <9ft, value=1,else=0)	-5.602	0.509	-10.997
Alpha		70.616	2.035	34.709
Number of obs = 426546 Chi squared = 18005.62 Prob>chi2=0.000				
Restricted LL = -35839.97 Log likelihood = -25448.01				
Pseudo R2=0.2613235				

Table D.155: SPF with LNADT, Length Offset, Roadway, and Route Dummy Variables: Animal

Variable	Description	Coeff.	S.E.	t-stat
Constant		-4.917	0.270	-18.202
LNADT	Log(AADT)	0.413	0.025	16.539
LENGTH	Segment Length	1.000	(Fixed Parameter)	
HCANG1	Horizontal Curve Central angle	0.0006	0.0003	2.352
DGC1	Degree of Curvature	-0.115	0.009	-13.440
RLNW	Average Lane width	-0.240	0.018	-13.139
SWR8901	Shoulder width dummy (if shoulder width right is 8-9ft and shoulder width left is 0-1ft, value=1,else=0)	-2.083	0.856	-2.434
SWC19	Shoulder width dummy (if shoulder width center is >1ft and <9ft, value=1,else=0)	-5.765	0.506	-11.390
SRN3	SR3 Dummy (1 if SR=3, 0 otherwise)	0.502	0.194	2.590
SRN6	SR6 Dummy (1 if SR=6, 0 otherwise)	0.500	0.127	3.926
SRN7	SR7 Dummy (1 if SR=7, 0 otherwise)	-0.808	0.143	-5.644
SRN9	SR9 Dummy (1 if SR=9, 0 otherwise)	-1.366	0.132	-10.338
SRN11	SR11 Dummy (1 if SR=11, 0 otherwise)	-1.658	0.260	-6.384
SRN12	SR12 Dummy (1 if SR=12, 0 otherwise)	0.797	0.074	10.795
SRN14	SR14 Dummy (1 if SR=14, 0 otherwise)	0.174	0.080	2.183
SRN18	SR18 Dummy (1 if SR=18, 0 otherwise)	-1.876	0.337	-5.571
SRN21	SR21 Dummy (1 if SR=21, 0 otherwise)	-1.100	0.147	-7.500
SRN26	SR26 Dummy (1 if SR=26, 0 otherwise)	1.699	0.143	11.863
SRN28	SR28 Dummy (1 if SR=28, 0 otherwise)	0.596	0.113	5.273
SRN31	SR31 Dummy (1 if SR=31, 0 otherwise)	-0.683	0.316	-2.162
SRN97	SR97 Dummy (1 if SR=97, 0 otherwise)	1.276	0.085	15.010
SRN104	SR104 Dummy (1 if SR=104, 0 otherwise)	0.767	0.291	2.637
SRN106	SR106 Dummy (1 if SR=106, 0 otherwise)	-0.603	0.255	-2.370
SRN112	SR112 Dummy (1 if SR=112, 0 otherwise)	-0.707	0.180	-3.934
SRN124	SR124 Dummy (1 if SR=124, 0 otherwise)	1.540	0.184	8.368
SRN129	SR129 Dummy (1 if SR=129, 0 otherwise)	-0.970	0.237	-4.089
SRN150	SR150 Dummy (1 if SR=150, 0 otherwise)	-0.713	0.256	-2.789
SRN155	SR155 Dummy (1 if SR=155, 0 otherwise)	0.369	0.140	2.640

Table D.155 (continued): SPF with LNADT, Length Offset, Roadway, and Route Dummy Variables: Animal

Variable	Description	Coeff.	S.E.	t-stat
SRN161	SR161 Dummy (1 if SR=161, 0 otherwise)	-1.545	0.352	-4.383
SRN174	SR174 Dummy (1 if SR=174, 0 otherwise)	0.619	0.246	2.518
SRN195	SR195 Dummy (1 if SR=195, 0 otherwise)	0.760	0.161	4.721
SRN202	SR202 Dummy (1 if SR=202, 0 otherwise)	-0.653	0.276	-2.366
SRN203	SR203 Dummy (1 if SR=203, 0 otherwise)	-0.420	0.204	-2.064
SRN206	SR206 Dummy (1 if SR=206, 0 otherwise)	-0.855	0.407	-2.099
SRN211	SR211 Dummy (1 if SR=211, 0 otherwise)	0.784	0.355	2.209
SRN231	SR231 Dummy (1 if SR=231, 0 otherwise)	-0.507	0.194	-2.611
SRN241	SR241 Dummy (1 if SR=241, 0 otherwise)	1.565	0.453	3.453
SRN243	SR243 Dummy (1 if SR=243, 0 otherwise)	-0.854	0.349	-2.447
SRN260	SR260 Dummy (1 if SR=260, 0 otherwise)	-1.658	0.634	-2.616
SRN261	SR261 Dummy (1 if SR=261, 0 otherwise)	-1.317	0.250	-5.271
SRN290	SR290 Dummy (1 if SR=290, 0 otherwise)	-1.129	0.421	-2.684
SRN395	SR395 Dummy (1 if SR=395, 0 otherwise)	1.413	0.119	11.850
SRN510	SR510 Dummy (1 if SR=510, 0 otherwise)	-2.936	1.060	-2.770
SRN539	SR539 Dummy (1 if SR=539, 0 otherwise)	-3.006	1.073	-2.801
SRN542	SR542 Dummy (1 if SR=542, 0 otherwise)	-0.989	0.179	-5.525
SRN821	SR821 Dummy (1 if SR=821, 0 otherwise)	-0.497	0.224	-2.223
SRN900	SR900 Dummy (1 if SR=900, 0 otherwise)	-2.091	0.465	-4.502
SRN970	SR970 Dummy (1 if SR=970, 0 otherwise)	2.905	0.767	3.789
SR432532	SR432 & SR532 Dummy (1 if SR=432 or 532, 0 otherwise)	-1.105	0.367	-3.013
SR123169	SR123 & SR169 Dummy (1 if SR=123 or 169, 0 otherwise)	-1.362	0.240	-5.674
SR24165	SR24 & SR165 Dummy (1 if SR=24 or 165, 0 otherwise)	-1.728	0.376	-4.597
Alpha		50.204	1.502	33.434
Number of obs = 426546 Chi squared = 15387.22 Prob>chi2=0.000				
Restricted LL = -35839.97 Log likelihood = -24688.46				
Pseudo R2=0.2375886				

Table D.156: SPF with LNADT, Length Offset, Roadway, and Roadside Variables: Animal

Variable	Description	Coeff.	S.E.	t-stat
Constant		-6.967	0.290	-24.045
LNADT	Log(AADT)	0.435	0.025	17.194
LENGTH	Segment Length	1.000	(Fixed Parameter)	
HCANG1	Horizontal Curve Central angle	0.0022	0.0003	7.422
DGC1	Degree of Curvature	-0.157	0.008	-18.496
RLNW	Average Lane width	-0.060	0.023	-2.628
SWR4501	Shoulder width dummy (if shoulder width right is 4-5ft and shoulder width left is 0-1ft, value=1,else=0)	-1.077	0.484	-2.224
SWR8901	Shoulder width dummy (if shoulder width right is 8-9ft and shoulder width left is 0-1ft, value=1,else=0)	-2.557	0.943	-2.711
SWC19	Shoulder width dummy (if shoulder width center is >1ft and <9ft, value=1,else=0)	-5.578	0.509	-10.958
LBRDRAL	Bridge rail length	-2.191	0.619	-3.539
DCLVERT	Culvert Dummy variable (1 if Culvert exists, 0 otherwise)	0.664	0.318	2.089
LCLVERT	Culvert length	-4.246	1.282	-3.312
LCURB00	Curb Dummy variable (1 if Curb exists, 0 otherwise)	-1.011	0.499	-2.027
DDRGLET	Drainage inlet Dummy variable (1 if Drainage inlet exists, 0 otherwise)	-0.487	0.186	-2.626
DGRDRAL	Guard rail Dummy variable (1 if Guard rail exists, 0 otherwise)	0.390	0.134	2.910
LGRDRL70	Proportion of guardrail length on a segment is 60-70%	-1.829	0.765	-2.390
LGRDRL00	Proportion of guardrail length on a segment is 90-100%	-1.280	0.194	-6.585
DRDAPRC	Road approach Dummy variable (1 if Road approach exists, 0 otherwise)	0.382	0.143	2.665
DRDSLP	Roadside slope Dummy variable (1 if Roadside slope exists, 0 otherwise)	0.188	0.076	2.474
DTREGRP	Tree group Dummy variable (1 if Tree group slope exists, 0 otherwise)	0.363	0.144	2.822
LTREG00	Proportion of Tree group on a segment is 90-100%	-0.915	0.220	-4.163
Alpha		67.305	1.942	34.654
Number of obs = 426546 Chi squared = 17566.13 Prob>chi2=0.000				
Restricted LL = -35839.97 Log likelihood = -25344.04				
Pseudo R2=0.2573633				

Table D.157: SPF with LNADT, Length Offset, Roadway, Roadside, and Route Dummy Variables: Animal

Variable	Description	Coeff.	S.E.	t-stat
Constant		-4.973	0.270	-18.440
LNADT	Log(AADT)	0.392	0.025	15.870
LENGTH	Segment Length	1.000	(Fixed Parameter)	
HCANG1	Horizontal Curve Central angle	0.0007	0.0003	2.669
DGC1	Degree of Curvature	-0.112	0.009	-13.123
RLNW	Average Lane width	-0.225	0.018	-12.458
SWR8901	Shoulder width dummy (if shoulder width right is 8-9ft and shoulder width left is 0-1ft, value=1,else=0)	-2.146	0.901	-2.382
SWC19	Shoulder width dummy (if shoulder width center is >1ft and <9ft, value=1,else=0)	-5.719	0.506	-11.306
DCLVERT	Culvert Dummy variable (1 if Culvert exists, 0 otherwise)	0.880	0.255	3.451
LCLVERT	Culvert length	-3.703	1.088	-3.403
LCURB00	Curb Dummy variable (1 if Curb exists, 0 otherwise)	-1.043	0.480	-2.171
DGRDRAL	Guard rail Dummy variable (1 if Guard rail exists, 0 otherwise)	0.564	0.116	4.867
LGRDRL70	Proportion of guardrail length on a segment is 60-70%	-1.975	0.725	-2.723
LGRDRL00	Proportion of guardrail length on a segment is 90-100%	-1.310	0.194	-6.764
DRDAPRC	Road approach Dummy variable (1 if Road approach exists, 0 otherwise)	0.447	0.121	3.707
DTREGRP	Tree group Dummy variable (1 if Tree group slope exists, 0 otherwise)	0.371	0.128	2.899
LTREG00	Proportion of Tree group on a segment is 90-100%	-0.699	0.210	-3.326
SRN3	SR3 Dummy (1 if SR=3, 0 otherwise)	0.478	0.189	2.523
SRN6	SR6 Dummy (1 if SR=6, 0 otherwise)	0.552	0.125	4.409
SRN7	SR7 Dummy (1 if SR=7, 0 otherwise)	-0.753	0.142	-5.290
SRN9	SR9 Dummy (1 if SR=9, 0 otherwise)	-1.348	0.154	-8.748
SRN11	SR11 Dummy (1 if SR=11, 0 otherwise)	-1.574	0.259	-6.076
SRN12	SR12 Dummy (1 if SR=12, 0 otherwise)	0.810	0.073	11.146
SRN14	SR14 Dummy (1 if SR=14, 0 otherwise)	0.200	0.079	2.525
SRN18	SR18 Dummy (1 if SR=18, 0 otherwise)	-1.859	0.355	-5.240
SRN21	SR21 Dummy (1 if SR=21, 0 otherwise)	-1.072	0.146	-7.340
SRN26	SR26 Dummy (1 if SR=26, 0 otherwise)	1.721	0.137	12.525
SRN28	SR28 Dummy (1 if SR=28, 0 otherwise)	0.571	0.115	4.954
SRN31	SR31 Dummy (1 if SR=31, 0 otherwise)	-0.661	0.314	-2.105

Table D.157 (continued): SPF with LNADT, Length Offset, Roadway, Roadside, and Route Dummy Variables: Animal

Variable	Description	Coeff.	S.E.	t-stat
SRN97	SR97 Dummy (1 if SR=97, 0 otherwise)	1.274	0.083	15.268
SRN104	SR104 Dummy (1 if SR=104, 0 otherwise)	0.876	0.289	3.038
SRN106	SR106 Dummy (1 if SR=106, 0 otherwise)	-0.610	0.251	-2.432
SRN112	SR112 Dummy (1 if SR=112, 0 otherwise)	-0.665	0.178	-3.737
SRN124	SR124 Dummy (1 if SR=124, 0 otherwise)	1.582	0.180	8.810
SRN129	SR129 Dummy (1 if SR=129, 0 otherwise)	-0.968	0.239	-4.051
SRN150	SR150 Dummy (1 if SR=150, 0 otherwise)	-0.665	0.257	-2.585
SRN155	SR155 Dummy (1 if SR=155, 0 otherwise)	0.410	0.138	2.976
SRN161	SR161 Dummy (1 if SR=161, 0 otherwise)	-1.503	0.358	-4.199
SRN174	SR174 Dummy (1 if SR=174, 0 otherwise)	0.658	0.241	2.729
SRN195	SR195 Dummy (1 if SR=195, 0 otherwise)	0.822	0.157	5.223
SRN202	SR202 Dummy (1 if SR=202, 0 otherwise)	-0.552	0.270	-2.048
SRN206	SR206 Dummy (1 if SR=206, 0 otherwise)	-0.874	0.405	-2.159
SRN211	SR211 Dummy (1 if SR=211, 0 otherwise)	0.772	0.340	2.271
SRN231	SR231 Dummy (1 if SR=231, 0 otherwise)	-0.524	0.195	-2.690
SRN241	SR241 Dummy (1 if SR=241, 0 otherwise)	1.324	0.488	2.712
SRN243	SR243 Dummy (1 if SR=243, 0 otherwise)	-0.832	0.344	-2.422
SRN260	SR260 Dummy (1 if SR=260, 0 otherwise)	-1.624	0.631	-2.572
SRN261	SR261 Dummy (1 if SR=261, 0 otherwise)	-1.325	0.273	-4.849
SRN290	SR290 Dummy (1 if SR=290, 0 otherwise)	-1.050	0.417	-2.518
SRN395	SR395 Dummy (1 if SR=395, 0 otherwise)	1.432	0.115	12.429
SRN510	SR510 Dummy (1 if SR=510, 0 otherwise)	-2.892	1.077	-2.684
SRN539	SR539 Dummy (1 if SR=539, 0 otherwise)	-2.944	1.068	-2.757
SRN542	SR542 Dummy (1 if SR=542, 0 otherwise)	-0.980	0.189	-5.190
SRN821	SR821 Dummy (1 if SR=821, 0 otherwise)	-0.455	0.222	-2.049
SRN900	SR900 Dummy (1 if SR=900, 0 otherwise)	-2.040	0.461	-4.429
SRN970	SR970 Dummy (1 if SR=970, 0 otherwise)	2.959	0.741	3.993
SR432532	SR432 & SR532 Dummy (1 if SR=432 or 532, 0 otherwise)	-1.091	0.401	-2.719
SR123169	SR123 & SR169 Dummy (1 if SR=123 or 169, 0 otherwise)	-1.311	0.244	-5.374
SR24165	SR24 & SR165 Dummy (1 if SR=24 or 165, 0 otherwise)	-1.679	0.374	-4.488
Alpha		48.359	1.437	33.660
Number of obs = 426546	Chi squared = 15062.69	Prob>chi2=0.000		
Restricted LL = -35839.97	Log likelihood = -24601.53			
Pseudo R2=0.2343813				

Table D.158: SPF with LNADT and Length Offset: (Bicycle+Pedestrian) (ZIP)

Variable	Description	Coeff.	S.E.	t-stat
Poisson/NB/Gamma regression model				
Constant		-5.730	0.215	-26.636
LNADT	Log(AADT)	0.255	0.025	10.016
LENGTH	Segment Length	1.000	(Fixed Parameter)	
Zero inflation model				
Tau		-1.200	0.019	-64.654
Number of obs = 426546				
Restricted LL = -2359.690 Log likelihood = -1895.81466				

Table D.159: SPF with LNADT, Length Offset, and Route Dummy Variables: (Bicycle+Pedestrian) (ZIP)

Variable	Description	Coeff.	S.E.	t-stat
Poisson/NB/Gamma regression model				
Constant		-5.892	0.235	-25.031
LNADT	Log(AADT)	0.267	0.027	9.731
LENGTH	Segment Length	1.000	(Fixed Parameter)	
SRN97	SR97 Dummy (1 if SR=97, 0 otherwise)	0.516	0.088	5.860
SRN106	SR106 Dummy (1 if SR=106, 0 otherwise)	0.499	0.198	2.518
SRN542	SR542 Dummy (1 if SR=542, 0 otherwise)	0.641	0.116	5.514
Zero inflation model				
Tau		-1.200	0.019	-64.360
Number of obs = 426546				
Restricted LL = -2359.690 Log likelihood = -1882.18505				

Table D.160: SPF with LNADT, Length Offset, and Roadway Variables: (Bicycle+Pedestrian) (ZIP)

Variable	Description	Coeff.	S.E.	t-stat
Poisson/NB/Gamma regression model				
Constant		-5.769	0.298	-19.372
LNADT	Log(AADT)	0.448	0.027	16.856
LENGTH	Segment Length	1.000	(Fixed Parameter)	
NLANEI	Number of lanes Increasing	-1.486	0.227	-6.551
Zero inflation model				
Tau		-1.184	0.019	-63.919
Number of obs = 426546				
Restricted LL = -2359.690 Log likelihood = -1849.12513				

Table D.161: SPF with LNADT, Length Offset, Roadway, and Route Dummy Variables: (Bicycle+Pedestrian) (ZIP)

Variable	Description	Coeff.	S.E.	t-stat
Poisson/NB/Gamma regression model				
Constant		-5.818	0.309	-18.831
LNADT	Log(AADT)	0.452	0.028	16.014
LENGTH	Segment Length	1.000	(Fixed Parameter)	
NLANEI	Number of lanes Increasing	-1.487	0.227	-6.548
SRN542	SR542 Dummy (1 if SR=5422, 0 otherwise)	0.573	0.116	4.935
Zero inflation model				
Tau		-1.182	0.019	-63.743
Number of obs = 426546				
Restricted LL = -2359.690 Log likelihood = -1844.78822				

Table D.162: SPF with LNADT, Length Offset, Roadway, and Roadside Variables: (Bicycle+Pedestrian) (ZIP)

Variable	Description	Coeff.	S.E.	t-stat
Poisson/NB/Gamma regression model				
Constant		-5.764	0.300	-19.206
LNADT	Log(AADT)	0.443	0.027	16.407
LENGTH	Segment Length	1.000	(Fixed Parameter)	
NLANEI	Number of lanes Increasing	-1.497	0.228	-6.560
DCLVEND	Culvert end Dummy variable (1 if Culvert end exists, 0 otherwise)	0.358	0.121	2.971
LGRDRL90	Proportion of guardrail length on a segment is 80-90%	1.712	0.154	11.115
Zero inflation model				
Tau		-1.171	0.019	-63.015
Number of obs = 426546				
Restricted LL = -2359.690 Log likelihood = -1831.18644				

Table D.163: SPF with LNADT, Length Offset, Roadway, Roadside, and Route Dummy Variables: (Bicycle+Pedestrian) (ZIP)

Variable	Description	Coeff.	S.E.	t-stat
Poisson/NB/Gamma regression model				
Constant		-5.931	0.316	-18.747
LNADT	Log(AADT)	0.455	0.029	15.572
LENGTH	Segment Length	1.000	(Fixed Parameter)	
NLANEI	Number of lanes Increasing	-1.485	0.228	-6.501
DCLVEND	Culvert end Dummy variable (1 if Culver end exists, 0 otherwise)	0.285	0.121	2.365
LGRDRL90	Proportion of guardrail length on a segment is 80-90%	1.700	0.166	10.238

Table D.163 (continued): SPF with LNADT, Length Offset, Roadway, Roadside, and Route Dummy Variables: (Bicycle+Pedestrian) (ZIP)

Variable	Description	Coeff.	S.E.	t-stat
SRN97	SR97 Dummy (1 if SR=97, 0 otherwise)	0.424	0.091	4.671
SRN106	SR106 Dummy (1 if SR=106, 0 otherwise)	0.484	0.200	2.424
SRN542	SR542 Dummy (1 if SR=542, 0 otherwise)	0.555	0.125	4.425
Zero inflation model				
Tau		-1.171	0.019	-62.724
Number of obs = 426546				
Restricted LL = -2359.690 Log likelihood = -1821.36276				

Table D.164: SPF with LNADT and Length Offset: One Parked/One Moving Type

Variable	Description	Coeff.	S.E.	t-stat
Constant		-10.772	1.174	-9.174
LNADT	Log(AADT)	0.505	0.158	3.195
LENGTH	Segment Length	1.000	(Fixed Parameter)	
Alpha		3298.944	459.084	7.186
Number of obs = 426546 Chi squared = 5261.825 Prob>chi2=0.000				
Restricted LL = -4863.051 Log likelihood = -2171.976				
Pseudo R2=0.5477771				

Table D.165: SPF with LNADT, Length Offset, and Route Dummy Variables: One Parked/One Moving Type (ZIP)

Variable	Description	Coeff.	S.E.	t-stat
Poisson/NB/Gamma regression model				
Constant		-3.565	0.127	-28.063
LNADT	Log(AADT)	0.136	0.015	8.929
LENGTH	Segment Length	1.000	(Fixed Parameter)	
SRN11	SR11 Dummy (1 if SR=11, 0 otherwise)	0.507	0.081	6.285
SRN26	SR26 Dummy (1 if SR=26, 0 otherwise)	0.316	0.075	4.197
SRN97	SR97 Dummy (1 if SR=97, 0 otherwise)	0.381	0.042	9.104
SRN105	SR105 Dummy (1 if SR=105, 0 otherwise)	0.362	0.108	3.354
SRN124	SR124 Dummy (1 if SR=124, 0 otherwise)	0.230	0.103	2.244
Zero inflation model				
Tau		-2.105	0.017	-122.080
Number of obs = 426546				
Restricted LL = -4863.051 Log likelihood = -3416.35238				

Table D.166: SPF with LNADT, Length Offset, and Roadway Variables: One Parked/One Moving Type (ZIP)

Variable	Description	Coeff.	S.E.	t-stat
Poisson/NB/Gamma regression model				
Constant		-3.393	0.207	-16.375
LNADT	Log(AADT)	0.227	0.016	14.606
LENGTH	Segment Length	1.000	(Fixed Parameter)	
NLANEI	Number of lanes Increasing	-1.065	0.175	-6.095
RLNW	Average Lane width	0.021	0.007	3.044
SWR8910	Shoulder width dummy (if shoulder width right is 8-9ft and shoulder width left is 0-1ft, value=1,else=0)	0.348	0.174	2.005
SWR1045	Shoulder width dummy (if shoulder width right is >10ft and shoulder width left is 4-5ft, value=1,else=0)	0.609	0.133	4.597
Zero inflation model				
Tau		-2.091	0.018	-118.611
Number of obs = 426546				
Restricted LL = -4863.051 Log likelihood = -3370.60923				

Table D.167: SPF with LNADT, Length Offset, Roadway, and Route Dummy Variables: One Parked/One Moving Type (ZIP)

Variable	Description	Coeff.	S.E.	t-stat
Poisson/NB/Gamma regression model				
Constant		-4.086	0.328	-12.457
LNADT	Log(AADT)	0.293	0.022	13.226
LENGTH	Segment Length	1.000	(Fixed Parameter)	
NLANEI	Number of lanes Increasing	-1.129	0.228	-4.948
RLNW	Average Lane width	0.019	0.009	2.018
SWR8910	Shoulder width dummy (if shoulder width right is 8-9ft and shoulder width left is 0-1ft, value=1,else=0)	0.433	0.176	2.459
SWR1045	Shoulder width dummy (if shoulder width right is >10ft and shoulder width left is 4-5ft, value=1,else=0)	0.731	0.135	5.427
SRN3	SR3 Dummy (1 if SR=3, 0 otherwise)	0.324	0.088	3.669
SRN7	SR7 Dummy (1 if SR=7, 0 otherwise)	0.265	0.106	2.498
SRN11	SR11 Dummy (1 if SR=11, 0 otherwise)	0.657	0.087	7.568
SRN12	SR12 Dummy (1 if SR=12, 0 otherwise)	0.176	0.063	2.786
SRN17	SR17 Dummy (1 if SR=17, 0 otherwise)	0.243	0.107	2.274
SRN26	SR26 Dummy (1 if SR=26, 0 otherwise)	0.500	0.080	6.286
SRN27	SR27 Dummy (1 if SR=27, 0 otherwise)	0.491	0.158	3.105
SRN31	SR31 Dummy (1 if SR=31, 0 otherwise)	0.495	0.211	2.343

Table D.167 (continued): SPF with LNADT, Length Offset, Roadway, and Route Dummy Variables: One Parked/One Moving Type (ZIP)

Variable	Description	Coeff.	S.E.	t-stat
SRN97	SR97 Dummy (1 if SR=97, 0 otherwise)	0.474	0.045	10.445
SRN105	SR105 Dummy (1 if SR=105, 0 otherwise)	0.487	0.112	4.360
SRN106	SR106 Dummy (1 if SR=106, 0 otherwise)	0.889	0.078	11.333
SRN109	SR109 Dummy (1 if SR=109, 0 otherwise)	0.345	0.129	2.665
SRN124	SR124 Dummy (1 if SR=124, 0 otherwise)	0.423	0.107	3.952
SRN129	SR129 Dummy (1 if SR=129, 0 otherwise)	0.407	0.177	2.299
SRN195	SR195 Dummy (1 if SR=195, 0 otherwise)	0.431	0.080	5.402
SRN206	SR206 Dummy (1 if SR=206, 0 otherwise)	0.903	0.109	8.309
SRN211	SR211 Dummy (1 if SR=211, 0 otherwise)	0.518	0.258	2.008
SRN221	SR221 Dummy (1 if SR=221, 0 otherwise)	0.633	0.106	5.993
SRN395	SR395 Dummy (1 if SR=395, 0 otherwise)	-0.437	0.093	-4.712
SRN706	SR706 Dummy (1 if SR=706, 0 otherwise)	0.535	0.183	2.918
SRN904	SR904 Dummy (1 if SR=904, 0 otherwise)	0.448	0.212	2.113
SRN906	SR906 Dummy (1 if SR=906, 0 otherwise)	2.098	0.075	27.827
SR115281	SR115 & SR281 Dummy (1 if SR=115 or 281, 0 otherwise)	0.508	0.213	2.381
Zero inflation model				
Tau		50.204	1.502	33.434
Number of obs = 426546				
Restricted LL = -4863.051 Log likelihood = -3219.01471				

Table D.168: SPF with LNADT, Length Offset, Roadway, and Roadside Variables: One Parked/One Moving Type (ZIP)

Variable	Description	Coeff.	S.E.	t-stat
Poisson/NB/Gamma regression model				
Constant		-3.334	0.208	-16.052
LNADT	Log(AADT)	0.223	0.016	13.921
LENGTH	Segment Length	1.000	(Fixed Parameter)	
NLANEI	Number of lanes Increasing	-1.054	0.174	-6.069
RLNW	Average Lane width	0.020	0.007	2.909
SWR8910	Shoulder width dummy (if shoulder width right is 8-9ft and shoulder width left is 0-1ft, value=1,else=0)	0.360	0.173	2.076
SWR1045	Shoulder width dummy (if shoulder width right is >10ft and shoulder width left is 4-5ft, value=1,else=0)	0.583	0.132	4.421
DFENCE	Fence Dummy variable (1 if Fence exists, 0 otherwise)	-1.158	0.242	-4.788
LFENCE	Fence length on a segment	1.446	0.324	4.462

Table D.168 (continued): SPF with LNADT, Length Offset, Roadway, and Roadside Variables: One Parked/One Moving Type (ZIP)

Variable	Description	Coeff.	S.E.	t-stat
LGRDRL50	Proportion of Guardrail on a segment is 40-50%	0.837	0.334	2.504
LGRDRL60	Proportion of Guardrail on a segment is 50-60%	0.760	0.300	2.535
LRDSLP00	Proportion of Roadside slope on a segment is >100%	-0.431	0.119	-3.608
LTREG40	Proportion of Tree group on a segment is 30-40%	1.450	0.331	4.381
LTREG80	Proportion of Tree group on a segment is 70-80%	0.569	0.284	2.004
LTREG00	Proportion of Tree group on a segment is >100%	0.297	0.111	2.670
Zero inflation model				
Tau		-2.122	0.018	-117.623
Number of obs = 426546				
Restricted LL = -4863.051 Log likelihood = -3347.44040				

Table D.169: SPF with LNADT, Length Offset, Roadway, Roadside, and Route Dummy Variables: One Parked/One Moving Type (ZIP)

Variable	Description	Coeff.	S.E.	t-stat
Poisson/NB/Gamma regression model				
Constant		-3.835	0.281	-13.639
LNADT	Log(AADT)	0.295	0.022	13.643
LENGTH	Segment Length	1.000	(Fixed Parameter)	
NLANEI	Number of lanes Increasing	-1.146	0.212	-5.413
SWR8910	Shoulder width dummy (if shoulder width right is 8-9ft and shoulder width left is 0-1ft, value=1,else=0)	0.451	0.176	2.562
SWR1045	Shoulder width dummy (if shoulder width right is >10ft and shoulder width left is 4-5ft, value=1,else=0)	0.688	0.134	5.141
DFENCE	Fence Dummy variable (1 if Fence exists, 0 otherwise)	-1.052	0.258	-4.070
LFENCE	Fence length on a segment	1.380	0.343	4.023
LGRDRL50	Proportion of Guardrail on a segment is 40-50%	1.013	0.345	2.940
LGRDRL60	Proportion of Guardrail on a segment is 50-60%	0.787	0.311	2.531
LRDSLP00	Proportion of Roadside slope on a segment is >100%	-0.504	0.122	-4.124

Table D.169 (continued): SPF with LNADT, Length Offset, Roadway, Roadside, and Route Dummy Variables: One Parked/One Moving Type (ZIP)

Variable	Description	Coeff.	S.E.	t-stat
LTREG40	Proportion of Tree group on a segment is 30-40%	1.408	0.409	3.445
LTREG80	Proportion of Tree group on a segment is 70-80%	0.599	0.298	2.007
LTREG00	Proportion of Tree group on a segment is >100%	0.336	0.116	2.898
SRN3	SR3 Dummy (1 if SR=3, 0 otherwise)	0.307	0.090	3.400
SRN7	SR7 Dummy (1 if SR=7, 0 otherwise)	0.222	0.106	2.106
SRN11	SR11 Dummy (1 if SR=11, 0 otherwise)	0.628	0.085	7.373
SRN12	SR12 Dummy (1 if SR=12, 0 otherwise)	0.173	0.063	2.728
SRN17	SR17 Dummy (1 if SR=17, 0 otherwise)	0.232	0.107	2.177
SRN26	SR26 Dummy (1 if SR=26, 0 otherwise)	0.505	0.081	6.213
SRN27	SR27 Dummy (1 if SR=27, 0 otherwise)	0.521	0.122	4.254
SRN97	SR97 Dummy (1 if SR=97, 0 otherwise)	0.480	0.046	10.364
SRN105	SR105 Dummy (1 if SR=105, 0 otherwise)	0.483	0.111	4.332
SRN106	SR106 Dummy (1 if SR=106, 0 otherwise)	0.863	0.078	11.067
SRN124	SR124 Dummy (1 if SR=124, 0 otherwise)	0.406	0.107	3.799
SRN129	SR129 Dummy (1 if SR=129, 0 otherwise)	0.419	0.177	2.375
SRN195	SR195 Dummy (1 if SR=195, 0 otherwise)	0.424	0.080	5.318
SRN206	SR206 Dummy (1 if SR=206, 0 otherwise)	0.872	0.125	6.973
SRN221	SR221 Dummy (1 if SR=221, 0 otherwise)	0.622	0.106	5.889
SRN395	SR395 Dummy (1 if SR=395, 0 otherwise)	-0.467	0.094	-4.977
SRN706	SR706 Dummy (1 if SR=706, 0 otherwise)	0.514	0.183	2.812
SRN904	SR904 Dummy (1 if SR=904, 0 otherwise)	0.433	0.211	2.052
SRN906	SR906 Dummy (1 if SR=906, 0 otherwise)	2.082	0.075	27.633
Zero inflation model				
Tau		48.359	1.437	33.660
Number of obs = 426546				
Restricted LL = -4863.051 Log likelihood = -3199.50113				

Table D.170: SPF with LNADT and Length offset: Entering/Leaving Driveway Type

Variable	Description	Coeff.	S.E.	t-stat
Constant		-12.505	0.589	-21.223
LNADT	Log(AADT)	0.924	0.078	11.904
LENGTH	Segment Length	1.000	(Fixed Parameter)	
Alpha		649.772	35.978	18.060
Number of obs = 426546 Chi squared = 26022.93 Prob>chi2=0.000				
Restricted LL = -23261.25 Log likelihood = -9376.316				
Pseudo R2=0.5811860				

Table D.171: SPF with LNADT, Length Offset, and Route Dummy Variables: Entering/Leaving Driveway Type

Variable	Description	Coeff.	S.E.	t-stat
Constant		-12.073	0.618	-19.549
LNADT	Log(AADT)	0.880	0.081	10.896
LENGTH	Segment Length	1.000	(Fixed Parameter)	
SRN18	SR18 Dummy (1 if SR=18, 0 otherwise)	-3.325	0.458	-7.266
SRN21	SR21 Dummy (1 if SR=21, 0 otherwise)	-1.025	0.252	-4.069
SRN25	SR25 Dummy (1 if SR=25, 0 otherwise)	-0.766	0.337	-2.271
SRN112	SR112 Dummy (1 if SR=112, 0 otherwise)	-0.951	0.268	-3.545
SRN129	SR129 Dummy (1 if SR=129, 0 otherwise)	-1.077	0.480	-2.244
SRN195	SR195 Dummy (1 if SR=195, 0 otherwise)	-1.884	0.413	-4.566
SRN290	SR290 Dummy (1 if SR=290, 0 otherwise)	-2.052	0.910	-2.254
SRN410	SR410 Dummy (1 if SR=410, 0 otherwise)	-0.573	0.256	-2.238
Alpha		622.602	34.798	17.892
Number of obs = 426546 Chi squared = 25640.52 Prob>chi2=0.000				
Restricted LL = -23261.25 Log likelihood = -9346.589				
Pseudo R2=0.5783528				

Table D.172: SPF with LNADT, Length Offset, and Roadway Variables: Entering/Leaving Driveway Type

Variable	Description	Coeff.	S.E.	t-stat
Constant		-9.536	0.400	-23.835
LNADT	Log(AADT)	1.154	0.074	15.527
LENGTH	Segment Length	1.000	(Fixed Parameter)	
NLANEI	Number of lanes Increasing	-4.457	0.221	-20.159
A1	Algebraic difference in gradients	-0.078	0.022	-3.505
MK1	Rate of vertical curvature/5280	-0.964	0.289	-3.332
DGC1	Degree of Curvature	-0.080	0.008	-10.076
Alpha		504.235	26.095	19.323
Number of obs = 426546 Chi squared = 23903.08 Prob>chi2=0.000				
Restricted LL = -23261.25 Log likelihood = -9199.816				
Pseudo R2=0.5650484				

Table D.173: SPF with LNADT, Length Offset, Roadway, and Route Dummy Variables: Entering/Leaving Driveway Type

Variable	Description	Coeff.	S.E.	t-stat
Constant		-10.040	0.417	-24.055
LNADT	Log(AADT)	1.213	0.077	15.822
LENGTH	Segment Length	1.000	(Fixed Parameter)	
NLANEI	Number of lanes Increasing	-4.427	0.224	-19.800
A1	Algebraic difference in gradients	-0.076	0.022	-3.479
MK1	Rate of vertical curvature/5280	-0.937	0.294	-3.192
DGC1	Degree of Curvature	-0.083	0.008	-10.531
SRN18	SR18 Dummy (1 if SR=18, 0 otherwise)	-2.468	0.946	-2.609
SRN109	SR109 Dummy (1 if SR=109, 0 otherwise)	0.978	0.444	2.204
SRN195	SR195 Dummy (1 if SR=195, 0 otherwise)	-1.972	0.426	-4.630
SRN231	SR231 Dummy (1 if SR=231 0 otherwise)	0.984	0.366	2.690
SRN305	SR305 Dummy (1 if SR=305, 0 otherwise)	-3.073	1.227	-2.505
Alpha		491.157	25.225	19.471
Number of obs = 426546 Chi squared = 23744.65 Prob>chi2=0.000				
Restricted LL = -23261.25 Log likelihood = -9177.617				
Pseudo R2=0.5640075				

Table D.174: SPF with LNADT, Length Offset, Roadway, and Roadside Variables: Entering/Leaving Driveway Type

Variable	Description	Coeff.	S.E.	t-stat
Constant		-9.432	0.401	-23.506
LNADT	Log(AADT)	1.156	0.076	15.308
LENGTH	Segment Length	1.000	(Fixed Parameter)	
NLANEI	Number of lanes Increasing	-4.493	0.227	-19.834
A1	Algebraic difference in gradients	-0.079	0.022	-3.515
MK1	Rate of vertical curvature/5280	-0.986	0.287	-3.440
DGC1	Degree of Curvature	-0.076	0.008	-9.149
LDITCH00	Proportion of Ditch on a segment is 90-100%	-2.139	0.559	-3.825
DFENCE	Fence Dummy variable (1 if Fence exists, 0 otherwise)	1.494	0.669	2.234
LFENCE	Fence length on a segment	-2.924	0.912	-3.208
LGRDRL00|	Proportion of Guardrail on a segment is 90-100%	-1.107	0.296	-3.741
DMALBOX	Mailbox Dummy variable (1 if Mailbox exists, 0 otherwise)	-1.775	0.752	-2.359
LRDSLP90	Proportion of Tree group on a segment is 80-90%	-1.524	0.315	-4.842
LRDSLP00	Proportion of Tree group on a segment is 90-100%	-0.646	0.269	-2.404
Alpha		470.933	24.744	19.032
Number of obs = 426546 Chi squared = 23474.69 Prob>chi2=0.000				
Restricted LL = -23261.25 Log likelihood = -9140.062				
Pseudo R2=0.5622032				

Table D.175: SPF with LNADT, Length Offset, Roadway, Roadside, and Route Dummy Variables: Entering/Leaving Driveway Type

Variable	Description	Coeff.	S.E.	t-stat
Constant		-9.816	0.434	-22.603
LNADT	Log(AADT)	1.202	0.079	15.167
LENGTH	Segment Length	1.000	(Fixed Parameter)	
NLANEI	Number of lanes Increasing	-4.456	0.228	-19.517
A1	Algebraic difference in gradients	-0.076	0.022	-3.427
MK1	Rate of vertical curvature/5280	-0.983	0.287	-3.421
DGC1	Degree of Curvature	-0.078	0.008	-9.488
LDITCH00|	Proportion of Ditch on a segment is 90-100%	-2.302	0.549	-4.194
DFENCE	Fence Dummy variable (1 if Fence exists, 0 otherwise)	1.795	0.793	2.264
LFENCE	Fence length on a segment	-3.234	1.085	-2.982

Table D.175 (continued): SPF with LNADT, Length Offset, Roadway, Roadside, and Route Dummy Variables: Entering/Leaving Driveway Type

Variable	Description	Coeff.	S.E.	t-stat
LGRDRL00	Proportion of Guardrail on a segment is 90-100%	-1.149	0.288	-3.986
LRDSLP90	Proportion of Tree group on a segment is 80-90%	-1.757	0.746	-2.356
LRDSLP00	Proportion of Tree group on a segment is 90-100%	-1.410	0.290	-4.858
DTREGRP	Tree group Dummy variable (1 if Fence exists, 0 otherwise)	-0.705	0.312	-2.263
SRN18	SR18 Dummy (1 if SR=18, 0 otherwise)	-2.496	0.948	-2.632
SRN21	SR21 Dummy (1 if SR=21, 0 otherwise)	-0.647	0.250	-2.582
SRN109	SR109 Dummy (1 if SR=109, 0 otherwise)	1.305	0.498	2.619
SRN112	SR129 Dummy (1 if SR=129, 0 otherwise)	-0.651	0.254	-2.567
SRN195	SR195 Dummy (1 if SR=195, 0 otherwise)	-2.079	0.412	-5.043
SRN231	SR231 Dummy (1 if SR=231 0 otherwise)	1.194	0.395	3.023
SRN305	SR305 Dummy (1 if SR=305, 0 otherwise)	-3.168	1.176	-2.693
Alpha		456.651	23.570	19.374
Number of obs = 426546 Chi squared = 23283.26 Prob>chi2=0.000				
Restricted LL = -23261.25 Log likelihood = -9112.505				
Pseudo R2=0.5609306				

Table D.176: SPF with LNADT and Length Offset: Crashes Classified as Other Type

Variable	Description	Coeff.	S.E.	t-stat
Constant		-8.030	0.358	-22.405
LNADT	Log(AADT)	0.310	0.046	6.796
LENGTH	Segment Length	1.000	(Fixed Parameter)	
Alpha		331.134	17.152	19.306
Number of obs = 426546 Chi squared = 7612.267 Prob>chi2=0.000				
Restricted LL = -12652.57 Log likelihood = -8736.411				
Pseudo R2=0.3034578				

Table D.177: SPF with LNADT Length Offset, and Route Dummy Variables: Crashes Classified as Other Type

Variable	Description	Coeff.	S.E.	t-stat
Constant		-6.179	0.353	-17.511
LNADT	Log(AADT)	0.035	0.044	0.789
LENGTH	Segment Length	1.000	(Fixed Parameter)	
SRN3	SR3 Dummy (1 if SR=3, 0 otherwise)	0.752	0.347	2.168
SRN9	SR9 Dummy (1 if SR=9, 0 otherwise)	-1.096	0.359	-3.056
SRN12	SR12 Dummy (1 if SR=12, 0 otherwise)	0.947	0.144	6.591
SRN14	SR14 Dummy (1 if SR=14, 0 otherwise)	1.282	0.195	6.567

Table D.177 (continued): SPF with LNADT Length Offset, and Route Dummy Variables: Crashes Classified as Other Type

Variable	Description	Coeff.	S.E.	t-stat
SRN17	SR17 Dummy (1 if SR=17, 0 otherwise)	0.940	0.209	4.504
SRN21	SR21 Dummy (1 if SR=21, 0 otherwise)	-1.700	0.259	-6.555
SRN23	SR23 Dummy (1 if SR=23, 0 otherwise)	-1.369	0.530	-2.584
SRN25	SR25 Dummy (1 if SR=25, 0 otherwise)	-0.641	0.220	-2.919
SRN26	SR26 Dummy (1 if SR=26, 0 otherwise)	0.804	0.259	3.104
SRN27	SR27 Dummy (1 if SR=27, 0 otherwise)	-1.197	0.331	-3.619
SRN28	SR28 Dummy (1 if SR=28, 0 otherwise)	1.140	0.247	4.606
SRN31	SR31 Dummy (1 if SR=31, 0 otherwise)	-2.246	1.076	-2.087
SRN97	SR97 Dummy (1 if SR=97, 0 otherwise)	1.567	0.198	7.901
SRN104	SR104 Dummy (1 if SR=104, 0 otherwise)	2.017	0.606	3.331
SRN112	SR112 Dummy (1 if SR=112, 0 otherwise)	-0.883	0.282	-3.135
SRN129	SR129 Dummy (1 if SR=129, 0 otherwise)	-1.537	0.670	-2.294
SRN155	SR155 Dummy (1 if SR=155, 0 otherwise)	0.574	0.219	2.618
SRN195	SR195 Dummy (1 if SR=195, 0 otherwise)	1.027	0.196	5.229
SRN203	SR203 Dummy (1 if SR=203, 0 otherwise)	0.945	0.424	2.230
SRN231	SR231 Dummy (1 if SR=231, 0 otherwise)	-0.845	0.330	-2.563
SRN261	SR261 Dummy (1 if SR=261, 0 otherwise)	-1.108	0.509	-2.175
SRN504	SR504 Dummy (1 if SR=504, 0 otherwise)	-1.385	0.594	-2.333
SRN821	SR821 Dummy (1 if SR=821, 0 otherwise)	1.592	0.364	4.377
SRN24165	SR24 & SR165 Dummy (1 if SR=24 or 165, 0 otherwise)	-1.612	0.511	-3.154
Alpha		241.691	13.310	18.159
Number of obs = 426546 Chi squared = 6957.072 Prob>chi2=0.000				
Restricted LL = -12652.57 Log likelihood = -8533.238				
Pseudo R2=0.2895939				

Table D.178: SPF with LNADT Length Offset, and Roadway Variables: Crashes Classified as Other Type (ZIP)

Variable	Description	Coeff.	S.E.	t-stat
Poisson/NB/Gamma regression model				
Constant		-2.517	0.053	-47.555
LNADT	Log(AADT)	0.082	0.007	11.618
LENGTH	Segment Length	1.000	(Fixed Parameter)	
HCANG1	Horizontal Curve Central angle	0.0003	0.0001	2.610
Zero inflation model				
Tau		-2.280	0.015	-149.962
Number of obs = 426546				
Restricted LL = -12652.57 Log likelihood = -10062.24688				

Table D.179: SPF with LNADT Length Offset, Roadway, and Route Dummy Variables: Crashes Classified as Other Type (ZIP)

Variable	Description	Coeff.	S.E.	t-stat
Constant		-2.397	0.066	-36.340
Poisson/NB/Gamma regression model				
LNADT	Log(AADT)	0.043	0.009	4.780
LENGTH	Segment Length	1.000	(Fixed Parameter)	
A1	Algebraic difference in gradients	0.008	0.004	2.206
SRN3	SR3 Dummy (1 if SR=3, 0 otherwise)	0.248	0.064	3.890
SRN9	SR9 Dummy (1 if SR=9, 0 otherwise)	-0.294	0.118	-2.483
SRN12	SR12 Dummy (1 if SR=12, 0 otherwise)	0.344	0.026	13.216
SRN14	SR14 Dummy (1 if SR=14, 0 otherwise)	0.474	0.028	16.876
SRN17	SR17 Dummy (1 if SR=17, 0 otherwise)	0.301	0.043	6.966
SRN21	SR21 Dummy (1 if SR=21, 0 otherwise)	-0.423	0.111	-3.804
SRN26	SR26 Dummy (1 if SR=26, 0 otherwise)	0.245	0.054	4.530
SRN27	SR27 Dummy (1 if SR=27, 0 otherwise)	-0.345	0.139	-2.483
SRN28	SR28 Dummy (1 if SR=28, 0 otherwise)	0.351	0.046	7.650
SRN97	SR97 Dummy (1 if SR=97, 0 otherwise)	0.539	0.025	21.643
SRN104	SR104 Dummy (1 if SR=104, 0 otherwise)	0.603	0.058	10.375
SRN155	SR155 Dummy (1 if SR=155, 0 otherwise)	0.153	0.055	2.783
SRN195	SR195 Dummy (1 if SR=195, 0 otherwise)	0.291	0.045	6.485
SRN203	SR203 Dummy (1 if SR=203, 0 otherwise)	0.372	0.074	5.046
SRN821	SR821 Dummy (1 if SR=821, 0 otherwise)	0.606	0.047	13.021
Zero inflation model				
Tau		-2.200	0.016	-141.584
Number of obs = 426546				
Restricted LL = -12652.57 Log likelihood = -9770.84895				

Table D.180: SPF with LNADT Length Offset, Roadway, and Roadside Variables: Crashes Classified as Other Type (ZIP)

Variable	Description	Coeff.	S.E.	t-stat
Poisson/NB/Gamma regression model				
Constant		-2.555	0.054	-46.965
LNADT	Log(AADT)	0.084	0.007	11.588
LENGTH	Segment Length	1.000	(Fixed Parameter)	
HCANG1	Horizontal Curve Central angle	0.0003	0.0001	2.508
LBRDRAL	Bridge rail length	-0.444	0.195	-2.280
DCURB	Curb Dummy variable (1 if Curb slope exists, 0 otherwise)	-0.254	0.121	-2.103
LDITCH00	Proportion of Ditch on a segment is 90-100%	-0.205	0.057	-3.582
LFENCE	Fence length on a segment	-0.155	0.065	-2.386
DMFXOBJ	Fixed object Dummy variable (1 if Fixed object slope exists, 0 otherwise)	0.118	0.048	2.466
DPDSTAL	Pedestal Dummy variable (1 if Pedestal slope exists, 0 otherwise)	-0.344	0.065	-5.274
DRDSLP	Roadside slope Dummy variable (1 if Roadside slope exists, 0 otherwise)	0.192	0.026	7.364
Zero inflation model				
Tau		-2.263	0.015	-148.374
Number of obs = 426546				
Restricted LL = -12652.57 Log likelihood = -9770.84895				

Table D.181: SPF with LNADT Length Offset, Roadway, Roadside, and Route Dummy Variables: Crashes Classified as Other Type (ZIP)

Variable	Description	Coeff.	S.E.	t-stat
Poisson/NB/Gamma regression model				
Constant		-2.430	0.067	-36.454
LNADT	Log(AADT)	0.046	0.009	5.038
LENGTH	Segment Length	1.000	(Fixed Parameter)	
A1	Algebraic difference in gradients	0.008	0.004	2.251
DCURB	Curb Dummy variable (1 if Curb slope exists, 0 otherwise)	-0.258	0.128	-2.012
LDITCH00	Proportion of Ditch on a segment is 90-100%	-0.139	0.060	-2.314
LFENCE	Fence length on a segment	-0.160	0.067	-2.386
DMFXOBJ	Fixed object Dummy variable (1 if Fixed object slope exists, 0 otherwise)	0.144	0.050	2.885
DPDSTAL	Pedestal Dummy variable (1 if Pedestal slope exists, 0 otherwise)	-0.236	0.070	-3.353
DRDSLP	Roadside slope Dummy variable (1 if Roadside slope exists, 0 otherwise)	0.121	0.028	4.356
SRN3	SR3 Dummy (1 if SR=3, 0 otherwise)	0.236	0.064	3.675
SRN9	SR9 Dummy (1 if SR=9, 0 otherwise)	-0.294	0.119	-2.475
SRN12	SR12 Dummy (1 if SR=12, 0 otherwise)	0.336	0.027	12.526
SRN14	SR14 Dummy (1 if SR=14, 0 otherwise)	0.462	0.028	16.302
SRN17	SR17 Dummy (1 if SR=17, 0 otherwise)	0.306	0.043	7.052
SRN21	SR21 Dummy (1 if SR=21, 0 otherwise)	-0.417	0.112	-3.738
SRN26	SR26 Dummy (1 if SR=26, 0 otherwise)	0.232	0.054	4.286
SRN27	SR27 Dummy (1 if SR=27, 0 otherwise)	-0.348	0.143	-2.426
SRN28	SR28 Dummy (1 if SR=28, 0 otherwise)	0.337	0.048	6.968
SRN97	SR97 Dummy (1 if SR=97, 0 otherwise)	0.524	0.026	20.408
SRN104	SR104 Dummy (1 if SR=104, 0 otherwise)	0.611	0.058	10.459
SRN155	SR155 Dummy (1 if SR=155, 0 otherwise)	0.159	0.055	2.874
SRN195	SR195 Dummy (1 if SR=195, 0 otherwise)	0.293	0.045	6.515
SRN203	SR203 Dummy (1 if SR=203, 0 otherwise)	0.363	0.074	4.908
SRN821	SR821 Dummy (1 if SR=821, 0 otherwise)	0.612	0.047	13.132
Zero inflation model				
Tau		-2.187	0.016	-140.568
Number of obs = 426546				
Restricted LL = -12652.57 Log likelihood = -9754.87834				

Table D.182: SPF with LNADT and Length Offset: Truck Type

Variable	Description	Coeff.	S.E.	t-stat
Constant		-6.742	0.090	-74.988
LNADT	Log(AADT)	0.490	0.011	43.135
LENGTH	Segment Length	1.000	(Fixed Parameter)	
Alpha		27.072	0.367	73.781
Number of obs = 426546 Chi squared = 72986.60 Prob>chi2=0.000				
Restricted LL = -122859.4 Log likelihood = -83166.30				
Pseudo R2=0.3049759				

Table D.183: SPF with LNADT, Length Offset, and Route Dummy Variables: Truck Type

Variable	Description	Coeff.	S.E.	t-stat
Constant		-5.362	0.104	-51.800
LNADT	Log(AADT)	0.304	0.013	24.032
LENGTH	Segment Length	1.000	(Fixed Parameter)	
SRN3	SR3 Dummy (1 if SR=3, 0 otherwise)	0.913	0.107	8.519
SRN9	SR9 Dummy (1 if SR=95, 0 otherwise)	-0.216	0.067	-3.201
SRN11	SR11 Dummy (1 if SR=11, 0 otherwise)	-0.704	0.082	-8.559
SRN12	SR12 Dummy (1 if SR=12, 0 otherwise)	0.314	0.041	7.631
SRN17	SR17 Dummy (1 if SR=17, 0 otherwise)	0.244	0.071	3.413
SRN21	SR21 Dummy (1 if SR=21, 0 otherwise)	-1.361	0.075	-18.133
SRN23	SR23 Dummy (1 if SR=23, 0 otherwise)	-0.754	0.120	-6.297
SRN25	SR25 Dummy (1 if SR=25, 0 otherwise)	-0.449	0.076	-5.888
SRN26	SR26 Dummy (1 if SR=26, 0 otherwise)	0.920	0.098	9.403
SRN27	SR27 Dummy (1 if SR=27, 0 otherwise)	-0.175	0.077	-2.275
SRN28	SR28 Dummy (1 if SR=28, 0 otherwise)	0.199	0.075	2.666
SRN31	SR31 Dummy (1 if SR=31, 0 otherwise)	-0.929	0.158	-5.885
SRN97	SR97 Dummy (1 if SR=97, 0 otherwise)	0.893	0.057	15.734
SRN104	SR104 Dummy (1 if SR=104, 0 otherwise)	1.227	0.186	6.610
SRN109	SR109 Dummy (1 if SR=109, 0 otherwise)	0.282	0.107	2.629
SRN112	SR112 Dummy (1 if SR=112, 0 otherwise)	-0.361	0.070	-5.160
SRN124	SR124 Dummy (1 if SR=124, 0 otherwise)	0.588	0.113	5.213
SRN127	SR127 Dummy (1 if SR=127, 0 otherwise)	-1.304	0.174	-7.509
SRN129	SR129 Dummy (1 if SR=129, 0 otherwise)	-1.100	0.119	-9.259
SRN141	SR141 Dummy (1 if SR=141, 0 otherwise)	0.462	0.167	2.766
SRN161	SR161 Dummy (1 if SR=164, 0 otherwise)	-0.470	0.135	-3.471
SRN172	SR172 Dummy (1 if SR=172, 0 otherwise)	-1.518	0.298	-5.099
SRN195	SR195 Dummy (1 if SR=195, 0 otherwise)	0.622	0.097	6.430
SRN203	SR203 Dummy (1 if SR=203, 0 otherwise)	0.306	0.140	2.181
SRN211	SR211 Dummy (1 if SR=211, 0 otherwise)	0.530	0.189	2.811
SRN221	SR221 Dummy (1 if SR=221, 0 otherwise)	0.379	0.161	2.349
SRN231	SR231 Dummy (1 if SR=231, 0 otherwise)	-0.362	0.082	-4.401

Table D.183 (continued): SPF with LNADT, Length Offset, and Route Dummy Variables: Truck Type

Variable	Description	Coeff.	S.E.	t-stat
SRN241	SR241 Dummy (1 if SR=241, 0 otherwise)	1.344	0.201	6.694
SRN243	SR243 Dummy (1 if SR=243, 0 otherwise)	0.637	0.203	3.134
SRN260	SR260 Dummy (1 if SR=260, 0 otherwise)	-0.900	0.179	-5.019
SRN261	SR261 Dummy (1 if SR=261, 0 otherwise)	-1.040	0.143	-7.286
SRN272	SR272 Dummy (1 if SR=272, 0 otherwise)	-0.939	0.228	-4.124
SRN290	SR290 Dummy (1 if SR=290, 0 otherwise)	-1.670	0.218	-7.674
SRN305	SR305 Dummy (1 if SR=305, 0 otherwise)	0.567	0.204	2.784
SRN395	SR395 Dummy (1 if SR=395, 0 otherwise)	0.221	0.059	3.742
SRN411	SR411 Dummy (1 if SR=411, 0 otherwise)	-0.579	0.253	-2.289
SRN503	SR503 Dummy (1 if SR=503, 0 otherwise)	0.257	0.078	3.292
SRN504	SR504 Dummy (1 if SR=504, 0 otherwise)	-0.668	0.092	-7.267
SRN507	SR507 Dummy (1 if SR=507, 0 otherwise)	0.658	0.130	5.066
SRN539	SR539 Dummy (1 if SR=539, 0 otherwise)	-1.233	0.145	-8.531
SRN542	SR542 Dummy (1 if SR=542, 0 otherwise)	0.450	0.062	7.232
SRN821	SR821 Dummy (1 if SR=821, 0 otherwise)	-0.230	0.109	-2.113
SRN904	SR904 Dummy (1 if SR=904, 0 otherwise)	0.450	0.209	2.147
SRN906	SR906 Dummy (1 if SR=906, 0 otherwise)	0.874	0.313	2.794
SRN970	SR970 Dummy (1 if SR=970, 0 otherwise)	1.347	0.361	3.729
SR502730	SR502 & SR730 Dummy (1 if SR=502 or 730, 0 otherwise)	0.953	0.291	3.276
SR432532	SR432 & SR532 Dummy (1 if SR=432 or 532, 0 otherwise)	0.915	0.172	5.316
SR123169	SR123 & SR169 Dummy (1 if SR=123 or 169, 0 otherwise)	-0.613	0.106	-5.807
SR24165	SR241 & SR165 Dummy (1 if SR=241 or 165, 0 otherwise)	-1.089	0.134	-8.109
Alpha		24.262	0.334	72.742
Number of obs = 426546 Chi squared = 67879.04 Prob>chi2=0.000				
Restricted LL = -122859.4 Log likelihood = -82232.57				
Pseudo R2=0.2921487				

Table D.184: SPF with LNADT, Length Offset, and Roadway Variables: Truck Type

Variable	Description	Coeff.	S.E.	t-stat
Constant		-4.694	0.102	-46.153
LNADT	Log(AADT)	0.750	0.013	59.130
LENGTH	Segment Length	1.000	(Fixed Parameter)	
NLANEI	Number of lanes Increasing	-4.363	0.063	-69.694
A1	Algebraic difference in gradients	-0.030	0.004	-7.081
MK1	Rate of vertical curvature/5280	-0.223	0.066	-3.401
DGC1	Degree of Curvature	0.009	0.002	5.828
RLNW	Average Lane width	0.036	0.008	4.239
SWR4523	Shoulder width dummy (if shoulder width right is 4-5ft and shoulder width left is 2-3ft, value=1,else=0)	-0.307	0.094	-3.250
SWR8901	Shoulder width dummy (if shoulder width right is 8-9ft and shoulder width left is 0-1ft, value=1,else=0)	-0.506	0.223	-2.271
SWR1001	Shoulder width dummy (if shoulder width right is >10ft and shoulder width left is 0-1ft, value=1,else=0)	-2.695	1.267	-2.128
SWR1023	Shoulder width dummy (if shoulder width right is >105ft and shoulder width left is 2-3ft, value=1,else=0)	-1.289	0.328	-3.926
SWC19	Shoulder width dummy (if shoulder width center is >1ft and <9ft, value=1,else=0)	-3.373	0.270	-12.473
Alpha		21.138	0.288	73.438
Number of obs = 426546 Chi squared = 65362.22 Prob>chi2=0.000				
Restricted LL = -122859.4 Log likelihood = -80669.76				
Pseudo R2=0.2883181				

Table D.185: SPF with LNADT, Length Offset, Roadway, and Route Dummy Variables: Truck Type

Variable	Description	Coeff.	S.E.	t-stat
Constant		-3.974	0.097	-41.077
LNADT	Log(AADT)	0.674	0.013	50.105
LENGTH	Segment Length	1.000	(Fixed Parameter)	
NLANEI	Number of lanes Increasing	-4.226	0.059	-71.446
A1	Algebraic difference in gradients	-0.025	0.004	-5.857
MK1	Rate of vertical curvature/5280	-0.377	0.051	-7.421
DGC1	Degree of Curvature	0.015	0.002	8.954
SWR4523	Shoulder width dummy (if shoulder width right is 4-5ft and shoulder width left is 2-3ft, value=1,else=0)	-0.314	0.094	-3.346
SWR1023	Shoulder width dummy (if shoulder width right is >105ft and shoulder width left is 2-3ft, value=1,else=0)	-1.216	0.314	-3.873
SWC19	Shoulder width dummy (if shoulder width center is >1ft and <9ft, value=1,else=0)	-3.361	0.265	-12.674
SRN3	SR3 Dummy (1 if SR=3, 0 otherwise)	0.702	0.126	5.591
SRN9	SR9 Dummy (1 if SR=95, 0 otherwise)	-0.385	0.061	-6.334
SRN11	SR11 Dummy (1 if SR=11, 0 otherwise)	-0.815	0.075	-10.840
SRN12	SR12 Dummy (1 if SR=12, 0 otherwise)	0.441	0.039	11.411
SRN17	SR17 Dummy (1 if SR=17, 0 otherwise)	0.333	0.066	5.049
SRN18	SR18 Dummy (1 if SR=18, 0 otherwise)	0.599	0.267	2.247
SRN21	SR21 Dummy (1 if SR=21, 0 otherwise)	-0.751	0.072	-10.421
SRN26	SR26 Dummy (1 if SR=26, 0 otherwise)	1.022	0.081	12.578
SRN28	SR28 Dummy (1 if SR=28, 0 otherwise)	0.209	0.067	3.104
SRN31	SR31 Dummy (1 if SR=31, 0 otherwise)	-0.574	0.155	-3.701
SRN97	SR97 Dummy (1 if SR=97, 0 otherwise)	0.721	0.049	14.568
SRN104	SR104 Dummy (1 if SR=104, 0 otherwise)	0.999	0.188	5.308
SRN112	SR112 Dummy (1 if SR=112, 0 otherwise)	-0.240	0.063	-3.812
SRN124	SR124 Dummy (1 if SR=124, 0 otherwise)	0.690	0.096	7.198
SRN127	SR127 Dummy (1 if SR=127, 0 otherwise)	-0.938	0.166	-5.650
SRN129	SR129 Dummy (1 if SR=129, 0 otherwise)	-0.746	0.116	-6.441
SRN141	SR141 Dummy (1 if SR=141, 0 otherwise)	0.520	0.143	3.637
SRN150	SR150 Dummy (1 if SR=150, 0 otherwise)	-0.654	0.129	-5.078
SRN161	SR161 Dummy (1 if SR=161, 0 otherwise)	-0.535	0.148	-3.612
SRN172	SR172 Dummy (1 if SR=172, 0 otherwise)	-0.757	0.291	-2.604
SRN195	SR195 Dummy (1 if SR=195, 0 otherwise)	0.556	0.096	5.785
SRN202	SR202 Dummy (1 if SR=202, 0 otherwise)	-0.481	0.117	-4.101
SRN206	SR206Dummy (1 if SR=206, 0 otherwise)	0.452	0.100	4.529
SRN211	SR211 Dummy (1 if SR=211, 0 otherwise)	0.622	0.166	3.755
SRN221	SR221 Dummy (1 if SR=221, 0 otherwise)	0.430	0.140	3.071

Table D.185 (continued): SPF with LNADT, Length Offset, Roadway, and Route Dummy Variables: Truck Type

Variable	Description	Coeff.	S.E.	t-stat
SRN241	SR241 Dummy (1 if SR=241, 0 otherwise)	1.117	0.182	6.141
SRN243	SR243 Dummy (1 if SR=243, 0 otherwise)	0.524	0.172	3.056
SRN260	SR260 Dummy (1 if SR=260, 0 otherwise)	-0.502	0.171	-2.928
SRN261	SR261 Dummy (1 if SR=261, 0 otherwise)	-0.442	0.136	-3.246
SRN272	SR272 Dummy (1 if SR=272, 0 otherwise)	-0.490	0.224	-2.186
SRN290	SR290 Dummy (1 if SR=290, 0 otherwise)	-1.116	0.300	-3.722
SRN302	SR302 Dummy (1 if SR=302, 0 otherwise)	-0.478	0.134	-3.558
SRN395	SR395 Dummy (1 if SR=395, 0 otherwise)	0.698	0.081	8.609
SRN410	SR410 Dummy (1 if SR=410, 0 otherwise)	0.298	0.055	5.448
SRN411	SR411 Dummy (1 if SR=411, 0 otherwise)	-0.911	0.223	-4.091
SRN503	SR503 Dummy (1 if SR=503, 0 otherwise)	0.220	0.075	2.932
SRN504	SR504 Dummy (1 if SR=504, 0 otherwise)	-0.608	0.089	-6.864
SRN510	SR510 Dummy (1 if SR=510, 0 otherwise)	-0.632	0.228	-2.770
SRN542	SR542 Dummy (1 if SR=542, 0 otherwise)	0.500	0.055	9.158
SRN706	SR706 Dummy (1 if SR=706, 0 otherwise)	0.289	0.141	2.052
SRN904	SR904 Dummy (1 if SR=904, 0 otherwise)	0.461	0.185	2.498
SRN906	SR906 Dummy (1 if SR=906 0 otherwise)	1.354	0.279	4.849
SRN970	SR970 Dummy (1 if SR=970, 0 otherwise)	1.149	0.293	3.917
SR502730	SR502 & SR730 Dummy (1 if SR=502 or 730, 0 otherwise)	0.724	0.266	2.721
SR432532	SR432 & SR532 Dummy (1 if SR=432 or 532, 0 otherwise)	0.581	0.199	2.918
SR123169	SR123 & SR169 Dummy (1 if SR=123 or 169, 0 otherwise)	-0.776	0.118	-6.567
SR24165	SR241 & SR165 Dummy (1 if SR=241 or 165, 0 otherwise)	-0.766	0.126	-6.074
Alpha		21.138	0.288	73.438
Number of obs = 426546 Chi squared = 61179.28 Prob>chi2=0.000				
Restricted LL = -122859.4 Log likelihood = -79919.25				
Pseudo R2=0.2768071				

Table D.186: SPF with LNADT, Length Offset, Roadway, and Roadside Variables: Truck Type

Variable	Description	Coeff.	S.E.	t-stat
Constant		-4.707	0.101	-46.395
LNADT	Log(AADT)	0.738	0.013	58.819
LENGTH	Segment Length	1.000	(Fixed Parameter)	
NLANEI	Number of lanes Increasing	-4.329	0.062	-69.498
A1	Algebraic difference in gradients	-0.028	0.004	-6.522
MK1	Rate of vertical curvature/5280	-0.201	0.067	-3.009
DGC1	Degree of Curvature	0.011	0.002	6.808
RLNW	Average Lane width	0.040	0.008	4.782
SWR4523	Shoulder width dummy (if shoulder width right is 4-5ft and shoulder width left is 2-3ft, value=1,else=0)	-0.317	0.095	-3.326
SWR8901	Shoulder width dummy (if shoulder width right is 8-9ft and shoulder width left is 0-1ft, value=1,else=0)	-0.522	0.217	-2.409
SWR1001	Shoulder width dummy (if shoulder width right is >10ft and shoulder width left is 0-1ft, value=1,else=0)	-2.696	1.267	-2.127
SWR1023	Shoulder width dummy (if shoulder width right is >10ft and shoulder width left is 2-3ft, value=1,else=0)	-1.247	0.328	-3.805
SWC19	Shoulder width dummy (if shoulder width center is >1ft and <9ft, value=1,else=0)	-3.355	0.268	-12.515
LBRDRAL	Bridge rail length	-0.320	0.122	-2.629
DCLVERT	Culvert Dummy variable (1 if Culvert exists, 0 otherwise)	0.491	0.123	4.011
LCLVERT	Culvert length	-1.623	0.291	-5.576
DDITCH	Ditch Dummy variable (1 if Ditch exists, 0 otherwise)	0.349	0.057	6.069
LDITCH00	Proportion of Ditch on a segment is 90-100%	-0.559	0.081	-6.912
DGRDRAL	Guard rail Dummy variable (1 if Guard rail exists, 0 otherwise)	0.408	0.066	6.147
LGRDRL00|	Proportion of Guard rail on a segment is 90-100%	-0.760	0.088	-8.645
DMFXOBJ	Fixed object Dummy variable (1 if Fixed object exists, 0 otherwise)	0.287	0.087	3.279
LRDSLP00|	Proportion of Roadside slope on a segment is 90-100%	-0.301	0.050	-6.014
LRCHCRP	Rock out cropping length on a segment	-1.264	0.307	-4.113
DTREE	Tree group Dummy variable (1 if Tree group exists, 0 otherwise)	0.263	0.105	2.501

Table D.186 (continued): SPF with LNADT, Length Offset, Roadway, and Roadside Variables: Truck Type

Variable	Description	Coeff.	S.E.	t-stat
LTREG00	Proportion of Tree group on a segment is 90-100%	-0.376	0.089	-4.226
DWHZRD	Water hazard Dummy variable (1 if Water hazard exists, 0 otherwise)	0.474	0.182	2.605
LWHZD00	Proportion of Water hazard on a segment is 90-100%	-0.691	0.262	-2.641
Alpha		20.559	0.280	73.468
Number of obs = 426546 Chi squared = 63703.70 Prob>chi2=0.000				
Restricted LL = -122859.4 Log likelihood = -80441.02				
Pseudo R2=0.2836498				

Table D.187: SPF with LNADT, Length Offset, Roadway, Roadside, and Route Dummy Variables: Truck Type

Variable	Description	Coeff.	S.E.	t-stat
Constant		-3.949	0.097	-40.780
LNADT	Log(AADT)	0.662	0.013	49.727
LENGTH	Segment Length	1.000	(Fixed Parameter)	
NLANEI	Number of lanes Increasing	-4.178	0.059	-70.909
A1	Algebraic difference in gradients	-0.023	0.004	-5.384
MK1	Rate of vertical curvature/5280	-0.347	0.051	-6.743
DGC1	Degree of Curvature	0.016	0.002	9.682
SWR4523	Shoulder width dummy (if shoulder width right is 4-5ft and shoulder width left is 2-3ft, value=1,else=0)	-0.318	0.094	-3.362
SWR1023	Shoulder width dummy (if shoulder width right is >10ft and shoulder width left is 2-3ft, value=1,else=0)	-1.168	0.314	-3.719
SWC19	Shoulder width dummy (if shoulder width center is >1ft and <9ft, value=1,else=0)	-3.342	0.263	-12.696
DCLVERT	Culvert Dummy variable (1 if Culvert exists, 0 otherwise)	0.501	0.122	4.101
LCLVERT	Culvert length	-1.685	0.299	-5.627
DDITCH	Ditch Dummy variable (1 if Ditch exists, 0 otherwise)	0.313	0.056	5.591
LDITCH00	Proportion of Ditch on a segment is 90-100%	-0.491	0.079	-6.233
DGRDRAL	Guard rail Dummy variable (1 if Guard rail exists, 0 otherwise)	0.492	0.065	7.532
LGRDRL00	Proportion of Guard rail on a segment is 90-100%	-0.768	0.087	-8.852
DMFXOBJ	Fixed object Dummy variable (1 if Fixed object exists, 0 otherwise)	0.295	0.083	3.553

Table D.187 (continued): SPF with LNADT, Length Offset, Roadway, Roadside, and Route Dummy Variables: Truck Type

Variable	Description	Coeff.	S.E.	t-stat
LRDSLP00	Proportion of Roadside slope on a segment is 90-100%	-0.355	0.050	-7.111
LRCHCRP	Rock out cropping length on a segment	-1.316	0.288	-4.563
DTREE	Tree group Dummy variable (1 if Tree group exists, 0 otherwise)	0.309	0.099	3.110
LTREG00	Proportion of Tree group on a segment is 90-100%	-0.288	0.089	-3.243
LWHZD00	Water hazard Dummy variable (1 if Water hazard exists, 0 otherwise)	-0.413	0.198	-2.084
SRN3	SR3 Dummy (1 if SR=3, 0 otherwise)	0.708	0.125	5.677
SRN9	SR9 Dummy (1 if SR=95, 0 otherwise)	-0.400	0.061	-6.561
SRN11	SR11 Dummy (1 if SR=11, 0 otherwise)	-0.791	0.075	-10.569
SRN12	SR12 Dummy (1 if SR=12, 0 otherwise)	0.444	0.039	11.446
SRN17	SR17 Dummy (1 if SR=17, 0 otherwise)	0.336	0.065	5.153
SRN18	SR18 Dummy (1 if SR=18, 0 otherwise)	0.524	0.262	2.002
SRN21	SR21 Dummy (1 if SR=21, 0 otherwise)	-0.758	0.072	-10.540
SRN26	SR26 Dummy (1 if SR=26, 0 otherwise)	1.023	0.080	12.845
SRN28	SR28 Dummy (1 if SR=28, 0 otherwise)	0.194	0.066	2.924
SRN31	SR31 Dummy (1 if SR=31, 0 otherwise)	-0.484	0.154	-3.135
SRN97	SR97 Dummy (1 if SR=97, 0 otherwise)	0.735	0.048	15.177
SRN104	SR104 Dummy (1 if SR=104, 0 otherwise)	1.031	0.184	5.594
SRN112	SR112 Dummy (1 if SR=112, 0 otherwise)	-0.241	0.062	-3.857
SRN124	SR124 Dummy (1 if SR=124, 0 otherwise)	0.704	0.094	7.457
SRN127	SR127 Dummy (1 if SR=127, 0 otherwise)	-0.888	0.164	-5.429
SRN129	SR129 Dummy (1 if SR=129, 0 otherwise)	-0.693	0.120	-5.761
SRN141	SR141 Dummy (1 if SR=141, 0 otherwise)	0.533	0.141	3.791
SRN150	SR150 Dummy (1 if SR=150, 0 otherwise)	-0.630	0.127	-4.959
SRN161	SR161 Dummy (1 if SR=161, 0 otherwise)	-0.534	0.146	-3.655
SRN172	SR172 Dummy (1 if SR=172, 0 otherwise)	-0.765	0.290	-2.642
SRN195	SR195 Dummy (1 if SR=195, 0 otherwise)	0.580	0.094	6.150
SRN202	SR202 Dummy (1 if SR=202, 0 otherwise)	-0.482	0.122	-3.949
SRN206	SR206Dummy (1 if SR=206, 0 otherwise)	0.483	0.105	4.610
SRN211	SR211 Dummy (1 if SR=211, 0 otherwise)	0.632	0.164	3.853
SRN221	SR221 Dummy (1 if SR=221, 0 otherwise)	0.443	0.138	3.219
SRN241	SR241 Dummy (1 if SR=241, 0 otherwise)	1.111	0.180	6.176
SRN243	SR243 Dummy (1 if SR=243, 0 otherwise)	0.508	0.166	3.050
SRN260	SR260 Dummy (1 if SR=260, 0 otherwise)	-0.499	0.170	-2.937
SRN261	SR261 Dummy (1 if SR=261, 0 otherwise)	-0.444	0.136	-3.266
SRN272	SR272 Dummy (1 if SR=272, 0 otherwise)	-0.501	0.223	-2.241

Table D.187 (continued): SPF with LNADT, Length Offset, Roadway, Roadside, and Route Dummy Variables: Truck Type

Variable	Description	Coeff.	S.E.	t-stat
SRN290	SR290 Dummy (1 if SR=290, 0 otherwise)	-1.117	0.298	-3.746
SRN302	SR302 Dummy (1 if SR=302, 0 otherwise)	-0.489	0.132	-3.696
SRN395	SR395 Dummy (1 if SR=395, 0 otherwise)	0.704	0.079	8.907
SRN410	SR410 Dummy (1 if SR=410, 0 otherwise)	0.267	0.055	4.892
SRN411	SR411 Dummy (1 if SR=411, 0 otherwise)	-0.925	0.224	-4.123
SRN503	SR503 Dummy (1 if SR=503, 0 otherwise)	0.231	0.074	3.130
SRN504	SR504 Dummy (1 if SR=504, 0 otherwise)	-0.619	0.088	-7.066
SRN510	SR510 Dummy (1 if SR=510, 0 otherwise)	-0.663	0.222	-2.984
SRN542	SR542 Dummy (1 if SR=542, 0 otherwise)	0.492	0.055	8.900
SRN706	SR706 Dummy (1 if SR=706, 0 otherwise)	0.299	0.138	2.167
SRN904	SR904 Dummy (1 if SR=904, 0 otherwise)	0.399	0.185	2.155
SRN906	SR906 Dummy (1 if SR=906 0 otherwise)	1.358	0.274	4.957
SRN970	SR970 Dummy (1 if SR=970, 0 otherwise)	1.170	0.287	4.079
SR502730	SR502 & SR730 Dummy (1 if SR=502 or 730, 0 otherwise)	0.750	0.261	2.875
SR432532	SR432 & SR532 Dummy (1 if SR=432 or 532, 0 otherwise)	0.551	0.194	2.842
SR123169	SR123 & SR169 Dummy (1 if SR=123 or 169, 0 otherwise)	-0.812	0.127	-6.375
SR24165	SR241 & SR165 Dummy (1 if SR=241 or 165, 0 otherwise)	-0.770	0.126	-6.139
Alpha		18.802	0.260	72.199
Number of obs = 426546 Chi squared = 59694.54 Prob>chi2=0.000				
Restricted LL = -122859.4 Log likelihood = -79688.38				
Pseudo R2=0.2724891				

Appendix E: Generalized Advanced SPF (HFN Models) for Individual Crash Types

The 25 crash type's dependent variables were modeled and compared to the corresponding Negative Binomial models. The tables below show the coefficients, alpha, and Log-likelihood at convergence. With the exception of the variable, eang (entering at angle type crash), the HFN models achieved better convergence log-likelihood and alpha. In the case of the variable eang, HFN alpha was higher than NB alpha, but log-likelihood at convergence was lower, implying HFN produces better fit.

Table E.1: Summary of NB and HFN Models for Individual Crash Types

Variable		rdside		rdway		pdo		pinj		evi	
		NB	HFN	NB	HFN	NB	HFN	NB	HFN	NB	HFN
Constant		0.693	-1.333	-6.017	-7.133	-4.335	-5.187	-6.994	-5.190	-3.148	-4.050
LNADT		0.462	0.494	0.963	1.017	0.734	0.766	0.910	0.766	0.639	0.669
Length		1.000	5.986	1.000	7.066	1.000	6.570	1.000	6.567	1.000	7.041
Roadway geometry	A1	-0.031	-	-	-	-0.011	0.011	-0.020	0.011	-0.040	-
	AVGLANEN	-	-	-4.490	-	-	-	-	-	-	-
	DGC1	0.029	0.040	0.012	0.025	0.014	0.031	0.010	0.031	0.027	0.045
	HCANG1	0.000	0.001	-0.001	-0.001	-	-	-	-	-	-
	MK1	-0.468	-0.390	-0.387	-0.328	-0.417	-0.341	-1.250	-0.340	-	-
	NLANE	-	-5.479	-	-4.438	-	-	-	-	-	-
	NLANED	-2.167	-	-	-	-2.876	-2.896	-2.550	-2.895	-2.909	-2.941
	NLANEI	-3.442	-	-	-	-1.518	-1.478	-1.570	-1.475	-2.785	-2.748
	RLNW	-0.067	-0.054	-	-	-	-	-	-	-	-
	SWC19	-2.341	-2.374	-3.123	-3.388	-3.929	-4.331	-2.410	-4.343	-1.882	-1.930
	SWR1001	-	-	-2.299	-	-	-	-	-	-	-
	SWR1023	-	-	-1.537	-1.726	-1.013	-0.990	-	-0.982	-	-
	SWR2367	-	-	-0.642	-	-	-	-	-	-	-
	SWR4523	-0.401	-0.319	-	-	-0.283	-0.169	-	-0.167	-0.516	-0.422
	SWR8901	-	-	-0.615	-0.671	-0.545	-	-	-	-	-
	SWR8910	-0.449	-	-	-	-0.526	-	-1.310	-	-	-
Roadside characteristics	DBRDRAL	-	-	-	-	-	-	-	-	-	-
	DBRGSTR	-	-	-	-	-	-	-	-	-	-
	DCLVEND	-	-	-	-	-	-	-	-	-	-
	DCLVERT	0.574	-0.342	0.342	-0.448	0.252	-0.338	-	-0.336	-	-
	DCURB	-	-	-	-	-	-	-	-	-	-
	DDITCH	0.453	-	-	-	0.423	-0.202	-	-0.205	-	-
	DDRGLET	-	-	-	-	-	-	-	-	-	-
	DFENCE	-	-	-	-	-0.220	0.307	-	0.308	-	-
	DGRDRAL	0.406	-0.334	0.430	-0.511	0.525	-0.397	0.386	-0.396	0.384	-0.503
	DGYWIRE	-	-	-	-	-	-	-	-	-	-
	DIMPACT	-	-	-	-	-	-	-	-	-	-
	DMALBOX	-	-	0.382	-0.401	-	-	-	-	0.615	-
	DMEXOBJ	0.241	-	0.356	-	0.349	-	-	-	0.463	-
	DPDSTAL	-	-	-	-	-	-	-	-	-	-
	DRCHCRP	-	-	-	-	-	-	-	-	-1.345	1.077
	DRDAPRC	-0.167	-	-	-	-	-	-	-	-	-
	DRDSLP	0.204	-	-	-	-	-	1.023	-	-	-
	DSUPRT	-	-	-	-	-	-	-	-	-	-
	DTREE	-	-	-	-	-	-	-	-	-	-

Table E.1 (continued): Summary of NB and HFN Models for Individual Crash Types

Variable		rdside		rdway		pdo		pinj		evi	
		NB	HFN	NB	HFN	NB	HFN	NB	HFN	NB	HFN
	DTREGRP	0.437	-0.348	0.249	-0.477	0.219	-0.448	-	-0.447	-	-
	LBRDRAL	-	-	-	-	-	-	-	-	-	-
	LBRDRL00	-	-	-	-	-	-	-	-	-	-
	LBRDRL60	-	-	-	-	-4.427	-	4.124	-	-	-
	LCLVERT	-2.128	1.333	-	-	-	1.701	-	-	-	-
	LCLVRT00	-	-	-	-	-0.548	-	-	1.708	-	-
	LCLVRT10	-	-	-	-	-	-	-	-	-	-
	LCLVRT20	-	-	-	-	-	-	-	-	-	-
	LCLVRT30	-	-	-	-	-3.652	-	-	-	-	-
	LCLVRT40	-	-	-	-	-	-	-	-	-	-
	LCLVRT50	-	-	-	-	-	-	-	-	-	-
	LCLVRT60	-	-	-	-	-	-	-	-	-	-
	LCURB00	-	-	-	-	-	-	-	-	-	-
	LCURB	-	-	-	-	-	-	-	-	-	-
	LCVT4060	-	-	-1.821	-	-	-	-	-	-	-
	LDITCH	-0.678	-	-	-	-	-	-	-	-	-
	LDITCH00	-	-	-0.461	-	-0.608	-	-0.448	0.234	-0.613	0.695
	LDITCH00	-	-	-	0.250	-	0.231	-	-	-	-
	LDITCH90	0.421	-	-	-	-	-	-	-	-	-
	LFENCE	-	-	-	-	-	-	-	-	-	-
	LFENCE00	-	-	-	-	-	-	-0.487	-	-0.410	0.563
	LFENCE20	-4.161	-	-	-	-	-	-	-	-	-
	LFENCE70	-0.981	-	-	-	-	-	-	-	-	-
	LGRDRL00	-0.818	0.424	-0.803	0.982	-0.980	0.615	-0.863	0.613	-0.717	1.155
	LGRDRL40	-	-	-	-	-	-	-	-	-	-
	LGRDRL50	-	-	-	-	-	-	-	-	-1.678	-
	LGRDRL70	-	-	-1.136	1.543	-0.952	-	-	-	-	-
	LGRDRL80	-0.885	-	-	-	-0.944	-	-	-	-	-
	LGRDRL90	-	-	-	-	-	-	-	-	-	-
	LRCHCRP	-0.941	1.314	-	-	-0.725	1.662	-	1.682	-	-
	LRDSLP	-	-	-	-	-	-	-1.320	-	-	-
	LRDSLP00	-0.427	0.362	-	-	-	-	-	-	-	-
	LRDSLP50	-	-	-	-	-	-	-	-	-	-
	LRDSLP60	-	-	-	-	-	-	-	-	-	-
	LRDSLP70	-	-	-	-	-	-	-	-	-	-
	LRDSLP90	-	-	-	-	-	-	-	-	-	-
	LTREG00	-	-	-	-	-	-	-	-	-	-
	LTREGRP	-0.557	-	-	-	-	-	-	-	-	-
	LTRGRP00	-	-	-0.655	0.756	-0.663	0.316	-	0.318	-	-
Route dummies	SRN3	0.289	0.225	0.558	0.658	0.591	0.642	0.588	0.645	-	-
	SRN6	-	-	-	-	-	-	-	-	-	-
	SRN7	0.213	0.320	-	-	-	-	0.386	-	-	-
	SRN9	-	-	-0.306	-0.151	-	-	-	-	-	-
	SRN11	-0.542	-0.308	-0.442	-	-0.416	-0.196	-	-0.195	-	-
	SRN12	0.229	0.168	0.596	0.600	0.545	0.537	-	0.540	-	-
	SRN14	-	-	-	-	-	-	-0.289	-	-	-
	SRN17	-	-	0.240	-	-	-	-	-	0.416	-
	SRN18	-	-	-	-	-	-	-	-	-	-
	SRN21	-1.092	-1.026	-0.569	-0.451	-0.933	-0.888	-0.782	-0.886	-0.668	-0.586
	SRN22	-	-	1.165	1.563	-	-	-	-	1.173	1.411
	SRN23	-0.442	-0.479	-0.333	-0.434	-	-	-0.752	-	-	-

Table E.1 (continued): Summary of NB and HFN Models for Individual Crash Types

Variable		rdside		rdway		pdo		pinj		evi	
		NB	HFN	NB	HFN	NB	HFN	NB	HFN	NB	HFN
	SRN25	-0.239	-0.232	-	-	-	-	-0.314	-	-	-
	SRN26	-	-	1.155	0.734	1.209	0.781	0.653	0.784	0.921	0.526
	SRN27	-	-	0.375	0.472	-	-	-	-	-	-
	SRN28	-	-	-	-	-	-	0.314	-	-	-
	SRN31	-0.663	-0.496	-0.848	-0.665	-0.806	-0.662	-1.222	-0.661	-	-
	SRN97	0.618	0.486	0.556	0.360	0.638	0.518	0.246	0.520	0.515	0.362
	SRN104	0.546	-	1.081	0.826	-	-	1.066	-	1.038	0.816
	SRN105	-	-	-	-	-	-	-	-	-	-
	SRN106	-	-	-	-	-	-	-	-	-	-
	SRN107	-	-	-	-	-	-	-	-	-	-
	SRN109	-	-	-	-	-	-	-	-	-	-
	SRN112	-	-	-0.226	-	-0.273	-0.200	-	-0.197	-	-
	SRN122	-	-	-	-	-	-	-	-	-	-
	SRN124	0.454	0.236	1.012	0.692	0.829	0.457	-	0.459	-	-
	SRN127	-	-	-	-	-0.939	-0.956	-	-0.954	-	-
	SRN129	-0.981	-0.955	-0.620	-0.466	-0.613	-0.597	-	-0.596	-	-
	SRN141	-	-	-	-	0.445	0.399	-	0.400	-	-
	SRN150	-	-	-	-	-	-	-	-	-	-
	SRN153	-	-	-	-	-	-	-	-	-0.553	-0.472
	SRN155	-	-	-	-	-	-	-	-	0.375	0.246
	SRN161	-	-	-	-	-0.543	-0.416	-	-0.414	-	-
	SRN172	-0.673	-0.795	-	-	-0.789	-1.083	-	-1.062	-	-
	SRN173	-	-	-	-	-	-	-	-	-	-
	SRN195	0.856	0.563	0.292	-	0.622	0.266	-	0.268	0.542	-
	SRN202	-	-	-0.406	-	-	-	-	-	-	-
	SRN203	-	-	-0.562	-0.410	-	-	-	-	-	-
	SRN206	-	-	0.641	0.855	0.544	0.498	-	0.502	-	-
	SRN211	0.432	-	-	-	-	-	-	-	-	-
	SRN215	-2.651	-2.493	-	-	-	-	-	-	-	-
	SRN221	-	-	0.391	-	-	-	-	-	-	-
	SRN231	-0.359	-0.283	-	-	-0.351	-0.320	-	-0.318	-	-
	SRN241	0.762	0.771	-	-	0.621	0.618	-	0.621	-	-
	SRN243	-	-	-	-	0.483	-	-	0.355	-	-
	SRN260	-	-	-	-	-	-	-	-	-	-
	SRN261	-	-	-	-	-	-	-	-	-	-
	SRN272	-0.416	-0.365	-	-	-	-	-	-	-1.625	-1.673
	SRN282	-	-	-	-	-	-	-	-	-	-
	SRN290	-2.127	-2.303	-1.206	-1.248	-1.176	-1.216	-2.662	-1.209	-1.566	-1.659
	SRN302	-	-	-	-	-	-	-	-	-	-
	SRN305	-1.911	-1.878	-	-	-	-	-	-	-	-
	SRN395	0.255	-	0.892	0.650	0.749	0.539	0.682	0.543	-	-
	SRN410	-	-	-	-	-	-	-	-	-	-
	SRN411	-	-	-	-	-	-	-	-	-	-
	SRN503	-	-	-	-	-	-	0.610	-	-	-
	SRN504	-	-	-0.585	-0.394	-0.514	-0.369	-0.579	-0.367	-0.402	-0.365
	SRN507	-	-	-	-	-	-	-	-	-	-
	SRN508	-	-	-	-	-	-	-	-	-	-
	SRN510	-	-	-	-	-	-	-	-	-	-
	SRN539	-	-	-	-	-	-	-	-	-	-
	SRN542	0.376	0.482	0.523	0.743	0.758	0.863	0.355	0.865	-	-
	SRN702	-	-	-	-	-	-	-	-	-	-
	SRN706	-	-	0.575	0.579	-	-	-	-	0.815	0.914
	SRN821	-0.276	-	-	-	-	-	-	-	-	-
	SRN900	-	-	-	-	-	-	-	-	-	-
	SRN904	-	-	0.690	-	0.387	-	-	-	-	-
	SRN906	1.410	1.446	1.687	-	1.996	1.967	-	1.972	-	-

Table E.1 (continued): Summary of NB and HFN Models for Individual Crash Types

Variable		rdside		rdway		pdo		pinj		evi	
		NB	HFN	NB	HFN	NB	HFN	NB	HFN	NB	HFN
	SRN970	-	-	-	-	1.296	0.963	-	0.962	-	-
	SR108109	0.230	0.294	-	-	0.198	0.285	-	0.288	-	-
	SR112150	-0.257	-	-	-	-	-	-	-	-	-
	SR115281	0.441	0.459	-	-	-	-	-	-	-	-
	SR123169	-1.032	-0.903	-0.841	-0.729	-0.883	-0.784	-0.811	-0.783	-0.972	-0.957
	SR141221	0.215	-	-	-	-	-	-	-	-	-
	SR153900	-	-	-0.326	-0.275	-	-	-	-	-	-
	SR160544	-0.933	-0.935	-	-	-0.974	-1.082	-	-1.085	-	-
	SR17107	0.317	-	-	-	-	-	-	-	-	-
	SR174508	-	-	-	-	0.249	-	-	-	-	-
	SR223243	0.496	0.390	-	-	-	-	-	-	-	-
	SR24165	-	-	-	-	0.223	-	-	-	-	-
	SR26022	-0.326	-0.451	-0.878	-1.308	-	-	-	-	-0.961	-1.240
	SR261142	-0.525	-0.591	-	-	-	-	-	-	-	-
	SR26702	0.909	0.535	-	-	-	-	-	-	-	-
	SR432532	-0.583	-0.443	-	-	0.666	0.786	-	0.788	-	-
	SR502730	-	-	-	-	0.713	0.551	-	0.560	-	-
	SR510902	-	-	-	-	-0.554	-0.453	-	-0.449	-	-
	SR534105	0.278	0.285	-	-	0.288	0.269	-	0.273	-	-
Alpha /(Tau)*		16.329	14.906	37.862	35.282	37.862	19.130	81.708	19.119	74.876	64.944
Log-likelihood		-74728.370	-73534.580	-69300.410	-68193.770	-78755.740	-77367.980	-30054.960	-27365.580	-33209.900	-32737.690

Table E.1 (continued): Summary of NB and HFN Models for Individual Crash Types

Variable		loinj		veh1		veh2		veh3		veh4	
		NB	HFN	NB	HFN	NB	HFN	NB	HFN	NB	HFN
Constant		-4.476	-5.503	0.268	-0.443	-7.634	-8.701	-14.534	-15.570	-5.719	-27.030
LNADT		0.727	0.758	0.476	0.479	1.071	1.095	1.153	1.199	0.658	2.324
Length		1.000	6.770	1.000	6.409	1.000	6.716	1.000	8.077	1.000	7.209
Roadway geometry	A1	-0.012	0.011	-0.024	-	-	-	-	-	0.033	-
	AVGLANEN	-	-	-	-	-	-	-	-	-	-
	DGC1	0.011	0.028	0.020	0.035	0.021	0.035	-	-	-0.041	-
	HCANG1	-	-	-	-	-0.001	-0.001	-	-	-	0.004
	MK1	-0.341	-0.295	-0.322	-0.236	-0.481	-0.458	-2.500	-3.210	-	-
	NLANE	-	-	-	-	-	-	-	-	-	-
	NLANED	-2.903	-2.919	-2.039	-2.024	-3.133	-3.085	-	-	-1.333	-
	NLANEI	-1.482	-1.424	-3.766	-3.844	-1.634	-1.534	-	-	-0.966	-
	RLNW	0.020	0.029	-0.080	-0.067	0.056	0.067	-	-	-0.012	-
	SWC19	-3.934	-4.260	-2.127	-2.124	-3.915	-4.163	-	-	-	-
	SWR1001	-	-	-	-	-	-	-	-	-	-
	SWR1023	-1.034	-0.949	-	-	-1.953	-1.884	-	-	-	-
	SWR2367	-	-	-	-	-0.707	-	-	-	-	-
	SWR4523	-0.313	-0.203	-0.332	-0.280	-	-	-	-	0.427	3.612
	SWR8901	-	-	-	-	-	-	-	-	-	-
	SWR8910	-0.533	-	-0.488	-	-	-	-	-	-	-
Roadside characteristics	DBRDRAL	-	-	-	-	-	-	-	-	0.435	-2.132
	DBRGSTR	-	-	-	-	-	-	-	-	-	-
	DCLVEND	-	-	-	-	-	-	0.594	-	0.405	-1.547
	DCLVERT	-	-	-	-0.299	-	-	-	-0.774	-	-
	DCURB	-	-	-0.539	-	-	-	-	-	-	-
	DDITCH	0.483	-0.403	0.497	-	0.393	-0.448	-	-0.416	-	-
	DDRGLET	-	-	-	-	-	-	-	-	-	-
	DFENCE	-0.204	0.216	0.276	-	-0.297	-	-	-	-	-
	DGRDRAL	0.465	-0.444	-0.381	-	-	-	-	-1.029	-	-
	DGYWIRE	-	-	-0.487	-	-	-	-	-	-	-
	DIMPACT	-	-	-	-	-	-	-	-	1.031	-
	DMAILBOX	-	-	-	-	-	-	-	-	-	-
	DMEXOBJ	0.417	-	-	-	0.606	-0.328	-	-	-	-
	DPDSTAL	-	-	-	-	-	-	-	-	-	-
	DRCHCRP	-	-	-	-	-	-	-	-	-	-
	DRDAPRC	-	-	-	-	-	-	-	-	-	-
	DRDSLP	-	-	-	-	-	-	-	-	-	-
	DSUPRT	-	-	-	-	-	-	-	-	-	-
	DTREE	-	-	-	-	-	-	-	-	-	-
	DTREGRP	-	-	-	-	-	-	-	-	-	-
	LBRDRAL	-	-	-	-	-	-	-	-	-	-
	LBRDRL00	-	-	-	0.284	-	-	-	-1.118	0.537	-
	LBRDRL60	-	-	-	-	-	-	-	-	-	-
	LCLVERT	-	-	-	-	-	-	-	-	-	-

Table E.1 (continued): Summary of NB and HFN Models for Individual Crash Types

Variable		loinj		veh1		veh2		veh3		veh4	
		NB	HFN	NB	HFN	NB	HFN	NB	HFN	NB	HFN
	LCLVRT00	-	-	-2.197	2.569	-	-	-	-	-	-
	LCLVRT10	-	-	-	-	-	-	-	-	-	-
	LCLVRT20	-	-	-	-	-	-	-	-	-	-
	LCLVRT30	-	-	-4.194	3.280	-	-	-	-	-	-
	LCLVRT40	-	-	-1.859	3.438	-	-	-	-	-	-
	LCLVRT50	-	-	-3.108	-	-	-	-	-	-	-
	LCLVRT60	-	-	-2.458	-	-	-	-	-	-	-
	LCURB00	-	-	-	-	-	-	-	-	-	-
	LCURB	-	-	-	-	-	-	-	-	-	-
	LCVT4060	-	-	-	-	-	-	-	-	-	-
	LDITCH	-	-	0.133	-	-	-	-	-	-	-
	LDITCH00	-	0.353	-	-	-	-	-	-	-	-
	LDITCH00	-0.665	-	-0.727	0.214	-0.866	0.925	-	-	-	-
	LDITCH80	-	-	-	-	-	-	-	-	-	-
	LFENCE	-	-	-	-	-	-	-	-	-	-
	LFENCE00	-	-	-	-	-	-	-	-	-	-
	LFENCE20	-	-	-	-	-	-	-	-	4.651	-18.500
	LFENCE70	-	-	-1.069	-	-	-	-	-	-	-
	LGRDRL00	-0.932	0.496	-0.619	-	-0.432	0.317	-	1.183	-0.381	-
	LGRDRL40	-	-	-	-	-	-	-	-	-	-
	LGRDRL50	-	-	-	-	-	-	-	-	-	-
	LGRDRL70	-0.937	-	-	-	-	-	-	-	-	-
	LGRDRL80	-	-	-	-	-	-	-	-	-	-
	LGRDRL90	-	-	-	-	-	-	-	-	0.698	-
	LRCHCRP	-	-	-	1.509	-	-	-	-	-	-
	LRDSLP	-	-	-	-	-	-	-	-	-	-
	LRDSLP00	-	-	-	-	-	-	-	-	-	-
	LRDSLP50	-	-	-	-	-	-	-	-	0.724	-
	LRDSLP60	-	-	-	-	-	-	-	-	0.497	-
	LRDSLP70	-	-	-	-	-	-	-	-	-	-
	LRDSLP90	-	-	-	-	-	-	-	-	-	-
	LTREG00	-	-	-	-	-	-	-	-	-	-
	LTREGRP	-	-	-	-0.503	-	-	-	-	-	-
	LTRGRP00	-0.511	-	-	0.505	-0.437	0.715	-	-	-	-
Route dummies	SRN3	0.522	0.599	-	-	-	-	-	-	0.320	-
	SRN6	-	-	-	-	-	-	-	-	-	-
	SRN7	-	-	-	-	-	-	-	-	-	-
	SRN9	-0.312	-0.163	-	-	-	-	-	-	-	-
	SRN11	-0.458	-0.174	-0.713	-0.482	-	-	-	-	-	-
	SRN12	0.517	0.535	0.342	0.353	0.496	0.469	-	-	-	-
	SRN14	-	-	-	-	-	-	-	-	-	-
	SRN17	-	-	0.315	-	-	-	-	-	-	-
	SRN18	-	-	0.653	0.537	-	-	-	-	-0.347	-
	SRN21	-0.955	-0.864	-1.015	-0.957	-0.861	-0.874	-	-	-	-

Table E.1 (continued): Summary of NB and HFN Models for Individual Crash Types

Variable		loinj		veh1		veh2		veh3		veh4	
		NB	HFN	NB	HFN	NB	HFN	NB	HFN	NB	HFN
	SRN22	-	-	-	-	-	-	-	-	0.809	-
	SRN23	-	-	-0.419	-0.516	-0.890	-1.052	-	-	-	-
	SRN25	-0.156	-	-0.209	-0.214	-0.235	-0.274	-1.537	-1.371	-	-
	SRN26	1.105	0.692	1.041	0.609	0.862	0.478	-	-	-	-
	SRN27	-	-	-0.344	-0.339	-	-	-	-	0.485	-
	SRN28	-	-	0.165	-0.222	-	-	-	-	-	-
	SRN31	-	-	-0.738	-0.589	-0.775	-0.848	-	-	-	-
	SRN97	0.591	0.495	0.686	0.585	0.330	-	-	-	-	-
	SRN104	-	-	-	-	-	-	-	-	0.721	-
	SRN105	-	-	-	-	-	-	-	-	0.304	-
	SRN106	-	-	-	-	-	-	-	-	-	-
	SRN107	-	-	-	-	-	-	-	-	0.795	-
	SRN109	-	-	-	-	-	-	-	-	0.756	-
	SRN112	-	-	-	-	-	-	-	-	-	-
	SRN122	-	-	-	-	-	-	-	-	-	-
	SRN124	-	-	0.753	0.441	0.601	0.435	-	-	0.772	-
	SRN127	-	-	-0.335	-0.345	-1.067	-1.286	-	-	-	-
	SRN129	-0.642	-0.569	-0.949	-0.950	-0.940	-0.921	-	-	-	-
	SRN141	-	-	-	-	-	-	-	-	-	-
	SRN150	-	-	-0.924	-0.618	-	-	-	-	-	-
	SRN153	-	-	-	-	-	-	-	-	-	-
	SRN155	-	-	-	-	-	-	-	-	-	-
	SRN161	-0.569	-0.386	-0.338	-	-	-	-	-	-	-
	SRN172	-	-	-	-	-1.230	-1.226	-	-	-	-
	SRN173	-	-	-	-	-	-	-	-	-	-
	SRN195	-	-	-	-	-	-	-	-	-	-
	SRN202	-	-	-	-	-	-	-	-	-	-
	SRN203	-	-	-	-	-	-	-	-	-	-
	SRN206	-	-	-	-	0.945	1.029	-	-	-	-
	SRN211	-	-	-	-	-	-	-	-	-	-
	SRN215	-	-	-	-	-	-	-	-	-	-
	SRN221	-	-	-	-	-	-	-	-	-	-
	SRN231	-	-	-	-	-	-	-	-	-	-
	SRN241	-	-	-	-	-	-	-	-	-	-
	SRN243	-	-	-	-	-	-	-	-	-	-
	SRN260	-	-	-	-	-	-	-	-	-	-
	SRN261	-	-	-	-	-	-	-	-	-	-
	SRN272	-	-	-	-	-	-	-	-	-	-
	SRN282	-	-	-	-	-	-	-	-	0.811	-
	SRN290	-	-	-	-	-	-	-	-	-	-
	SRN302	-	-	-	-	-	-	-	-	-	-
	SRN305	-	-	-	-	-	-	-	-	0.281	-
	SRN395	0.690	0.496	-	-	-	-	-	-	-	-
	SRN410	-	-	-	-	-	-	-	-	-	-

Table E.1 (continued): Summary of NB and HFN Models for Individual Crash Types

Variable		loinj		veh1		veh2		veh3		veh4	
		NB	HFN	NB	HFN	NB	HFN	NB	HFN	NB	HFN
	SRN411	-	-	-	-	-	-	-	-	-	-
	SRN503	-	-	-	-	-	-	-	-	-	-
	SRN504	-0.574	-0.404	-0.481	-0.373	-0.601	-0.459	-	-	-	-
	SRN507	-	-	-	-	-	-	-	-	-	-
	SRN508	-	-	-	-	-	-	-	-	-	-
	SRN510	-	-	-	-	-	-	-	-	0.461	-
	SRN539	-	-	-	-	-	-	-	-	-	-
	SRN542	0.728	0.891	0.232	0.328	0.803	0.975	0.966	1.452	-	-
	SRN702	-	-	-	-	-	-	-	-	-	-
	SRN706	-	-	-	-	-	-	1.628	1.579	1.037	-
	SRN821	-	-	-	-	-	-	-	-	-	-
	SRN900	-	-	-	-	-	-	-	-	-	-
	SRN904	-	-	-	-	-	-	-	-	-	-
	SRN906	-	-	-	-	-	-	-	-	-	-
	SRN970	1.184	0.916	1.284	0.913	-	-	-	-	-	-
	SR108109	-	-	0.180	0.225	-	-	-	-	-	-
	SR112150	-	-	-	-	-	-	-	-	-	-
	SR115281	-	-	-	-	-	-	-	-	-	-
	SR123169	-0.974	-0.867	-1.139	-1.015	-0.839	-0.823	-	-	-	-
	SR141221	-	-	-	-	-	-	-	-	-	-
	SR153900	-	-	-	-	-	-	-	-	-	-
	SR160544	-	-	-	-	-	-	-	-	-	-
	SR17107	-	-	-	-	-	-	-	-	-	-
	SR174508	-	-	-	-	-	-	-	-	-	-
	SR223243	-	-	-	-	-	-	-	-	-	-
	SR24165	-	-	-	-	-	-	-	-	-	-
	SR26022	-0.270	-0.293	-0.354	-0.512	-	-	-	-	-	-
	SR261142	-	-	-0.602	-0.742	-	-	-	-	-	-
	SR26702	-	-	-	-	-	-	-	-	-	-
	SR432532	0.560	0.725	-0.933	-0.838	-	-	-	-	0.752	-
	SR502730	-	-	-	-	-	-	-	-	-	-
	SR510902	-	-	-	-	-	-	-	-	-	-
	SR534105	-	-	-	-	-	-	-	-	-	-
Alpha /(Tau)*		25630	23477	12277	10493	83288	76879	955667	993.199	(-2319)	6880313
Log-likelihood		-74668250	-73411480	-91605450	-89461500	-43974230	-43513770	-7365.159	-7272731	-2939569	-1294987

Table E.1 (continued): Summary of NB and HFN Models for Individual Crash Types

Variable		rend		sdirsw		sdirt		sdiroth		headon	
		NB	HFN	NB	HFN	ZI-NB	HFN	NB	HFN	NB	HFN
Constant		-12.058	-13.609	-9.647	-10.933	-2.791	-8.966	-9.106	-9.875	-11.426	-11.657
LNADT		1.507	1.584	1.122	1.222	0.196	0.873	1.148	1.170	0.707	0.662
Length		1.000	6.925	1.000	7.997	1.000	9.407	1.000	8.256	1.000	6.611
Roadway geometry	A1	-	-	-	-	-	-	-	-	-	-
	AVGLANEN	-	-	-	-	-	-	-	-	-	-
	DGC1	-0.040	-	-	-	-0.028	-	-	-	0.048	0.066
	HCANG1	-0.002	-0.002	-	-	-0.001	-0.005	-	-	-	-
	MK1	-0.636	-0.454	-	-	-	-	-	-	-	-
	NLANE	-	-	-	-	-	-	-	-	-	-
	NLANED	-3.350	-3.314	-	-	-	-	-	-	-	-
	NLANEI	-1.650	-1.520	-5.335	-5.515	-1.095	-5.204	-6.026	-6.096	-	-
	RLNW	0.068	0.069	-	-	-	-	-	-	-	-
	SWC19	-2.314	-2.593	-	-	-	-	-	-	-	-
	SWR1001	-	-	-	-	-	-	-	-	-	-
	SWR1023	-	-	-	-	-	-	-	-	-	-
	SWR2367	-1.205	-	-	-	-	-	-	-	-	-
	SWR4523	-	-	-	-	-	-	-	-	-	-
	SWR8901	-	-	-	-	-	-	-	-	-	-
	SWR8910	-	-	-	-	-	-	-	-	-	-
Roadside characteristics	DBRDRAL	-	-	-	-	-	-	-	-	-	-
	DBRGSTR	-	-	-	-	-	-	-	-	-	-
	DCLVEND	-	-	-	-	-	-	-	-0.868	-	-
	DCLVERT	0.785	-0.532	-	-0.815	-	-	-	-	-	-1.791
	DCURB	-	-	-	-	-	-	-	-	-	-
	DDITCH	-	-0.297	1.315	-	-	-	-	-	-	-
	DDRGLET	-	-	-	-1.548	-	-	-	-1.014	-1.994	1.652
	DFENCE	-	-	-	-	-	-1.174	-	-	-	-
	DGRDRAL	-	-0.985	-	-1.206	-	-	-	-1.102	-	-
	DGYWIRE	-	-	-	-	-	-	-	-	-	-
	DIMPACT	-	-	-	-	-	-	-	-	-	-
	DMAILBOX	-	-	-	-	-	-	-	-	-	-
	DMFXOBJ	-	-	-	-	-	-	-	-	-	-
	DPDSTAL	-	-	-1.338	-	-	-	-	-	-	-
	DRCHCRP	-	-	-	-	-	-	-	-	-	-
	DRDAPRC	-	-	-	-	-	-1.123	-	-	-	-
	DRDSLP	-	-	-	-	-	-	-	-	-	-
	DSUPRT	-	-	-	1.073	-	-	-	-	-	-
	DTREE	-	-	-	-	-	-	-	-	-	-

Variable	rend		sdirsw		sdirt		sdiroth		headon	
	NB	HFN	NB	HFN	ZI-NB	HFN	NB	HFN	NB	HFN
DTREGRP	-	-0.420	-	-	-	-	-	-	-	-
LBRDRAL	-	-	-	-	-	-	-	-	-	-
LBRDRL00	-	-	-	-	-	-	-	-	-	-
LBRDRL60	-	-	-	-	-	-	-	-	-	-
LCLVERT	-	-	-	-	-	-	-	-	-	18.270

Table E.1 (continued): Summary of NB and HFN Models for Individual Crash Types

Variable		rend		sdirsw		sdirt		sdiroth		headon	
		NB	HFN	NB	HFN	ZI-NB	HFN	NB	HFN	NB	HFN
	LCLVRT00	-	2.373	-	-	-	-	-	-	-	-
	LCLVRT10	-	-	-	-	-	-	-	-	-	-
	LCLVRT20	-	-	-	-	-	-	-	-	-	-
	LCLVRT30	-	-	-	-	-	-	-	-	-	-
	LCLVRT40	-	-	-	-	-	-	-	-	-	-
	LCLVRT50	-	-	-	-	-	-	-	-	-	-
	LCLVRT60	-	-	-	-	-	-	-	-	-	-
	LCURB00	-	-	-	-	-	-	-	-	-	-
	LCURB	-	-	-	-	-	-	-	-	-	-
	LCVT4060	-	-	-	-	-	-	-	-	-	-
	LDITCH	-	-	-	-	-	-	-	-	-	-
	LDITCH00	-	0.474	-	-	-	-	-	-	-	-
	LDITCH00	-	-	-1.604	-	-	-	-	-	-	-
	LDITCH90	-	-	-	-	-	-	-	-	-	-
	LFENCE	-	-	-	-	-	-	-	-	-	-
	LFENCE00	-	-	-	-	-	-	-	-	-	-
	LFENCE20	-	-	-	-	-	-	-	-	-	-
	LFENCE70	-	-	-	-	-	-	-	-	-	-
	LGRDRL00	-0.972	0.723	-	1.477	-0.557	2.096	-	1.554	-	-
	LGRDRL40	-	-	-	-4.370	-	-	-	-	-	-
	LGRDRL50	-	-	-	-	-	-	-	-	-	-
	LGRDRL70	-	-	-	-	-	-	-	-	-	-
	LGRDRL80	-	-	-	-	-	-	-	-	-	-
	LGRDRL90	-	-	-	-	-	-	-	-	-	-
	LRCHCRP	-	1.951	-	-	-	-	-	-	-	-
	LRDSLP	-0.402	-	-	-	-	-	-	-	-	-
	LRDSLP00	-	-	-	-	-	-	-	1.016	-	0.731
	LRDSLP50	-	-	-	-	-	-	-	-	-	-
	LRDSLP60	-	-	-	-	-	-	-	-	-	-
	LRDSLP70	-	-	-	-	-	-	-	3.553	-	-
	LRDSLP90	-	-	-	-	-	-	-	-	-	-
	LTREG00	-	-	-	-	-	-	-2.307	-	-	-
	LTREGRP	-	-	-	-	-	-	-	-	-	-
	LTRGRP00	-	1.468	-	-	-	-	-	-	-	-
Route dummies	SRN3	-	-	-	-	-	-	-	-	-	-
	SRN6	-	-	-	-	-	-	-	-	-	-
	SRN7	-	-	-	-	0.274	-	-	-	-	-
	SRN9	-	-	-	-	-	-	-	-	-	-
	SRN11	-	-	-	-	-	-	-	-	-	-
	SRN12	0.273	0.290	-	-	0.125	1.696	0.840	0.667	-	-
	SRN14	-	-	-	-	-	-	-	-	-	-
	SRN17	-	-	-	-	-	-	1.064	-	-	-
	SRN18	-	-	-	-	-	-	-	-	-	-
	SRN21	-1.335	-1.373	-	-	-	-	-	-	-1.279	-1.585

Table E.1 (continued): Summary of NB and HFN Models for Individual Crash Types

Variable		rend		sdirsw		sdirt		sdiroth		headon	
		NB	HFN	NB	HFN	ZI-NB	HFN	NB	HFN	NB	HFN
	SRN22	-	-	-	-	-	-	-	-	-	-
	SRN23	-	-	-	-	-	-	-	-	-	-
	SRN25	-1.138	-1.003	-	-	-	-	-	-	-	-
	SRN26	-	-	-	-	-	-	1.869	-	-	-
	SRN27	-	-	-	-	-	-	-	-	-	-
	SRN28	-	-	-	-	-	-	1.608	1.116	-	-
	SRN31	-	-	-	-	-	-	-	-	-	-
	SRN97	-	-	-	-	-	-	-	-	-	-
	SRN104	-	-	-	-	-	-	-	-	-	-
	SRN105	-	-	-	-	-	-	-	-	-	-
	SRN106	-	-	-	-	-	-	-	-	-	-
	SRN107	-	-	-	-	-	-	-	-	-	-
	SRN109	-	-	-	-	-	-	-	-	-	-
	SRN112	-	-	-	-1.259	-	-	-	-	-	-
	SRN122	-	-	-1.663	-	-	-	-	-	-	-
	SRN124	-	-	-	-	-	-	-	-	-	-
	SRN127	-	-	-	-	-	-	-	-	-	-
	SRN129	-	-	-	-	-	-	-	-	-	-
	SRN141	-	-	-	-	-	-	-	-	-	-
	SRN150	-	-	-	-	-	-	-	-	-	-
	SRN153	-	-	-	-	-	-	-	-	-	-
	SRN155	-	-	-	-	0.256	-	-	-	-	-
	SRN161	-	-	-	-	-	-	-	-	-	-
	SRN172	-	-	-	-	-	-	-	-	-	-
	SRN173	-	-	-	-	-	-	-	-	-	-
	SRN195	-	-	-	-	-	-	-	-	-	-
	SRN202	-	-	-	-	-	-	-	-	-	-
	SRN203	-	-	-	-	-	-	-	-	-	-
	SRN206	-	-	-	-	-	-	-	-	-	-
	SRN211	-	-	-	-	-	-	-	-	-	-
	SRN215	-	-	-	-	-	-	-	-	-	-
	SRN221	-	-	-	-	-	-	-	-	-	-
	SRN231	-	-	-	-	0.394	-	-	-	-1.621	-1.750
	SRN241	-	-	-	-	-	-	-	-	-	-
	SRN243	-	-	-	-	-	-	-	-	-	-
	SRN260	-	-	-	-	-	-	-	-	-	-
	SRN261	-	-	-	-	-	-	-	-	-	-
	SRN272	-	-	-	-	-	-	-	-	-	-
	SRN282	-	-	-	-	-	-	-	-	-	-
	SRN290	-	-	-	-	-	-	-	-	-	-
	SRN302	-	-	-	-	-	-	-	-	-	-
	SRN305	-	-	-	-	-	-	-	-	-	-
	SRN395	-	-	-	-	-	-	-	-	-	-
	SRN410	-	-	-	-	-	-	0.913	0.890	-	-

Table E.1 (continued): Summary of NB and HFN Models for Individual Crash Types

Variable		rend		sdirsw		sdirt		sdiroth		headon	
		NB	HFN	NB	HFN	ZI-NB	HFN	NB	HFN	NB	HFN
	SRN411	-	-	-	-	-	-	-	-	-	-
	SRN503	-	-	-	-	-	-	-	-	-	-
	SRN504	-0.919	-0.656	-	-	-	-	-	-	-2.174	-2.036
	SRN507	-	-	-	-	-	-	-	-	-	-
	SRN508	-	-	-	-	-	-	-	-	-	-
	SRN510	-	-	-	-	-	-	-	-	-	-
	SRN539	-	-	-	-	-	-	-	-	-	-
	SRN542	0.618	0.810	-	-	-	-	1.204	1.272	-	-
	SRN702	-	-	-	-	-	-	-	-	-	-
	SRN706	-	-	-	-	-	-	-	-	-	-
	SRN821	-	-	-	-	-	-	-	-	-	-
	SRN900	-	-	-	-	-	-	-	-	-	-
	SRN904	-	-	-	-	-	-	-	-	-	-
	SRN906	-	-	-	-	-	-	-	-	-	-
	SRN970	-	-	-	-	-	-	-	-	-	-
	SR108109	-	-	-	-	-	-	-	-	-	-
	SR112150	-	-	-	-	-	-	-	-	-	-
	SR115281	-	-	-	-	-	-	-	-	-	-
	SR123169	-	-	-	-	-	-	-	-	-	-
	SR141221	-	-	-	-	-	-	-	-	-	-
	SR153900	-	-	-	-	-	-	-	-	-	-
	SR160544	-	-	-	-	-	-	-	-	-	-
	SR17107	-	-	-	-	-	-	-	-	-	-
	SR174508	-	-	-	-	-	-	-	-	-	-
	SR223243	-	-	-	-	-	-	-	-	-	-
	SR24165	-	-	-	-	-	-	-	-	-	-
	SR26022	-	-	-	-	-	-	-	-	-	-
	SR261142	-	-	-	-	-	-	-	-	-	-
	SR26702	-	-	-	-	-	-	-	-	-	-
	SR432532	-	-	-	-	-	-	-	-	-	-
	SR502730	-	-	-	-	-	-	-	-	-	-
	SR510902	-	-	-	-	-	-	-	-	-	-
	SR534105	-	-	-	-	-	-	-	-	-	-
Alpha /(Tau)*		170215	169877	1282526	1231383	(2.166)	3760706	1282526	1005835	1527571	1367394
Log-likelihood		-18851890	-18573880	-3810248	-3737504	-3320204	-1960572	-4526843	-4467507	-4820279	-4785086

Table E.1 (continued): Summary of NB and HFN Models for Individual Crash Types

Variable		odirsw		odiroth		fobj		eang		oturn	
		NB	HFN	NB	HFN	NB	HFN	NB	HFN	NB	HFN
Constant		-6.162	-7.199	-6.515	-7.670	-0.891	-1.726	-22.240	-23.240	-3.082	-4.064
LNADT		0.897	0.981	0.977	1.055	0.466	0.507	1.553	1.695	0.083	0.113
Length		1.000	6.409	1.000	7.315	1.000	5.271	1.000	3.194	1.000	6.593
Roadway geometry	A1	-	-	-	-	-0.032	-0.013	-	-	-0.040	-
	AVGLANEN	-	-	-	-	-	-	-	-	-	-
	DGC1	0.045	0.066	0.050	0.073	0.032	0.044	-0.054	-	0.031	0.044
	HCANG1	-	-	-	-	-	-	-	-	0.001	0.001
	MK1	-	-	-3.669	-3.195	-0.632	-0.526	-5.236	-	-	-
	NLANE	-	-	-	-	-	-	-	-	-	-
	NLANED	-	-	-	-	-	-	-	-	-	-
	NLANEI	-6.329	-6.556	-6.540	-6.757	-5.335	-5.416	-3.879	-4.322	-	-
	RLNW	-	-	-	-	-0.069	-0.055	0.590	0.598	-0.167	-0.161
	SWC19	-	-	-	-	-2.839	-2.837	-	-	-4.879	-5.624
	SWR1001	-	-	-	-	-	-	-	-	-	-
	SWR1023	-	-	-	-	-	-	-	-	-	-
	SWR2367	-	-	-	-	-	-	-	-	-	-
	SWR4523	-	-	1.032	1.299	-0.354	-0.280	-	-	-0.615	-0.481
	SWR8901	-	-	-	-	-	-	-	-	-	-
	SWR8910	-	-	-	-	-	-	-	-	-1.512	-1.312
Roadside characteristics	DBRDRAL	-	-1.274	-	-	-	-	-	-	-	-
	DBRGSTR	-	-	-	-1.573	-	-	-	-	-	-
	DCLVEND	-	-	-	-	-	-	-	-1.569	-	-
	DCLVERT	-	-	-	-0.710	0.574	-0.298	-	-	0.755	-0.519
	DCURB	-	-	-	-	-	-	-	-	-0.860	1.229
	DDITCH	0.763	-	-	-	0.170	-	-	-	0.254	-
	DDRGLET	-	-	-	-	0.274	-	-	-	-	-
	DFENCE	-	-1.341	-	-	-0.226	-	-	-	-	-
	DGRDRAL	-	-0.527	-	-0.539	0.478	-0.504	-	-	0.354	-
	DGYWIRE	-	-	-	-	-	-	-	-	-	-
	DIMPACT	-	-	-	-	-	-	-	-	-	-
	DMALBOX	-	-	-	-	-	-	-	-	-	-
	DMEXOBJ	-	-	-	-	-	-	-	-	0.488	-
	DPDSTAL	-	-	-	-	-	-	-	-	-	-
	DRCHCRP	-	-	-	-	-	-	-	-	-	-
	DRDAPRC	-	-	-	-	-0.195	-	1.761	-0.890	-	-
	DRDSLP	-	-	-	-	0.353	-	-	-	-	-
	DSUPRT	-	-	-	-	-	-	-	-	-	-
	DTREE	-	-	-	-	0.256	-0.331	-	-	-	-
	DTREGRP	-	-	-	-	0.240	-0.306	-	-	-	-
	LBRDRAL	-	-	-	-	-	-	-	-	-1.436	2.464
	LBRDRL00	-	-	-	-	-	-	-	-	-	-
	LBRDRL60	-	-	-	-	-	-	-	-	-	-
	LCLVERT	-	-	-	-	-1.996	1.120	-	-4.169	-4.072	3.997

Table E.1 (continued): Summary of NB and HFN Models for Individual Crash Types

Variable		odirsw		odiroth		fobj		eang		oturn	
		NB	HFN	NB	HFN	NB	HFN	NB	HFN	NB	HFN
	LCLVRT10	-	-	-	-	-	-	-	-	-	-
	LCLVRT20	-	-	-	-	-	-	-	-	-	-
	LCLVRT30	-	-	-	-	-	-	-	-	-	-
	LCLVRT40	-	-	-	-	-	-	-	-	-	-
	LCLVRT50	-	-	-	-	-	-	-	-	-	-
	LCLVRT60	-	-	-	-	-	-	-	-	-	-
	LCURB00	-	-	-	1.837	-	-	-	-	-	-
	LCURB	-	-	-	-	-	-	-	-	-	-
	LCVT4060	-	-	-	-	-	-	-	-	-	-
	LDITCH	-	-	-	-	-	-	-	-	-	-
	LDITCH00	-1.217	-	-	-	-	-	-	-	-0.683	-
	LDITCH00	-	0.868	-	-	-0.336	-	-	-	-	-
	LDITCH90	-	-	-	-	-	-	-	-	-	-
	LFENCE	-1.288	3.668	-0.904	-	-	-	-	-	-	-
	LFENCE00	-	-	-	-	-	-	-	-	-	-
	LFENCE20	-	-	-	-	-	-	-	-	-	-
	LFENCE70	-	-	-	-	-	-	-	-	-	-
	LGRDRL00	-	-	-	-	-0.751	0.442	-	-	-1.181	0.878
	LGRDRL40	-	-	-	-	-	-	-	-	-2.817	-
	LGRDRL50	-	-	-	-	-	-	-	-	-	-
	LGRDRL70	-	-	-	-	-	-	-	-	-1.346	2.492
	LGRDRL80	-	-	-	-	-0.948	-	-	-	-	-
	LGRDRL90	-	-	-	-	-	-	-	-	-1.852	-
	LRCHCRP	-	-	-	-	-0.772	1.319	-	-	-	-
	LRDSLP	-	-	-	-	-	-	-	-	-	-
	LRDSLP00	-	-	-	0.839	-0.466	0.334	-	-	-0.483	0.435
	LRDSLP50	-	-	-	-	-	-	-	-	-	-
	LRDSLP60	-	-	-	-	-	-	-	-	-	-
	LRDSLP70	-	-	-	-	-0.447	-	-	-	-	-
	LRDSLP90	-	-	-	-	-	-	-	-	-	-
	LTREG00	-	-	-	-	-0.280	-	-	-	-	-
	LTREGRP	-	-	-	-	-	-	-	-	-	-
	LTRGRP00	-	-	-	-	-	-	-	-	-	-
Route dummies	SRN3	-	-	-	-	0.329	0.307	-	-	-	-
	SRN6	-	-	-	-	0.219	0.215	-	-	-	-
	SRN7	-	-	-	-	0.224	0.286	-	-	-	-
	SRN9	-	-	-	-	-	-	-	-	-	-
	SRN11	-1.403	-1.609	-	-	-0.499	-0.298	-	-	-0.964	-0.712
	SRN12	-	-	0.590	0.710	0.291	0.265	-	-	-	-
	SRN14	-	-	-	-	-	-	-1.202	-1.226	-	-
	SRN17	-	-	-	-	0.160	-	-	-	0.685	0.437
	SRN18	-	-	-	-	0.863	0.946	-	-	-0.722	-0.785
	SRN21	-1.173	-0.810	-2.414	-	-1.146	-1.041	1.869	2.212	-1.430	-1.351
	SRN22	-	-	-	-	-0.479	-0.544	-	-	-	-
	SRN23	-	-	-	-	-0.752	-0.750	-	-	-0.391	-0.489

Table E.1 (continued): Summary of NB and HFN Models for Individual Crash Types

Variable		odirsw		odiroth		fobj		eang		oturn	
		NB	HFN	NB	HFN	NB	HFN	NB	HFN	NB	HFN
	SRN25	-	-	-	-	-0.161	-	-	-	-0.672	-0.669
	SRN26	-	-	-	-	0.765	0.412	2.497	2.209	1.221	0.842
	SRN27	-	-	-1.083	-	-0.525	-0.532	-	-	-	-
	SRN28	-	-	-	-	-	-	-	-	0.526	0.200
	SRN31	-	-	-	-	-0.861	-0.662	-	-	-0.828	-0.766
	SRN97	-	-	-	-	0.482	0.413	-1.613	-1.123	1.013	0.871
	SRN104	-	-	-	-	0.634	-	-	-	-	-
	SRN105	-	-	-	-	0.337	0.345	-	-	-	-
	SRN106	-1.509	-	-	-	0.296	0.464	-	-	-1.096	-0.738
	SRN107	-	-	-	-	-	-	-	-	-	-
	SRN109	-	-	-	-	0.282	0.339	-	-	-	-
	SRN112	0.744	1.085	-	-	-	-	-	-	-0.766	-0.557
	SRN122	-	-	-	-	-	-	-	-	-	-
	SRN124	-	-	1.079	-	-	-	-	-	1.106	0.858
	SRN127	-	-	-	-	-	-	-	-	-	-
	SRN129	-	-	-	-	-1.062	-1.070	-	-	-1.308	-1.235
	SRN141	-	-	-	-	-	-	-	-	-	-
	SRN150	-	-	-	-	-0.510	-0.357	-	-	-1.491	-1.169
	SRN153	-	-	-	-	-	-	-	-	-	-
	SRN155	-	-	-0.765	-	-	-	-	-	-	-
	SRN161	-	-	-	-	-	-	-	-	-	-
	SRN172	-	-	-	-	-1.449	-1.472	-	-	-	-
	SRN173	-	-	-	-	-	-	-	-	-	-
	SRN195	-	-	-	-	0.518	0.212	-2.104	-2.467	1.631	1.352
	SRN202	-	-	-	-	-0.601	-0.534	-	-	-	-
	SRN203	-	-	-	-	-	-	-	-	-	-
	SRN206	-	-	-	-	-	-	-	-	-	-
	SRN211	-	-	-	-	-0.391	-	-	-	-	-
	SRN215	-	-	-	-	-	-	-	-	-	-
	SRN221	-	-	-	-	-	-0.680	-	-	1.091	0.942
	SRN231	-	-	-	-	-0.400	-0.331	-	-	-0.639	-0.527
	SRN241	-	-	-	-	1.218	0.950	-	-	3.591	3.460
	SRN243	-	-	-	-	-	-	-	-	1.392	1.134
	SRN260	-	-	-	-	-	-	-	-	-0.633	-0.786
	SRN261	-	-	-	-	-0.835	-0.797	-	-	-0.666	-0.602
	SRN272	-	-	-	-	-	-	-	-	-1.807	-1.829
	SRN282	-	-	-	-	-	-	-	-	-	-
	SRN290	-	-	-	-	-2.617	-2.839	-	-	-1.834	-1.772
	SRN302	-	-	-2.266	-	-	-	-	-	-	-
	SRN305	-	-	-	-	-1.572	-1.604	-	-	-	-
	SRN395	-	-	-	-	-	-	-	-	-	-
	SRN410	-	-	-	-	0.262	0.262	-	-	-0.208	-0.238
	SRN411	-	-	-	-	-	-	-	-	-	-
	SRN503	-	-	-	-	-	-	-	-	-	-

Table E.1 (continued): Summary of NB and HFN Models for Individual Crash Types

Variable		odirsw		odiroth		fobj		eang		oturn	
		NB	HFN	NB	HFN	NB	HFN	NB	HFN	NB	HFN
	SRN504	-1.853	-1.717	-	-	-0.432	-0.353	-	-	-0.638	-0.471
	SRN507	-	-	-	-	-	-	-	-	0.630	0.734
	SRN508	-	-	-	-	0.366	0.291	-	-	-	-
	SRN510	-	-	-	-	-	-	-	-	-	-
	SRN539	-	-	-	-	-	-	-	-	-	-
	SRN542	1.046	1.471	1.033	1.368	0.494	0.577	-	-	-	-
	SRN702	-	-	-	-	-	-	-	-	-	-
	SRN706	-	-	-	-	-	-	-	-	-	-
	SRN821	-1.613	-	-1.569	-	-	-	-	-	-0.741	-0.519
	SRN900	-	-	-	-	-	-	-	-	-	-
	SRN904	-	-	-	-	-	-	-	-	-	-
	SRN906	-	-	-	-	-	-	-	-	-	-
	SRN970	-	-	-	-	-	-	-	-	-	-
	SR108109	-	-	-	-	-	-	-	-	-	-
	SR112150	-	-	-	-	-	-	-	-	-	-
	SR115281	-	-	-	-	-	-	-	-	-	-
	SR123169	-	-	-	-	-1.037	-0.878	-	-	-1.511	-1.395
	SR141221	-	-	-	-	-	-	-	-	-	-
	SR153900	-	-	-	-	-	-	-	-	-	-
	SR160544	-	-	-	-	-	-	-	-	-	-
	SR17107	-	-	-	-	-	-	-	-	-	-
	SR174508	-	-	-	-	-	-	-	-	-	-
	SR223243	-	-	-	-	-	-	-	-	-	-
	SR24165	-	-	-	-	-0.704	-0.491	-	-	-2.435	-2.163
	SR26022	-	-	-	-	-	-	-	-	-	-
	SR261142	-	-	-	-	-	-	-	-	-	-
	SR26702	-	-	-	-	-	-	-	-	-	-
	SR432532	-	-	-	-	-0.592	-0.498	-	-	-1.637	-1.564
	SR502730	-	-	-	-	0.553	-	-	-	-	-
	SR510902	-	-	-	-	-	-	-	-	-	-
	SR534105	-	-	-	-	-	-	-	-	-	-
Alpha /(Tau)*		787.676	750.547	692.295	656.523	19.461	18.802	1794.824	2320.949	51.022	42.229
Log-likelihood		-6825.406	-6763.145	-7199.535	-7139.344	-57712.430	-57011.930	-2221.267	-2219.314	-26837.610	-26325.900

Table E.1 (continued): Summary of NB and HFN Models for Individual Crash Types

Variable		animal		bkpd=bicycle+ped		entvdr		other		truck	
		NB	HFN	NB	HFN	NB	HFN	NB	HFN	NB	HFN
Constant		-4.973	-6.308	-5.931	-13.579	-9.816	-10.763	-2.430	-7.703	-3.949	-4.837
LNADT		0.392	0.423	0.455	1.134	1.202	1.230	0.046	0.141	0.662	0.701
Length		1.000	7.152	1.000	6.829	1.000	6.233	1.000	6.538	1.000	6.455
Roadway geometry	A1	-	-	-	-	-0.076	-0.044	0.008	-	-0.023	-
	AVGLANEN	-	-	-	-	-	-	-	-	-	-
	DGC1	-0.112	-0.068	-	-	-0.078	-0.053	-	-	0.016	0.031
	HCANG1	0.001	0.001	-	-	-	-	-	-	-	-
	MK1	-	-	-	-	-0.983	-0.850	-	-	-0.347	-0.273
	NLANE	-	-	-	-	-	-	-	-	-	-
	NLANED	-	-	-	-	-	-	-	-	-	-
	NLANEI	-	-	-1.485	-3.623	-4.456	-4.379	-	-	-4.178	-4.166
	RLNW	-0.225	-0.191	-	-	-	-	-	-	-	-
	SWC19	-5.719	-6.757	-	-	-	-	-	-	-3.342	-3.619
	SWR1001	-	-	-	-	-	-	-	-	-	-
	SWR1023	-	-	-	-	-	-	-	-	-1.168	-1.088
	SWR2367	-	-	-	-	-	-	-	-	-	-
	SWR4523	-	-	-	-	-	-	-	-	-0.318	-0.266
	SWR8901	-	-	-	-	-	-	-	-	-	-
	SWR8910	-2.146	-	-	-	-	-	-	-	-	-
Roadside characteristics	DBRDRAL	-	-	-	-	-	-	-	-	-	-
	DBRGSTR	-	-	-	-	-	-	-	-	-	-
	DCLVEND	-	-	0.285	-	-	-	-	-	-	-
	DCLVERT	0.880	-0.411	-	-	-	-	-	-	0.501	-0.501
	DCURB	-	-	-	-	-	-	-0.258	-	-	-
	DDITCH	-	-	-	-	-	-	-	-	0.313	-0.181
	DDRGLET	-	-	-	-	-	-	-	-	-	-
	DFENCE	-	-	-	-	1.795	-1.262	-	-	-	-
	DGRDRAL	0.564	-	-	-1.282	-	-	-	-	0.492	-0.386
	DGYWIRE	-	-	-	-	-	-	-	-	-	-
	DIMPACT	-	-	-	-	-	-	-	-	-	-
	DMALBOX	-	-	-	-	-	-	-	-	-	-
	DMFXOBJ	-	-	-	-	-	-	0.144	-	0.295	-
	DPDSTAL	-	-	-	-	-	-	-0.236	-	-	-
	DRCHCRP	-	-	-	-	-	-	-	-	-	-
	DRDAPRC	0.447	-	-	-	-	-	-	0.866	-	-
	DRDSLP	-	-	-	-	-	-	0.121	-0.840	-	-
	DSUPRT	-	-	-	-	-	-	-	-	-	-
	DTREE	-	-	-	-	-	-	-	-	0.309	-0.320
	DTREGRP	0.371	-0.710	-	-	-0.705	-	-	-	-	-
	LBRDRAL	-	-	-	-	-	-	-	-	-	-
	LBRDRL00	-	-	-	-	-	-	-	-	-	-
	LBRDRL60	-	-	-	-	-	-	-	-	-	-

Table E.1 (continued): Summary of NB and HFN Models for Individual Crash Types

Variable		animal		bkpd=bicycle+ped		entvdr		other		truck	
		NB	HFN	NB	HFN	NB	HFN	NB	HFN	NB	HFN
	LCLVERT	-3.703	5.009	-	-	-	-	-	-	-1.685	1.399
	LCLVRT00	-	-	-	-	-	-	-	-	-	-
	LCLVRT10	-	-	-	-	-	-	-	-	-	-
	LCLVRT20	-	-	-	-	-	-	-	-	-	-
	LCLVRT30	-	-	-	-	-	-	-	-	-	-
	LCLVRT40	-	-	-	-	-	-	-	-	-	-
	LCLVRT50	-	-	-	-	-	-	-	-	-	-
	LCLVRT60	-	-	-	-	-	-	-	-	-	-
	LCURB00	-1.043	-	-	-	-	-	-	-	-	-
	LCURB	-	-	-	-	-	-	-	-	-	-
	LCVT4060	-	-	-	-	-	-	-	-	-	-
	LDITCH	-	-	-	-	-	-	-	-	-	-
	LDITCH00	-	-	-	-	-	-	-	-	-	0.408
	LDITCH00	-	-	-	-	-	2.220	-0.139	-	-0.491	-
	LDITCH90	-	-	-	-	-2.302	-	-	-	-	-
	LFENCE	-	-	-	-	-3.234	3.498	-0.160	-	-	-
	LFENCE00	-	-	-	-	-	-	-	-	-	-
	LFENCE20	-	-	-	-	-	-	-	-	-	-
	LFENCE70	-	-	-	-	-	-	-	-	-	-
	LGRDRL00	-1.310	0.774	-	-	-1.149	1.560	-	-	-0.768	0.649
	LGRDRL40	-	-	-	-	-	-	-	-	-	-
	LGRDRL50	-	-	-	-	-	-	-	-	-	-
	LGRDRL70	-1.975	-	-	-	-	-	-	-	-	-
	LGRDRL80	-	-	-	-	-	-	-	-	-	-
	LGRDRL90	-	-	1.700	-	-	-	-	-	-	-
	LRCHCRP	-	-	-	-	-	-	-	-	-1.316	2.508
	LRDSLP	-	-	-	-	-	-	-	-	-	-
	LRDSLP00	-	-	-	-	-1.410	1.565	-	0.955	-0.355	0.217
	LRDSLP50	-	-	-	-	-	-	-	-	-	-
	LRDSLP60	-	-	-	-	-	-	-	-	-	-
	LRDSLP70	-	-	-	-	-	-	-	-	-	-
	LRDSLP90	-	-	-	-	-1.757	3.010	-	-	-	-
	LTREG00	-0.699	-	-	-	-	-	-	-	-0.288	-
	LTREGRP	-	-	-	-	-	-	-	-	-	-
	LTRGRP00	-	-	-	-	-	-	-	-	-0.413	-
Route dummies	SRN3	0.478	0.556	-	-	-	-	0.236	0.687	0.708	0.676
	SRN6	0.552	0.614	-	-	-	-	-	-	-	-
	SRN7	-0.753	-0.547	-	-	-	-	-	-	-	-
	SRN9	-1.348	-1.139	-	-	-	-	-0.294	-0.809	-0.400	-0.322
	SRN11	-1.574	-1.178	-	-	-	-	-	-	-0.791	-0.593
	SRN12	0.810	0.780	-	-	-	-	0.336	1.029	0.444	0.409
	SRN14	0.200	0.168	-	-	-	-	0.462	1.281	-	-
	SRN17	-	-	-	-	-	-	0.306	0.906	0.336	-
	SRN18	-1.859	-1.865	-	-	-2.496	-2.456	-	-	0.524	0.576

Table E.1 (continued): Summary of NB and HFN Models for Individual Crash Types

Variable		animal		bkpd=bicycle+ped		entvdr		other		truck	
		NB	HFN	NB	HFN	NB	HFN	NB	HFN	NB	HFN
	SRN21	-1.072	-0.915	-	-	-0.647	-	-0.417	-1.241	-0.758	-0.681
	SRN22	-	-	-	-	-	-	-	-	-	-
	SRN23	-	-	-	-	-	-	-	-	-	-
	SRN25	-	-	-	-	-	-	-	-	-	-
	SRN26	1.721	1.241	-	-	-	-	0.232	0.493	1.023	0.617
	SRN27	-	-	-	-	-	-	-0.348	-1.103	-	-
	SRN28	0.571	0.286	-	-	-	-	0.337	0.975	0.194	-0.174
	SRN31	-0.661	-	-	-	-	-	-	-	-0.484	-0.459
	SRN97	1.274	1.134	0.424	-	-	-	0.524	1.567	0.735	0.572
	SRN104	0.876	-	-	-	-	-	0.611	1.938	1.031	0.647
	SRN105	-	-	-	-	-	-	-	-	-	-
	SRN106	-0.610	-	0.484	-	-	-	-	-	-	-
	SRN107	-	-	-	-	-	-	-	-	-	-
	SRN109	-	-	-	-	1.305	1.163	-	-	-	-
	SRN112	-0.665	-0.598	-	-	-0.651	-	-	-	-0.241	-0.146
	SRN122	-	-	-	-	-	-	-	-	-	-
	SRN124	1.582	1.209	-	-	-	-	-	-	0.704	0.379
	SRN127	-	-	-	-	-	-	-	-	-0.888	-0.950
	SRN129	-0.968	-0.849	-	-	-	-	-	-	-0.693	-0.670
	SRN141	-	-	-	-	-	-	-	-	0.533	0.503
	SRN150	-0.665	-	-	-	-	-	-	-	-0.630	-0.409
	SRN153	-	-	-	-	-	-	-	-	-	-
	SRN155	0.410	0.356	-	-	-	-	0.159	0.501	-	-
	SRN161	-1.503	-1.270	-	-	-	-	-	-	-0.534	-0.472
	SRN172	-	-	-	-	-	-	-	-	-0.765	-0.944
	SRN173	0.658	-	-	-	-	-	-	-	-	-
	SRN195	0.822	0.446	-	-	-2.079	-2.077	0.293	0.895	0.580	0.241
	SRN202	-0.552	-	-	-	-	-	-	-	-0.482	-0.377
	SRN203	-	-	-	-	-	-	0.363	1.041	-	-
	SRN206	-0.874	-	-	-	-	-	-	-	0.483	0.415
	SRN211	0.772	0.678	-	-	-	-	-	-	0.632	0.468
	SRN215	-	-	-	-	-	-	-	-	-	-
	SRN221	-	-	-	-	-	-	-	-	0.443	-
	SRN231	-0.524	-0.443	-	-	1.194	1.022	-	-	-	-
	SRN241	1.324	-	-	-	-	-	-	-	1.111	0.884
	SRN243	-0.832	-1.186	-	-	-	-	-	-	0.508	0.362
	SRN260	-1.624	-1.995	-	-	-	-	-	-	-0.499	-0.788
	SRN261	-1.325	-1.350	-	-	-	-	-	-	-0.444	-0.455
	SRN272	-	-	-	-	-	-	-	-	-0.501	-0.462
	SRN282	-	-	-	-	-	-	-	-	-	-
	SRN290	-1.050	-1.004	-	-	-	-	-	-	-1.117	-1.139
	SRN302	-	-	-	-	-	-	-	-	-0.489	-0.375
	SRN305	-	-	-	-	-3.168	-3.172	-	-	-	-
	SRN395	1.432	1.174	-	-	-	-	-	-	0.704	0.496

Table E.1 (continued): Summary of NB and HFN Models for Individual Crash Types

Variable		animal		bkpd=bicycle+ped		entvdr		other		truck	
		NB	HFN	NB	HFN	NB	HFN	NB	HFN	NB	HFN
	SRN410	-	-	-	-	-	-	-	-	0.267	0.237
	SRN411	-	-	-	-	-	-	-	-	-0.925	-0.707
	SRN503	-	-	-	-	-	-	-	-	0.231	0.304
	SRN504	-	-	-	-	-	-	-	-	-0.619	-0.492
	SRN507	-	-	-	-	-	-	-	-	-	-
	SRN508	-	-	-	-	-	-	-	-	-	-
	SRN510	-2.892	-2.715	-	-	-	-	-	-	-0.663	-0.638
	SRN539	-2.944	-2.861	-	-	-	-	-	-	-	-
	SRN542	-0.980	-0.830	0.555	2.423	-	-	-	-	0.492	0.631
	SRN702	-	-	-	-	-	-	-	-	-	-
	SRN706	-	-	-	-	-	-	-	-	0.299	-
	SRN821	-0.455	-	-	-	-	-	0.612	1.659	-	-
	SRN900	-2.040	-1.798	-	-	-	-	-	-	-	-
	SRN904	-	-	-	-	-	-	-	-	0.399	-
	SRN906	-	-	-	-	-	-	-	-	1.358	1.242
	SRN970	2.959	2.522	-	-	-	-	-	-	1.170	0.653
	SR108109	-	-	-	-	-	-	-	-	-	-
	SR112150	-	-	-	-	-	-	-	-	-	-
	SR115281	-	-	-	-	-	-	-	-	-	-
	SR123169	-1.311	-1.087	-	-	-	-	-	-	-0.812	-0.721
	SR141221	-	-	-	-	-	-	-	-	-	-
	SR153900	-	-	-	-	-	-	-	-	-	-
	SR160544	-	-	-	-	-	-	-	-	-	-
	SR17107	-	-	-	-	-	-	-	-	-	-
	SR174508	-	-	-	-	-	-	-	-	-	-
	SR223243	-	-	-	-	-	-	-	-	-	-
	SR24165	-1.679	-0.787	-	-	-	-	-	-	-0.770	-0.540
	SR26022	-	-	-	-	-	-	-	-	-	-
	SR261142	-	-	-	-	-	-	-	-	-	-
	SR26702	-	-	-	-	-	-	-	-	-	-
	SR432532	-1.091	-0.972	-	-	-	-	-	-	0.551	0.687
	SR502730	-	-	-	-	-	-	-	-	0.750	0.608
	SR510902	-	-	-	-	-	-	-	-	-	-
	SR534105	-	-	-	-	-	-	-	-	-	-
Alpha /(Tau)*		48.359	40.999	(-1.171)	3256.298	456.651	412.557	(-2.186)	212.952	18.802	17.082
Log-likelihood		-24601.530	-23982.560	-1821.363	-1227.533	-9112.505	-9052.940	-9754.878	-8415.897	-79688.380	-78271.030

* Tau for ZINB or ZIP Model

Table E.2: Variable Description Table

Variable	Description	Variable	Description
Length	Segment Length	SRN14	SR14 Dummy (1 if SR=14, 0 otherwise)
LNADT	Log(AADT)	SRN17	SR17 Dummy (1 if SR=17, 0 otherwise)
A1	Algebraic difference in gradients, percent	SRN18	SR18 Dummy (1 if SR=18, 0 otherwise)
AVGLANEN	Average Number of lanes (NLANED+NLANEI)/2	SRN21	SR21 Dummy (1 if SR=21, 0 otherwise)
DGC1	Degree of Curvature	SRN22	SR22 Dummy (1 if SR=22, 0 otherwise)
HCANG1	Horizontal Curve Central angle	SRN23	SR23 Dummy (1 if SR=23, 0 otherwise)
MK1	Rate of vertical curvature/5280	SRN25	SR25 Dummy (1 if SR=25, 0 otherwise)
NLANE	Total number of lanes (NLANED+NLANEI)	SRN26	SR26 Dummy (1 if SR=26, 0 otherwise)
NLANED	Number of lanes Decreasing	SRN27	SR27 Dummy (1 if SR=27, 0 otherwise)
NLANEI	Number of lanes Increasing	SRN28	SR28 Dummy (1 if SR=28, 0 otherwise)
RLNW	Average Lane width	SRN31	SR31 Dummy (1 if SR=31, 0 otherwise)
SWC19	Shoulder width dummy (if shoulder width center is >1ft and <9ft, value=1,else=0)	SRN97	SR97 Dummy (1 if SR=97, 0 otherwise)
SWR1001	Shoulder width dummy (if shoulder width right is >10ft and shoulder width left is 0-1ft, value=1,else=0)	SRN104	SR104 Dummy (1 if SR=104, 0 otherwise)
SWR1023	Shoulder width dummy (if shoulder width right is >10ft and shoulder width left is 2-3ft, value=1,else=0)	SRN105	SR105 Dummy (1 if SR=105, 0 otherwise)
SWR2367	Shoulder width dummy (if shoulder width right is 2-3ft and shoulder width left is 6-7ft, value=1,else=0)	SRN106	SR106 Dummy (1 if SR=106, 0 otherwise)
SWR4523	Shoulder width dummy (if shoulder width right is 4-5ft and shoulder width left is 2-3ft, value=1,else=0)	SRN107	SR107 Dummy (1 if SR=106, 0 otherwise)
SWR8901	Shoulder width dummy (if shoulder width right is 8-9ft and shoulder width left is 0-1ft, value=1,else=0)	SRN109	SR109 Dummy (1 if SR=109, 0 otherwise)
SWR8910	Shoulder width dummy (if shoulder width right is 8-9ft and shoulder width left is >10ft, value=1,else=0)	SRN112	SR112 Dummy (1 if SR=112, 0 otherwise)
DBRDRAL	Bridge rail Dummy variable (1 if Bridge rail exists, 0 otherwise)	SRN122	SR122 Dummy (1 if SR=122, 0 otherwise)
DBRGSTR	Bridge rail Dummy variable (1 if bridge rail exists, 0 otherwise)	SRN124	SR124 Dummy (1 if SR=124, 0 otherwise)
DCLVEND	Culvert end Dummy variable (1 if Culvert end exists, 0 otherwise)	SRN127	SR127 Dummy (1 if SR=127, 0 otherwise)
DCLVERT	Culvert Dummy variable (1 if Culvert exists, 0 otherwise)	SRN129	SR129 Dummy (1 if SR=129, 0 otherwise)
DCURB	Curb Dummy variable (1 if Curb slope exists, 0 otherwise)	SRN141	SR141 Dummy (1 if SR=141, 0 otherwise)

Table E.2 (continued): Variable Description Table

Variable	Description	Variable	Description
DDITCH	Ditch Dummy variable (1 if Ditch exists, 0 otherwise)	SRN150	SR150 Dummy (1 if SR=150, 0 otherwise)
DDRGLET	Drainage inlet Dummy variable (1 if Drainage inlet exists, 0 otherwise)	SRN153	SR153 Dummy (1 if SR=150, 0 otherwise)
DFENCE	Fence Dummy variable (1 if Fence exists, 0 otherwise)	SRN155	SR155 Dummy (1 if SR=155, 0 otherwise)
DGRDRAL	Guardrail Dummy variable (1 if Guardrail exists, 0 otherwise)	SRN161	SR161 Dummy (1 if SR=161, 0 otherwise)
DGYWIRE	Guywire Dummy variable (1 if Guywire exists, 0 otherwise)	SRN172	SR172 Dummy (1 if SR=172, 0 otherwise)
DIMPACT	Impact attenuator Dummy variable (1 if Impact attenuator exists, 0 otherwise)	SRN173	SR174 Dummy (1 if SR=174, 0 otherwise)
DMALBOX	Mailbox Dummy variable (1 if Mailbox exists, 0 otherwise)	SRN195	SR195 Dummy (1 if SR=195, 0 otherwise)
DMFXOBJ	Fixed object Dummy variable (1 if Fixed object exists, 0 otherwise)	SRN202	SR202 Dummy (1 if SR=202, 0 otherwise)
DPDSTAL	Pedstal Dummy variable (1 if Pedstal exists, 0 otherwise)	SRN203	SR203 Dummy (1 if SR=203, 0 otherwise)
DRCHCRP	Rock out cropping Dummy variable (1 if Rock out cropping exists, 0 otherwise)	SRN206	SR206 Dummy (1 if SR=206, 0 otherwise)
DRDAPRC	Road approach Dummy variable (1 if Road approach exists, 0 otherwise)	SRN211	SR211 Dummy (1 if SR=211, 0 otherwise)
DRDSLP	Road side slope Dummy variable (1 if Road side slope exists, 0 otherwise)	SRN215	SR215 Dummy (1 if SR=215, 0 otherwise)
DSUPRT	Support Dummy variable (1 if Support exists, 0 otherwise)	SRN221	SR221 Dummy (1 if SR=221, 0 otherwise)
DTREE	Tree Dummy variable (1 if Tree exists in segment, 0 otherwise)	SRN231	SR231 Dummy (1 if SR=231, 0 otherwise)
DTREGRP	Tree group Dummy variable (1 if Tree group exists, 0 otherwise)	SRN241	SR241 Dummy (1 if SR=241, 0 otherwise)
LBRDRAL	Bridge rail length on Segment	SRN243	SR243 Dummy (1 if SR=243, 0 otherwise)
LBRDRL00	Proportion of Bridge rail length on segment is 90-100%	SRN260	SR260 Dummy (1 if SR=260, 0 otherwise)
LBRDRL60	Proportion of Bridge rail length on segment is 50-60%	SRN261	SR261 Dummy (1 if SR=261, 0 otherwise)
LCLVERT	Culvert length on Segment	SRN272	SR272 Dummy (1 if SR=272, 0 otherwise)
LCLVRT00	Proportion of culvert length on segment is 90-100%	SRN282	SR282 Dummy (1 if SR=272, 0 otherwise)
LCLVRT10	Proportion of culvert length on segment is 0-10%	SRN290	SR290 Dummy (1 if SR=290, 0 otherwise)
LCLVRT20	Proportion of culvert length on segment is 10-20%	SRN302	SR302 Dummy (1 if SR=302, 0 otherwise)
LCLVRT30	Proportion of culvert length on segment is 20-30%	SRN305	SR305 Dummy (1 if SR=305, 0 otherwise)
LCLVRT40	Proportion of culvert length on segment is 30-40%	SRN395	SR395 Dummy (1 if SR=395, 0 otherwise)
LCLVRT50	Proportion of culvert length on segment is 40-50%	SRN410	SR410 Dummy (1 if SR=410, 0 otherwise)
LCLVRT60	Proportion of culvert length on segment is 50-60%	SRN411	SR411 Dummy (1 if SR=411, 0 otherwise)
LCURB00	Proportion of curb length on segment is 90-100%	SRN503	SR503 Dummy (1 if SR=503, 0 otherwise)

Table E.2 (continued): Variable Description Table

Variable	Description	Variable	Description
LCURB	Curb length on segment	SRN504	SR504 Dummy (1 if SR=504, 0 otherwise)
LCVT4060	Proportion of culvert length on segment is 30-60%	SRN507	SR507 Dummy (1 if SR=507, 0 otherwise)
LDITCH	Ditch length on Segment	SRN508	SR508 Dummy (1 if SR=508, 0 otherwise)
LDITCH00	Proportion of Ditch length on segment is 90-100%	SRN510	SR510 Dummy (1 if SR=510, 0 otherwise)
LDITCH90	Proportion of Ditch length on segment is 80-90%	SRN539	SR539 Dummy (1 if SR=539, 0 otherwise)
LFENCE	Fence length on Segment	SRN542	SR542 Dummy (1 if SR=542, 0 otherwise)
LFENCE00	Proportion of Fence length on segment is 90-100%	SRN702	SR702 Dummy (1 if SR=542, 0 otherwise)
LFENCE20	Proportion of Fence length on segment is 10-20%	SRN706	SR706 Dummy (1 if SR=706, 0 otherwise)
LFENCE70	Proportion of Fence length on segment is 60-70%	SRN821	SR821 Dummy (1 if SR=821, 0 otherwise)
LGRDRL00	Proportion of Guard rail length on segment is 90-100%	SRN900	SR900 Dummy (1 if SR=900, 0 otherwise)
LGRDRL40	Proportion of guardrail length on segment is 30-40%	SRN904	SR904 Dummy (1 if SR=904, 0 otherwise)
LGRDRL50	Proportion of guardrail length on segment is 40-50%	SRN906	SR906 Dummy (1 if SR=906, 0 otherwise)
LGRDRL70	Proportion of guardrail length on segment is 60-70%	SRN970	SR970 Dummy (1 if SR=970, 0 otherwise)
LGRDRL80	Proportion of Guard rail length on segment is 80-90%	SR108109	State route Dummy (1 if SR=108 or SR=109, 0 otherwise)
LGRDRL90	Proportion of guardrail length on segment is 80-90%	SR112150	State route Dummy (1 if SR=112 or SR=150, 0 otherwise)
LRCHCRP	Rock out cropping length on segment	SR115281	State route Dummy (1 if SR=115 or SR=281, 0 otherwise)
LRDSLP	Road slope length on Segment	SR123169	State route Dummy (1 if SR=123 or SR=169, 0 otherwise)
LRDSLP00	Proportion of Roadside slope length on segment is 90-100%	SR141221	State route Dummy (1 if SR=141 or SR=221, 0 otherwise)
LRDSLP50	Proportion of Roadside slope length on segment is 40-50%	SR153900	State route Dummy (1 if SR=153 or SR=900, 0 otherwise)
LRDSLP60	Proportion of Roadside slope length on segment is 50-60%	SR160544	State route Dummy (1 if SR=160 or SR=544, 0 otherwise)
LRDSLP70	Proportion of Roadside slope length on segment is 60-70%	SR17107	State route Dummy (1 if SR=17 or SR=107, 0 otherwise)
LRDSLP90	Proportion of Roadside slope length on segment is 80-90%	SR174508	State route Dummy (1 if SR=174 or SR=508, 0 otherwise)
LTREG00	Proportion of Tree group on a segment is 90-100%	SR223243	State route Dummy (1 if SR=223 or SR=243, 0 otherwise)
LTREGRP	Tree group length on segment	SR24165	State route Dummy (1 if SR=24 or SR=165, 0 otherwise)
LTRGRP00	Proportion of Tree group on a segment is 90-100%	SR26022	State route Dummy (1 if SR=260 or SR=22, 0 otherwise)
SRN3	SR3 Dummy (1 if SR=3, 0 otherwise)	SR432532	State route Dummy (1 if SR=432 or SR=532, 0 otherwise)
SRN6	SR6 Dummy (1 if SR=6, 0 otherwise)	SR26702	State route Dummy (1 if SR=26 or SR=702, 0 otherwise)
SRN7	SR7 Dummy (1 if SR=7, 0 otherwise)	SR261142	State route Dummy (1 if SR=261 or SR=142, 0 otherwise)

Table E.2 (continued): Variable Description Table

Variable	Description	Variable	Description
SRN9	SR9 Dummy (1 if SR=9, 0 otherwise)	SR502730	State route Dummy (1 if SR=502 or SR=730, 0 otherwise)
SRN11	SR11 Dummy (1 if SR=11, 0 otherwise)	SR510902	State route Dummy (1 if SR=510 or SR=902, 0 otherwise)
SRN12	SR12 Dummy (1 if SR=12, 0 otherwise)	SR534105	State route Dummy (1 if SR=534 or SR=105, 0 otherwise)

Appendix F: Generalized Advanced SPF (Random Parameter Models) for Individual Crash Types

Table F.1: Random Parameter Negative Binomial Estimation of Total Crash Type Frequency

	Constant Parameter		Random Parameter				
Variable: total crash	Mean	T-statistic	Distri-bution	Mean	T-statistic	Std. Dev	T-statistic
Constant	-0.045	-0.560	N.A.	N.A.	N.A.	N.A.	N.A.
Logarithm of length of segment in miles	1.062	116.613	N.A.	N.A.	N.A.	N.A.	N.A.
Logarithm of ADT	N.A. [1]	N.A.	Normal	0.638	65.123	0.167	135.375
Roadway Geometrics							
Algebraic difference in gradients	0.009	2.503	N.A.	N.A.	N.A.	N.A.	N.A.
Shoulder width dummy (if shoulder width right is 4-5ft and shoulder width left is 2-3ft, value=1,else=0)	-0.429	-5.464	N.A.	N.A.	N.A.	N.A.	N.A.
Shoulder width dummy (if shoulder width center is >1ft and <9ft, value=1,else=0)	-3.763	-13.152	N.A.	N.A.	N.A.	N.A.	N.A.
Degree of curvature	N.A.	N.A.	Normal	0.041	26.824	0.045	29.434
Rateofvertical curvature/5280	N.A.	N.A.	Normal	-1.141	-12.456	1.173	14.212
Roadside Variables							
Fixed object dummy variable (1 if fixed object exists, 0 otherwise)	0.176	3.105	N.A.	N.A.	N.A.	N.A.	N.A.
Proportion of road side slope on a segment is 90-100%	-0.107	-3.034	N.A.	N.A.	N.A.	N.A.	N.A.
Fence dummy variable (1 if fence exists, 0 otherwise)	-0.128	-2.810	N.A.	N.A.	N.A.	N.A.	N.A.
Rock-out cropping length on a segment	-0.678	-3.162	N.A.	N.A.	N.A.	N.A.	N.A.
Proportion of guard rail length on a segment is 90-100%	-0.110	-2.121	N.A.	N.A.	N.A.	N.A.	N.A.
State Route Dummies							
SR3 dummy (1 if SR=3, 0 otherwise)	0.795	13.017	N.A.	N.A.	N.A.	N.A.	N.A.
SR21 dummy (1 if SR=21, 0 otherwise)	-0.793	-11.475	N.A.	N.A.	N.A.	N.A.	N.A.
SR23 dummy (1 if SR=23, 0 otherwise)	-0.572	-5.239	N.A.	N.A.	N.A.	N.A.	N.A.
SR25 dummy (1 if SR=25, 0 otherwise)	-0.319	-5.234	N.A.	N.A.	N.A.	N.A.	N.A.
SR31 dummy (1 if SR=31, 0 otherwise)	-0.518	-3.924	N.A.	N.A.	N.A.	N.A.	N.A.

[1] N.A. means not applicable. Parameter values are either fixed across observations for variables with "constant parameters," or defined by distributions for variables with "random parameters."

Table F.1 (continued): Random Parameter Negative Binomial Estimation of Total Crash Type Frequency

	Constant Parameter		Random Parameter				
Variable: total crash	Mean	T-statistic	Distri-bution	Mean	T-statistic	Std. Dev	T-statistic
SR97 dummy (1 if SR=97, 0 otherwise)	0.496	15.363	N.A.	N.A.	N.A.	N.A.	N.A.
SR104 dummy (1 if SR=104, 0 otherwise)	0.878	9.280	N.A.	N.A.	N.A.	N.A.	N.A.
SR123 dummy (1 if SR=123, 0 otherwise)	-4.205	-7.073	N.A.	N.A.	N.A.	N.A.	N.A.
SR124 dummy (1 if SR=124, 0 otherwise)	0.397	4.971	N.A.	N.A.	N.A.	N.A.	N.A.
SR129 dummy (1 if SR=129, 0 otherwise)	-0.835	-7.674	N.A.	N.A.	N.A.	N.A.	N.A.
SR165 dummy (1 if SR=165, 0 otherwise)	-0.431	-3.790	N.A.	N.A.	N.A.	N.A.	N.A.
SR172 dummy (1 if SR=172, 0 otherwise)	-0.812	-3.952	N.A.	N.A.	N.A.	N.A.	N.A.
SR231 dummy (1 if SR=231, 0 otherwise)	-0.256	-3.700	N.A.	N.A.	N.A.	N.A.	N.A.
SR260 dummy (1 if SR=260, 0 otherwise)	-0.903	-5.581	N.A.	N.A.	N.A.	N.A.	N.A.
SR261 dummy (1 if SR=261, 0 otherwise)	-0.413	-3.896	N.A.	N.A.	N.A.	N.A.	N.A.
SR272 dummy (1 if SR=272, 0 otherwise)	-0.579	-3.139	N.A.	N.A.	N.A.	N.A.	N.A.
SR290 dummy (1 if SR=290, 0 otherwise)	-2.301	-7.866	N.A.	N.A.	N.A.	N.A.	N.A.
SR395 dummy (1 if SR=395, 0 otherwise)	0.375	6.811	N.A.	N.A.	N.A.	N.A.	N.A.
SR532 dummy (1 if SR=532, 0 otherwise)	1.251	9.613	N.A.	N.A.	N.A.	N.A.	N.A.
SR542 dummy (1 if SR=542, 0 otherwise)	0.767	16.004	N.A.	N.A.	N.A.	N.A.	N.A.
SR706 dummy (1 if SR=706, 0 otherwise)	0.279	2.239	N.A.	N.A.	N.A.	N.A.	N.A.
SR821 dummy (1 if SR=821, 0 otherwise)	-0.283	-2.830	N.A.	N.A.	N.A.	N.A.	N.A.
SR970 dummy (1 if SR=970, 0 otherwise)	0.819	5.091	N.A.	N.A.	N.A.	N.A.	N.A.
SR127 & SR504 dummy (1 if SR=127 or 504, 0 otherwise)	-0.563	-8.220	N.A.	N.A.	N.A.	N.A.	N.A.
SR125 & SR153 dummy (1 if SR=125 or 153, 0 otherwise)	-0.252	-3.170	N.A.	N.A.	N.A.	N.A.	N.A.
SR164 & SR503 dummy (1 if SR=164 or 503, 0 otherwise)	0.311	5.365	N.A.	N.A.	N.A.	N.A.	N.A.
SR12 & SR501 dummy (1 if SR=12 or 501, 0 otherwise)	0.407	13.792	N.A.	N.A.	N.A.	N.A.	N.A.
SR206 & SR502 dummy (1 if SR=206 or 502, 0 otherwise)	0.569	7.172	N.A.	N.A.	N.A.	N.A.	N.A.

Table F.1 (continued): Random Parameter Negative Binomial Estimation of Total Crash Type Frequency

	Constant Parameter		Random Parameter				
Variable: total crash	Mean	T-statistic	Distri-bution	Mean	T-statistic	Std. Dev	T-statistic
Scale parameter for over-dispersion	0.175	108.990					
Convergent log-likelihood for fixed parameter negative binomial	-123,326.40						
Log-likelihood at random parameter negative binomial convergence	-116,525.40						
Number of observations	426,546 (47,394 segments with 9 year panel)						

Table F.2: Model for Random Parameter Negative Binomial Estimation of Roadside Crash Type Frequency

	Constant Parameter		Random Parameter				
Variable: roadside	Mean	T-statistic	Distribu-tion	Mean	T-statistic	Std. Dev.	T-statistic
Constant	N.A. [2]	N.A.	Normal	1.106	3.870	1.265	107.932
Logarithm of length of segment in miles	0.976	85.436	N.A.	N.A.	N.A.	N.A.	N.A.
Logarithm of ADT	N.A.	N.A.	Normal	0.548	43.163	0.007	6.401
Roadway Geometrics							
Number of lanes decreasing direction	-2.279	-10.153	N.A.	N.A.	N.A.	N.A.	N.A.
Horizontal curve central angle	0.000	3.817	N.A.	N.A.	N.A.	N.A.	N.A.
Rate of vertical curvature/5280	-0.564	-9.174	N.A.	N.A.	N.A.	N.A.	N.A.
Degree of curvature	0.049	36.036	N.A.	N.A.	N.A.	N.A.	N.A.
Average lane width	-0.054	-6.848	N.A.	N.A.	N.A.	N.A.	N.A.
Shoulder width dummy (if shoulder width right is 4-5ft and shoulder width left is 2-3ft, value=1,else=0)	-0.579	-5.983	N.A.	N.A.	N.A.	N.A.	N.A.
Shoulder width dummy (if shoulder width center is >1ft and <9ft, value=1,else=0)	-2.444	-5.879	N.A.	N.A.	N.A.	N.A.	N.A.
Number of lanes increasing direction	N.A.	N.A.	Normal	-3.546	-26.409	0.022	2.342
Roadside Variables							
Proportion of guardrail on a segment is 70-80%	-0.918	-2.959	N.A.	N.A.	N.A.	N.A.	N.A.
Proportion of guardrail on a segment is 90-100%	-0.267	-3.119	N.A.	N.A.	N.A.	N.A.	N.A.
Proportion of roadside slope on a segment is 90-100%	-0.119	-2.734	N.A.	N.A.	N.A.	N.A.	N.A.
Proportion of fence on a segment is 10-20% or 60-70%	-1.147	-2.752	N.A.	N.A.	N.A.	N.A.	N.A.
Guardrail dummy variable (1 if guardrail exists,0otherwise)	0.157	2.900	N.A.	N.A.	N.A.	N.A.	N.A.
Road approach dummy variable (1 if road approach exists, 0 otherwise)	-0.143	-2.728	N.A.	N.A.	N.A.	N.A.	N.A.
Rock-out cropping length on a segment	-0.905	-2.946	N.A.	N.A.	N.A.	N.A.	N.A.
Tree group dummy variable (1 if tree group exists, 0 otherwise)	0.113	2.405	N.A.	N.A.	N.A.	N.A.	N.A.
State Route Dummies							
SR3 dummy (1 if SR=3, 0 otherwise)	0.357	4.296	N.A.	N.A.	N.A.	N.A.	N.A.
SR7 dummy (1 if SR=7, 0 otherwise)	0.517	7.655	N.A.	N.A.	N.A.	N.A.	N.A.

[2] N.A. means not applicable. Parameter values are either fixed across observations for variables with "constant parameters," or defined by distributions for variables with "random parameters."

Table F.2 (continued): Model for Random Parameter Negative Binomial Estimation of Roadside Crash Type Frequency

	Constant Parameter		Random Parameter				
Variable: roadside	Mean	T-statistic	Distribu-tion	Mean	T-statistic	Std. Dev.	T-statistic
SR12 dummy (1 if SR=12, 0 otherwise)	0.142	3.559	N.A.	N.A.	N.A.	N.A.	N.A.
SR21 dummy (1 if SR=21, 0 otherwise)	-1.045	-11.886	N.A.	N.A.	N.A.	N.A.	N.A.
SR23 dummy (1 if SR=23, 0 otherwise)	-0.599	-4.575	N.A.	N.A.	N.A.	N.A.	N.A.
SR25 dummy (1 if SR=25, 0 otherwise)	-0.347	-4.630	N.A.	N.A.	N.A.	N.A.	N.A.
SR31 dummy (1 if SR=31, 0 otherwise)	-0.446	-2.779	N.A.	N.A.	N.A.	N.A.	N.A.
SR97 dummy (1 if SR=97, 0 otherwise)	0.447	11.594	N.A.	N.A.	N.A.	N.A.	N.A.
SR129 dummy (1 if SR=129, 0 otherwise)	-0.922	-6.755	N.A.	N.A.	N.A.	N.A.	N.A.
SR172 dummy (1 if SR=172, 0 otherwise)	-0.858	-3.332	N.A.	N.A.	N.A.	N.A.	N.A.
SR195 dummy (1 if SR=195, 0 otherwise)	0.593	8.643	N.A.	N.A.	N.A.	N.A.	N.A.
SR231 dummy (1 if SR=231, 0 otherwise)	-0.332	-3.499	N.A.	N.A.	N.A.	N.A.	N.A.
SR241 dummy (1 if SR=241, 0 otherwise)	0.709	5.839	N.A.	N.A.	N.A.	N.A.	N.A.
SR272 dummy (1 if SR=272, 0 otherwise)	-0.487	-2.337	N.A.	N.A.	N.A.	N.A.	N.A.
SR290 dummy (1 if SR=290, 0 otherwise)	-2.638	-4.856	N.A.	N.A.	N.A.	N.A.	N.A.
SR305 dummy (1 if SR=305, 0 otherwise)	-2.340	-8.175	N.A.	N.A.	N.A.	N.A.	N.A.
SR542 dummy (1 if SR=542, 0 otherwise)	0.663	11.301	N.A.	N.A.	N.A.	N.A.	N.A.
SR821 dummy (1 if SR=821, 0 otherwise)	-0.279	-2.277	N.A.	N.A.	N.A.	N.A.	N.A.
SR123 & SR169 dummy (1 if SR=123 or 169, 0 otherwise)	-1.065	-7.818	N.A.	N.A.	N.A.	N.A.	N.A.
SR260 & SR22 dummy (1 if SR=260 or 22, 0 otherwise)	-0.498	-3.737	N.A.	N.A.	N.A.	N.A.	N.A.
SR260 & SR22 dummy (1 if SR=260 or 22, 0 otherwise)	-0.529	-4.241	N.A.	N.A.	N.A.	N.A.	N.A.
SR108 & SR109 dummy (1 if SR=108 or 109, 0 otherwise)	0.287	3.638	N.A.	N.A.	N.A.	N.A.	N.A.
SR534 & SR105 dummy (1 if SR=534 or 105, 0 otherwise)	0.294	3.143	N.A.	N.A.	N.A.	N.A.	N.A.
SR223 & SR243 dummy (1 if SR=223 or 243, 0 otherwise)	0.402	3.107	N.A.	N.A.	N.A.	N.A.	N.A.

Table F.2 (continued): Model for Random Parameter Negative Binomial Estimation of Roadside Crash Type Frequency

	Constant Parameter		Random Parameter				
Variable: roadside	Mean	T-statistic	Distribu-tion	Mean	T-statistic	Std. Dev.	T-statistic
SR26 & SR702 dummy (1 if SR=26 or 702, 0 otherwise)	0.554	8.726	N.A.	N.A.	N.A.	N.A.	N.A.
Scale parameter for over-dispersion	0.172	67.815					
Convergent log-likelihood for fixed parameter negative binomial	-74,728.37						
Log-likelihood at random parameter negative binomial convergence	-71,006.92						
Number of observations	426,546 (47,394 segments with 9 year panel)						

Table F.3: Model for Random Parameter Negative Binomial Estimation of Roadway Crash Type Frequency

	Constant Parameter		Random Parameter				
Variable	Mean	T-statistic	Distribution	Mean	T-statistic	Std. Dev.	T-statistic
Constant	N.A. [3]	N.A.	Normal	-3.199	-29.377	0.059	4.764
Logarithm of length of segment in miles	N.A.	N.A.	Normal	1.734	86.707	0.642	88.215
Logarithm of ADT	N.A.	N.A.	Normal	1.187	75.038	0.042	27.074
Roadway Geometrics							
Rate of vertical curvature/5280	-0.300	-3.186	N.A.	N.A.	N.A.	N.A.	N.A.
Shoulder width dummy (if shoulder width right is 8-9ft and shoulder width left is 0-1ft, value=1,else=0)	-0.669	-2.558	N.A.	N.A.	N.A.	N.A.	N.A.
Shoulder width dummy (if shoulder width center is >1ft and <9ft, value=1,else=0)	-3.782	-10.177	N.A.	N.A.	N.A.	N.A.	N.A.
Number of lanes increasing and decreasing direction	N.A.	N.A.	Normal	-2.902	-65.900	0.097	15.738
Degree of curvature	N.A.	N.A.	Normal	0.036	13.412	0.024	10.065
Roadside Variables							
Proportion of guardrail on a segment is 90-100%	-0.196	-2.373	N.A.	N.A.	N.A.	N.A.	N.A.
Proportion of ditch on a segment is 90-100%	-0.129	-1.768	N.A.	N.A.	N.A.	N.A.	N.A.
State Route Dummies							
SR3 dummy (1 if SR=3, 0 otherwise)	0.982	10.437	N.A.	N.A.	N.A.	N.A.	N.A.
SR12 dummy (1 if SR=12, 0 otherwise)	0.646	13.879	N.A.	N.A.	N.A.	N.A.	N.A.
SR22 dummy (1 if SR=22, 0 otherwise)	1.271	3.733	N.A.	N.A.	N.A.	N.A.	N.A.
SR26 dummy (1 if SR=26, 0 otherwise)	0.693	8.497	N.A.	N.A.	N.A.	N.A.	N.A.
SR97 dummy (1 if SR=97, 0 otherwise)	0.511	10.070	N.A.	N.A.	N.A.	N.A.	N.A.
SR104 dummy (1 if SR=104, 0 otherwise)	0.985	6.924	N.A.	N.A.	N.A.	N.A.	N.A.
SR124 dummy (1 if SR=124, 0 otherwise)	0.919	7.588	N.A.	N.A.	N.A.	N.A.	N.A.
SR129 dummy (1 if SR=129, 0 otherwise)	-0.597	-3.155	N.A.	N.A.	N.A.	N.A.	N.A.
SR206 dummy (1 if SR=206, 0 otherwise)	0.352	1.849	N.A.	N.A.	N.A.	N.A.	N.A.

[3] N.A. means not applicable. Parameter values are either fixed across observations for variables with "constant parameters," or defined by distributions for variables with "random parameters."

Table F.3 (continued): Model for Random Parameter Negative Binomial Estimation of Roadway Crash Type Frequency

	Constant Parameter		Random Parameter				
Variable	Mean	T-statistic	Distribu-tion	Mean	T-statistic	Standard Deviation	T-statistic
SR290 dummy (1 if SR=290, 0 otherwise)	-2.252	-6.691	N.A.	N.A.	N.A.	N.A.	N.A.
SR395 dummy (1 if SR=395, 0 otherwise)	0.905	10.561	N.A.	N.A.	N.A.	N.A.	N.A.
SR542 dummy (1 if SR=542, 0 otherwise)	0.762	9.063	N.A.	N.A.	N.A.	N.A.	N.A.
SR706 dummy (1 if SR=706, 0 otherwise)	0.512	2.603	N.A.	N.A.	N.A.	N.A.	N.A.
SR123 & SR169 dummy (1 if SR=123 or 169, 0 otherwise)	-0.738	-5.249	N.A.	N.A.	N.A.	N.A.	N.A.
SR260 & SR22 dummy (1 if SR=260 or 22, 0 otherwise)	-1.182	-3.944	N.A.	N.A.	N.A.	N.A.	N.A.
Scale parameter for over-dispersion	0.0724	83.9380					
Convergent log-likelihood for fixed parameter negative binomial	-69,300.41						
Log-likelihood at random parameter negative binomial convergence	-65,718.39						
Number of observations	426,546 (47,394 segments with 9 year panel)						

Table F.4: Model for Random Parameter Negative Binomial Estimation of Crashes Involving PDO Type Crash Frequency

	Constant Parameter		Random Parameter				
Variable: PDO	Mean	T-statistic	Distribu-tion	Mean	T-statistic	Standard Deviation	T-statistic
Constant	N.A. [4]	N.A.	Normal	-1.692	-17.667	0.491	46.648
Logarithm of length of segment in miles	N.A.	N.A.	Normal	1.386	96.562	0.477	97.549
Logarithm of ADT	N.A.	N.A.	Normal	0.836	67.208	0.007	5.680
Roadway Geometrics							
Number of lanes increasing and decreasing direction	-2.499	-69.309	N.A.	N.A.	N.A.	N.A.	N.A.
Algebraic difference in gradients	0.018	4.103	N.A.	N.A.	N.A.	N.A.	N.A.
Degree of curvature	0.046	24.846	N.A.	N.A.	N.A.	N.A.	N.A.
Shoulder width dummy (if shoulder width right is 4-5ft and shoulder width left is 2-3ft, value=1,else=0)	-0.312	-3.146	N.A.	N.A.	N.A.	N.A.	N.A.
Shoulder width dummy (if shoulder width center is >1ft and <9ft, value=1,else=0)	-3.971	-6.972	N.A.	N.A.	N.A.	N.A.	N.A.
Rate of vertical curvature/5280	N.A.	N.A.	Normal	-1.235	-10.235	1.284	12.009
Roadside Variables							
Ditch dummy variable (1 if ditch exists, 0 otherwise)	0.124	3.426	N.A.	N.A.	N.A.	N.A.	N.A.
Fence dummy variable (1 if fence exists, 0 otherwise)	-0.154	-2.710	N.A.	N.A.	N.A.	N.A.	N.A.
Guardrail dummy variable (1 if guardrail exists, 0 otherwise)	0.166	3.114	N.A.	N.A.	N.A.	N.A.	N.A.
Proportion of tree group on a segment is 90-100%	-0.283	-3.244	N.A.	N.A.	N.A.	N.A.	N.A.
Rock-out cropping length on a segment	-0.694	-2.540	N.A.	N.A.	N.A.	N.A.	N.A.
State Route Dummies							
SR3 dummy (1 if SR=3, 0 otherwise)	0.794	10.240	N.A.	N.A.	N.A.	N.A.	N.A.
SR12 dummy (1 if SR=12, 0 otherwise)	0.594	16.298	N.A.	N.A.	N.A.	N.A.	N.A.
SR21 dummy (1 if SR=21, 0 otherwise)	-0.799	-7.979	N.A.	N.A.	N.A.	N.A.	N.A.
SR26 dummy (1 if SR=26, 0 otherwise)	0.787	12.228	N.A.	N.A.	N.A.	N.A.	N.A.
SR31 dummy (1 if SR=31, 0 otherwise)	-0.607	-2.885	N.A.	N.A.	N.A.	N.A.	N.A.

[4] N.A. means not applicable. Parameter values are either fixed across observations for variables with "constant parameters," or defined by distributions for variables with "random parameters."

Table F.4 (continued): Model for Random Parameter Negative Binomial Estimation of Crashes Involving PDO Type Crash Frequency

	Constant Parameter		Random Parameter				
Variable: PDO	Mean	T-statistic	Distribu-tion	Mean	T-statistic	Standard Deviation	T-statistic
SR97 dummy (1 if SR=97, 0 otherwise)	0.594	14.740	N.A.	N.A.	N.A.	N.A.	N.A.
SR124 dummy (1 if SR=124, 0 otherwise)	0.616	6.222	N.A.	N.A.	N.A.	N.A.	N.A.
SR127 dummy (1 if SR=127, 0 otherwise)	-0.962	-4.084	N.A.	N.A.	N.A.	N.A.	N.A.
SR129 dummy (1 if SR=129, 0 otherwise)	-0.726	-4.923	N.A.	N.A.	N.A.	N.A.	N.A.
SR141 dummy (1 if SR=141, 0 otherwise)	0.450	3.120	N.A.	N.A.	N.A.	N.A.	N.A.
SR172 dummy (1 if SR=172, 0 otherwise)	-0.833	-2.280	N.A.	N.A.	N.A.	N.A.	N.A.
SR195 dummy (1 if SR=195, 0 otherwise)	0.366	4.763	N.A.	N.A.	N.A.	N.A.	N.A.
SR206 dummy (1 if SR=206, 0 otherwise)	0.661	4.771	N.A.	N.A.	N.A.	N.A.	N.A.
SR231 dummy (1 if SR=231, 0 otherwise)	-0.325	-2.869	N.A.	N.A.	N.A.	N.A.	N.A.
SR241 dummy (1 if SR=241, 0 otherwise)	0.888	6.096	N.A.	N.A.	N.A.	N.A.	N.A.
SR290 dummy (1 if SR=290, 0 otherwise)	-1.660	-5.729	N.A.	N.A.	N.A.	N.A.	N.A.
SR395 dummy (1 if SR=395, 0 otherwise)	0.587	8.384	N.A.	N.A.	N.A.	N.A.	N.A.
SR504 dummy (1 if SR=504, 0 otherwise)	-0.449	-3.894	N.A.	N.A.	N.A.	N.A.	N.A.
SR542 dummy (1 if SR=542, 0 otherwise)	1.040	16.298	N.A.	N.A.	N.A.	N.A.	N.A.
SR906 dummy (1 if SR=906, 0 otherwise)	2.469	8.521	N.A.	N.A.	N.A.	N.A.	N.A.
SR970 dummy (1 if SR=970, 0 otherwise)	1.195	5.971	N.A.	N.A.	N.A.	N.A.	N.A.
SR432 & SR532 dummy (1 if SR=432 or 532, 0 otherwise)	0.685	4.739	N.A.	N.A.	N.A.	N.A.	N.A.
SR123 & SR169 dummy (1 if SR=123 or 169, 0 otherwise)	-0.905	-7.178	N.A.	N.A.	N.A.	N.A.	N.A.
SR510 & SR902 dummy (1 if SR=510 or 902, 0 otherwise)	-0.537	-3.303	N.A.	N.A.	N.A.	N.A.	N.A.
SR108 & SR109 dummy (1 if SR=108 or 109, 0 otherwise)	0.284	3.331	N.A.	N.A.	N.A.	N.A.	N.A.

Table F.4 (continued): Model for Random Parameter Negative Binomial Estimation of Crashes Involving PDO Type Crash Frequency

	Constant Parameter		Random Parameter				
Variable: PDO	Mean	T-statistic	Distribu-tion	Mean	T-statistic	Standard Deviation	T-statistic
SR534 & SR105 dummy (1 if SR=534 or 105, 0 otherwise)	0.284	2.879	N.A.	N.A.	N.A.	N.A.	N.A.
Scale parameter for over-dispersion	0.127	78.214					
Convergent log-likelihood for fixed parameter negative binomial	-78,755.74						
Log-likelihood at random parameter negative binomial convergence	-74,510.41						
Number of observations	426,546 (47,394 segments with 9 year panel)						

Table F.5: Model for Random Parameter Negative Binomial Estimation of Crashes Involving Possible Injury Type Crash frequency

	Constant Parameter		Random Parameter				
Variable: possible injury	Mean	T-statistic	Distribu-tion	Mean	T-statistic	Standard Deviation	T-statistic
Constant	-3.861	-22.472	N.A.	N.A.	N.A.	N.A.	N.A.
Logarithm of length of segment in miles	N.A. [5]	N.A.	Normal	1.663	54.989	0.616	57.330
Logarithm of ADT	N.A.	N.A.	Normal	1.177	47.344	0.036	14.855
Roadway Geometrics							
Degree of curvature	0.052	13.630	N.A.	N.A.	N.A.	N.A.	N.A.
Number of lanes increasing and decreasing direction	N.A.	N.A.	Normal	-3.204	-45.747	0.325	31.593
Roadside Variables							
Proportion of fence on a segment is 90-100%	-0.505	-2.719	N.A.	N.A.	N.A.	N.A.	N.A.
State Route Dummies							
SR3 dummy (1 if SR=3, 0 otherwise)	0.768	5.560	N.A.	N.A.	N.A.	N.A.	N.A.
SR7 dummy (1 if SR=7, 0 otherwise)	0.734	5.421	N.A.	N.A.	N.A.	N.A.	N.A.
SR21 dummy (1 if SR=21, 0 otherwise)	-0.414	-2.270	N.A.	N.A.	N.A.	N.A.	N.A.
SR129 dummy (1 if SR=129, 0 otherwise)	-0.795	-2.399	N.A.	N.A.	N.A.	N.A.	N.A.
SR290 dummy (1 if SR=290, 0 otherwise)	-3.482	-4.319	N.A.	N.A.	N.A.	N.A.	N.A.
SR395 dummy (1 if SR=395, 0 otherwise)	0.533	4.202	N.A.	N.A.	N.A.	N.A.	N.A.
SR542 dummy (1 if SR=542, 0 otherwise)	0.894	6.652	N.A.	N.A.	N.A.	N.A.	N.A.
Scale parameter for over-dispersion	0.038	45.847					
Convergent log-likelihood for fixed parameter negative binomial	-30,054.96						
Log-likelihood at random parameter negative binomial convergence	-28,852.52						
Number of observations	426,546 (47,394 segments with 9 year panel)						

[5] N.A. means not applicable. Parameter values are either fixed across observations for variables with "constant parameters," or defined by distributions for variables with "random parameters."

Table F.6: Model for Random Parameter Negative Binomial Estimation Crashes Involving Evident Injury Type Crash Frequency

	Constant Parameter		Random Parameter				
Variable: evident injury	Mean	T-statistic	Distribu-tion	Mean	T-statistic	Standard Deviation	T-statistic
Constant	-1.886	-7.987	N.A.	N.A.	N.A.	N.A.	N.A.
Logarithm of length of segment in miles	N.A. [6]	N.A.	Normal	1.306	62.636	0.158	36.130
Logarithm of ADT	0.486	30.187	N.A.	N.A.	N.A.	N.A.	N.A.
Roadway Geometrics							
Number of lanes increasing and decreasing direction	-1.122	-10.600	N.A.	N.A.	N.A.	N.A.	N.A.
Shoulder width dummy (if shoulder width right is 4-5ft & left is 2-3ft, value=1,else=0)	-0.531	-3.493	N.A.	N.A.	N.A.	N.A.	N.A.
Shoulder width dummy (if shoulder width center is >1ft and <9ft, value=1,else=0)	-1.966	-5.669	N.A.	N.A.	N.A.	N.A.	N.A.
Degree of curvature	N.A.	N.A.	Normal	0.311	55.170	0.278	44.443
Roadside Variables							
Fence length on a segment	-0.319	-2.947	N.A.	N.A.	N.A.	N.A.	N.A.
Proportion of ditch on a segment is 100%	-0.304	-3.172	N.A.	N.A.	N.A.	N.A.	N.A.
Rock-out cropping dummy variable (1 if rock-out cropping exists, 0 otherwise)	-1.484	-2.865	N.A.	N.A.	N.A.	N.A.	N.A.
State Route Dummies							
SR21 dummy (1 if SR=21, 0 otherwise)	-0.616	-5.125	N.A.	N.A.	N.A.	N.A.	N.A.
SR22 dummy (1 if SR=22, 0 otherwise)	1.504	3.220	N.A.	N.A.	N.A.	N.A.	N.A.
SR104 dummy (1 if SR=104, 0 otherwise)	0.428	2.630	N.A.	N.A.	N.A.	N.A.	N.A.
SR153 dummy (1 if SR=153, 0 otherwise)	-0.603	-2.178	N.A.	N.A.	N.A.	N.A.	N.A.
SR272 dummy (1 if SR=272, 0 otherwise)	-1.366	-1.915	N.A.	N.A.	N.A.	N.A.	N.A.
SR290 dummy (1 if SR=290, 0 otherwise)	-2.137	-5.969	N.A.	N.A.	N.A.	N.A.	N.A.
SR706 dummy (1 if SR=706, 0 otherwise)	0.786	6.230	N.A.	N.A.	N.A.	N.A.	N.A.
SR123169 dummy (1 if SR=123 or 169, 0 otherwise)	-0.672	-3.274	N.A.	N.A.	N.A.	N.A.	N.A.

[6] N.A. means not applicable. Parameter values are either fixed across observations for variables with "constant parameters," or defined by distributions for variables with "random parameters."

Table F.6 (continued): Model for Random Parameter Negative Binomial Estimation Crashes Involving Evident Injury Type Crash Frequency

	Constant Parameter		Random Parameter				
Variable: evident injury	Mean	T-statistic	Distribu-tion	Mean	T-statistic	Standard Deviation	T-statistic
SR26022 dummy (1 if SR=260or22, 0 otherwise)	-1.497	-3.406	N.A.	N.A.	N.A.	N.A.	N.A.
Scale parameter for over-dispersion	0.035	50.707					
Convergent log-likelihood for fixed parameter negative binomial	-37,765.20						
Log-likelihood at random parameter negative binomial convergence	-35,400.20						
Number of observations	426,546 (47,394 segments with 9 year panel)						

Table F.7: Model for Random Parameter Negative Binomial Estimation Crashes Involving Serious Injury Type Crash Frequency

	Constant Parameter		Random Parameter				
Variable: serious injury	Mean	T-statistic	Distribu-tion	Mean	T-statistic	Standard Deviation	T-statistic
Constant	-3.442	-6.611	N.A. [7]	N.A.	N.A.	N.A.	N.A.
Logarithm of length of segment in miles	1.144	22.791	N.A.	N.A.	N.A.	N.A.	N.A.
Logarithm of ADT	N.A.	N.A.	Normal	0.439	10.375	0.009	2.069
Roadway Geometrics							
Degree of curvature	0.069	9.557	N.A.	N.A.	N.A.	N.A.	N.A.
Average lane width	N.A.	N.A.	Normal	-0.257	-6.926	0.125	26.646
Roadside Variables							
Proportion of guardrail on a segment is 60-70%	1.754	2.199	N.A.	N.A.	N.A.	N.A.	N.A.
Culvert dummy variable (1 if culvert exists, 0 otherwise)	0.521	2.085	N.A.	N.A.	N.A.	N.A.	N.A.
Tree group dummy variable (1 if tree Group exists, 0 otherwise)	0.351	2.096	N.A.	N.A.	N.A.	N.A.	N.A.
State Route Dummies							
SR21 dummy (1 if SR=21, 0 otherwise)	-1.148	-3.607	N.A.	N.A.	N.A.	N.A.	N.A.
SR25 dummy (1 if SR=25, 0 otherwise)	-0.842	-2.918	N.A.	N.A.	N.A.	N.A.	N.A.
SR97 dummy (1 if SR=97, 0 otherwise)	0.424	2.606	N.A.	N.A.	N.A.	N.A.	N.A.
SR261 & SR142 dummy (1 if SR=261 or 142, 0 otherwise)	-1.688	-2.886	N.A.	N.A.	N.A.	N.A.	N.A.
Scale parameter for over-dispersion	0.006	22.452					
Convergent log-likelihood for fixed parameter negative binomial	-11,188.22						
Log-likelihood at random parameter negative binomial convergence	-10,955.82						
Number of observations	426,546 (47,394 segments with 9 year panel)						

[7] N.A. means not applicable. Parameter values are either fixed across observations for variables with "constant parameters," or defined by distributions for variables with "random parameters."

Table F.8: Model for Random Parameter Negative Binomial Estimation Crashes Involving Fatal Injury Type Crash Frequency

	Constant Parameter		Random Parameter				
Variable: fatal	Mean	T-statistic	Distribu-tion	Mean	T-statistic	Standard Deviation	T-statistic
Constant	-7.057	-13.210	N.A.	N.A.	N.A.	N.A.	N.A.
Logarithm of length of segment in miles	N.A. [8]	N.A.	Normal	1.509	14.942	0.508	16.254
Logarithm of ADT	0.548	8.446	N.A.	N.A.	N.A.	N.A.	N.A.
Roadway Geometrics							
Degree of curvature	0.075	5.417	N.A.	N.A.	N.A.	N.A.	N.A.
Roadside Variables							
Fence dummy variable (1 if fence exists, 0 otherwise)	-0.749	-2.031	N.A.	N.A.	N.A.	N.A.	N.A.
State Route Dummies							
SR27 dummy (1 if SR=27, 0 otherwise)	-3.046	-2.281	N.A.	N.A.	N.A.	N.A.	N.A.
SR97 dummy (1 if SR=97, 0 otherwise)	0.774	3.061	N.A.	N.A.	N.A.	N.A.	N.A.
Scale parameter for over-dispersion	0.002	14.953					
Convergent log-likelihood for fixed parameter negative binomial	-7,383.95						
Log-likelihood at random parameter negative binomial convergence	-5,328.26						
Number of observations	426,546 (47,394 segments with 9 year panel)						

[8] N.A. means not applicable. Parameter values are either fixed across observations for variables with "constant parameters," or defined by distributions for variables with "random parameters."

Table F.9: Model for Random Parameter Negative Binomial Estimation Crashes Unknown Evident Injury Type Crash Frequency

	Constant Parameter		Random Parameter				
Variable: unknown injury	Mean	T-statistic	Distribu-tion	Mean	T-statistic	Standard Deviation	T-statistic
Constant	-3.252	-3.726	N.A.	N.A.	N.A.	N.A.	N.A.
Logarithm of length of segment in miles	0.917	21.615	N.A.	N.A.	N.A.	N.A.	N.A.
Logarithm of ADT	N.A. [9]	N.A.	Normal	0.409	9.037	0.123	25.399
Roadway Geometrics							
Number of lanes increasing direction	-4.180	-5.241	N.A.	N.A.	N.A.	N.A.	N.A.
Degree of curvature	0.043	8.126	N.A.	N.A.	N.A.	N.A.	N.A.
Roadside Variables							
Proportion of tree group on a segment is 90-100%	-1.271	-2.122	N.A.	N.A.	N.A.	N.A.	N.A.
State Route Dummies							
SR22 dummy (1 if SR=22, 0 otherwise)	0.928	2.623	N.A.	N.A.	N.A.	N.A.	N.A.
SR155 dummy (1 if SR=155, 0 otherwise)	0.604	3.378	N.A.	N.A.	N.A.	N.A.	N.A.
SR173 dummy (1 if SR=173, 0 otherwise)	1.460	3.169	N.A.	N.A.	N.A.	N.A.	N.A.
SR243 dummy (1 if SR=243, 0 otherwise)	1.365	3.514	N.A.	N.A.	N.A.	N.A.	N.A.
SR906 dummy (1 if SR=906, 0 otherwise)	2.310	3.217	N.A.	N.A.	N.A.	N.A.	N.A.
State route dummy (1 if SR=24 or SR=165, 0 otherwise)	1.274	4.792	N.A.	N.A.	N.A.	N.A.	N.A.
Scale parameter for over-dispersion	0.059	6.973					
Convergent log-likelihood for fixed parameter negative binomial	-5,839.38						
Log-likelihood at random parameter negative binomial convergence	-5,642.07						
Number of observations	426,546 (47,394 segments with 9 year panel)						

[9] N.A. means not applicable. Parameter values are either fixed across observations for variables with "constant parameters," or defined by distributions for variables with "random parameters."

Table F.10: Model for Random Parameter Negative Binomial Estimation Crashes Involving More than One Injury Type Crash Frequency

	Constant Parameter		Random Parameter				
Variable: more than one injury	Mean	T-statistic	Distribu-tion	Mean	T-statistic	Standard Deviation	T-statistic
Constant	N.A. [10]	N.A.	Normal	-2.519	-17.332	0.290	21.880
Logarithm of length of segment in miles	7.261	80.733	N.A.	N.A.	N.A.	N.A.	N.A.
Logarithm of ADT	N.A.	N.A.	Normal	0.822	52.237	0.005	2.809
Roadway Geometrics							
Number of lanes increasing direction	N.A.	N.A.	Normal	-5.839	-20.443	1.445	81.320
Number of lanes decreasing direction	N.A.	N.A.	Normal	-2.555	-9.295	0.113	8.897
Rate of vertical curvature/5280	N.A.	N.A.	Normal	-1.350	-8.463	1.337	9.076
Roadside Variables							
Proportion of guardrail on a segment is 90-100%	-0.441	-3.968	N.A.	N.A.	N.A.	N.A.	N.A.
Proportion of ditch on a segment is 90-100%	-0.397	-5.059	N.A.	N.A.	N.A.	N.A.	N.A.
Curb length on a segment	-0.719	-3.083	N.A.	N.A.	N.A.	N.A.	N.A.
Guardrail dummy variable (1 if guardrail exists, 0 otherwise)	0.207	2.634	N.A.	N.A.	N.A.	N.A.	N.A.
Mailbox dummy variable (1 if mailbox exists, 0 otherwise)	0.446	3.769	N.A.	N.A.	N.A.	N.A.	N.A.
State Route Dummies							
SR3 dummy (1 if SR=3, 0 otherwise)	0.705	6.496	N.A.	N.A.	N.A.	N.A.	N.A.
SR7 dummy (1 if SR=7, 0 otherwise)	0.431	4.864	N.A.	N.A.	N.A.	N.A.	N.A.
SR21 dummy (1 if SR=21, 0 otherwise)	-0.701	-6.046	N.A.	N.A.	N.A.	N.A.	N.A.
SR23 dummy (1 if SR=23, 0 otherwise)	-0.597	-2.859	N.A.	N.A.	N.A.	N.A.	N.A.
SR26 dummy (1 if SR=26, 0 otherwise)	0.541	5.528	N.A.	N.A.	N.A.	N.A.	N.A.
SR97 dummy (1 if SR=97, 0 otherwise)	0.347	6.101	N.A.	N.A.	N.A.	N.A.	N.A.
SR129 dummy (1 if SR=129, 0 otherwise)	-0.472	-2.534	N.A.	N.A.	N.A.	N.A.	N.A.
SR211 dummy (1 if SR=211, 0 otherwise)	0.637	2.872	N.A.	N.A.	N.A.	N.A.	N.A.
SR290 dummy (1 if SR=290, 0 otherwise)	-2.810	-7.192	N.A.	N.A.	N.A.	N.A.	N.A.

[10] N.A. means not applicable. Parameter values are either fixed across observations for variables with "constant parameters," or defined by distributions for variables with "random parameters."

Table F.10 (continued): Model for Random Parameter Negative Binomial Estimation Crashes Involving More than One Injury Type Crash Frequency

	Constant Parameter		Random Parameter				
Variable: more than one injury	Mean	T-statistic	Distribu-tion	Mean	T-statistic	Standard Deviation	T-statistic
SR302 dummy (1 if SR=302, 0 otherwise)	-0.773	-3.451	N.A.	N.A.	N.A.	N.A.	N.A.
SR503 dummy (1 if SR=503, 0 otherwise)	0.700	6.710	N.A.	N.A.	N.A.	N.A.	N.A.
SR504 dummy (1 if SR=504, 0 otherwise)	-0.476	-3.591	N.A.	N.A.	N.A.	N.A.	N.A.
SR108109 dummy (1 if SR=108 or SR=109, 0 otherwise)	0.327	3.050	N.A.	N.A.	N.A.	N.A.	N.A.
SR160544 dummy (1 if SR=160 or SR=544, 0 otherwise)	-2.072	-3.479	N.A.	N.A.	N.A.	N.A.	N.A.
SR123169 dummy (1 if SR=123 or SR=169, 0 otherwise)	-0.914	-5.879	N.A.	N.A.	N.A.	N.A.	N.A.
Scale parameter for over-dispersion	0.047	67.632					
Convergent log-likelihood for fixed parameter negative binomial	-60,867.23						
Log-likelihood at random parameter negative binomial convergence	-59,486.82						
Number of observations	426,546 (47,394 segments with 9 year panel)						

Table F.11: Model for Random Parameter Negative Binomial Estimation Crashes Involving One Injury Type Crash Frequency

	Constant Parameter		Random Parameter				
Variable: one injury	Mean	T-statistic	Distribution	Mean	T-statistic	Standard Deviation	T-statistic
Constant	-5.508	-4.145	N.A.	N.A.	N.A.	N.A.	N.A.
Logarithm of length of segment in miles	N.A. [11]	N.A.	Normal	1.905	25.099	0.753	24.292
Logarithm of ADT	1.549	23.988	N.A.	N.A.	N.A.	N.A.	N.A.
Roadway Geometrics							
Number of lanes increasing direction	-5.651	-21.452	N.A.	N.A.	N.A.	N.A.	N.A.
Number of lanes decreasing direction	-3.177	-2.466	N.A.	N.A.	N.A.	N.A.	N.A.
Degree of curvature	0.119	11.293	N.A.	N.A.	N.A.	N.A.	N.A.
Rate of vertical curvature/5280	-2.826	-3.531	N.A.	N.A.	N.A.	N.A.	N.A.
Roadside Variables							
Dummy for culvert end	5.532	7.941	N.A.	N.A.	N.A.	N.A.	N.A.
Percent length of segment for curb	-4.124	-3.580	N.A.	N.A.	N.A.	N.A.	N.A.
Percent length of segment for ditch	-0.627	-2.313	N.A.	N.A.	N.A.	N.A.	N.A.
Scale parameter for over-dispersion	0.006	20.684					
Convergent log-likelihood for fixed parameter negative binomial	-10,833.89						
Log-likelihood at random parameter negative binomial convergence	-8,584.13						
Number of observations	426,546 (47,394 segments with 9 year panel)						

[11] N.A. means not applicable. Parameter values are either fixed across observations for variables with "constant parameters," or defined by distributions for variables with "random parameters."

Table F.12: Model for Random Parameter Negative Binomial Estimation Crashes Involving No Injury Type Crash Frequency

	Constant Parameter		Random Parameter				
Variable: no injury	Mean	T-statistic	Distribu-tion	Mean	T-statistic	Standard Deviation	T-statistic
Constant	N.A. [12]	N.A.	Normal	-1.504	-14.306	0.171	16.217
Logarithm of length of segment in miles	N.A.	N.A.	Normal	1.396	92.976	0.485	91.915
Logarithm of ADT	0.830	63.293	N.A.	N.A.	N.A.	N.A.	N.A.
Roadway Geometrics							
Number of lanes decreasing direction	-2.649	-23.563	N.A.	N.A.	N.A.	N.A.	N.A.
Algebraic difference in gradients, percent	0.016	3.210	N.A.	N.A.	N.A.	N.A.	N.A.
Rate of vertical curvature/5280	-0.306	-4.186	N.A.	N.A.	N.A.	N.A.	N.A.
Degree of Curvature	0.045	22.225	N.A.	N.A.	N.A.	N.A.	N.A.
Shoulder width dummy (if shoulder width right is 4-5ft and shoulder width left is 2-3ft, value=1,else=0)	-0.333	-3.127	N.A.	N.A.	N.A.	N.A.	N.A.
Shoulder width dummy (if shoulder width center is >1ft and <9ft, value=1,else=0)	-3.989	-6.651	N.A.	N.A.	N.A.	N.A.	N.A.
Number of lanes increasing direction	N.A.	N.A.	Normal	-2.397	-23.093	0.037	3.518
Roadside Variables							
Proportion of guard rail length on a segment is 90-100%	-0.291	-3.074	N.A.	N.A.	N.A.	N.A.	N.A.
Ditch dummy variable (1 if ditch exists, 0 otherwise)	0.091	2.460	N.A.	N.A.	N.A.	N.A.	N.A.
Guardrail dummy variable (1 if guardrail exists, 0 otherwise)	0.173	2.964	N.A.	N.A.	N.A.	N.A.	N.A.
State Route Dummies							
SR3 dummy (1 if SR=3, 0 otherwise)	0.711	8.222	N.A.	N.A.	N.A.	N.A.	N.A.
SR9 dummy (1 if SR=9, 0 otherwise)	-0.262	-3.626	N.A.	N.A.	N.A.	N.A.	N.A.
SR12 dummy (1 if SR=12, 0 otherwise)	0.549	13.168	N.A.	N.A.	N.A.	N.A.	N.A.
SR21 dummy (1 if SR=21, 0 otherwise)	-0.891	-8.240	N.A.	N.A.	N.A.	N.A.	N.A.
SR26 dummy (1 if SR=26, 0 otherwise)	0.683	9.702	N.A.	N.A.	N.A.	N.A.	N.A.

[12] N.A. means not applicable. Parameter values are either fixed across observations for variables with "constant parameters," or defined by distributions for variables with "random parameters."

TableF.12 (continued): Model for Random Parameter Negative Binomial Estimation Crashes Involving No Injury Type Crash Frequency

	Constant Parameter		Random Parameter				
Variable: no injury	Mean	T-statistic	Distribu-tion	Mean	T-statistic	Standard Deviation	T-statistic
SR97 dummy (1 if SR=97, 0 otherwise)	0.547	12.477	N.A.	N.A.	N.A.	N.A.	N.A.
SR129 dummy (1 if SR=129, 0 otherwise)	-0.833	-5.327	N.A.	N.A.	N.A.	N.A.	N.A.
SR161 dummy (1 if SR=161, 0 otherwise)	-0.326	-2.077	N.A.	N.A.	N.A.	N.A.	N.A.
SR395 dummy (1 if SR=395, 0 otherwise)	0.522	6.965	N.A.	N.A.	N.A.	N.A.	N.A.
SR504 dummy (1 if SR=504, 0 otherwise)	-0.451	-3.812	N.A.	N.A.	N.A.	N.A.	N.A.
SR542 dummy (1 if SR=542, 0 otherwise)	1.013	14.879	N.A.	N.A.	N.A.	N.A.	N.A.
SR970 dummy (1 if SR=970, 0 otherwise)	1.098	4.879	N.A.	N.A.	N.A.	N.A.	N.A.
SR432532 (1 if SR=432 or SR=532, 0 otherwise)	0.663	4.090	N.A.	N.A.	N.A.	N.A.	N.A.
SR123169 dummy (1 if SR=123 or SR=169, 0 otherwise)	-0.998	-7.334	N.A.	N.A.	N.A.	N.A.	N.A.
SR26022 dummy (1 if SR=260 or SR=22, 0 otherwise)	-0.584	-4.680	N.A.	N.A.	N.A.	N.A.	N.A.
Scale parameter for over-dispersion	0.094	71.914					
Convergent log-likelihood for fixed parameter negative binomial	-74,668.25						
Log-likelihood at random parameter negative binomial convergence	-71,060.79						
Number of observations	426,546 (47,394 segments with 9 year panel)						

Table F.13: Model for Random Parameter Negative Binomial Estimation Crashes Involving One Vehicle Type Crash Frequency

	Constant Parameter		Random Parameter				
Variable: involving one vehicle	Mean	T-statistic	Distribu-tion	Mean	T-statistic	Standard Deviation	T-statistic
Constant	2.586	9.029	N.A.	N.A.	N.A.	N.A.	N.A.
Logarithm of length of segment in miles	N.A. [13]	N.A.	Normal	1.290	115.569	0.409	108.62
Logarithm of ADT	N.A.	N.A.	Normal	0.543	50.584	0.049	46.045
Roadway Geometrics							
Number of lanes increasing direction	-3.418	-22.456	N.A.	N.A.	N.A.	N.A.	N.A.
Number of lanes decreasing direction	-2.653	-12.378	N.A.	N.A.	N.A.	N.A.	N.A.
Rate of vertical curvature/5280	-0.237	-3.998	N.A.	N.A.	N.A.	N.A.	N.A.
Average lane width	-0.060	-7.734	N.A.	N.A.	N.A.	N.A.	N.A.
Shoulder width dummy (if shoulder width right is 4-5ft and shoulder width left is 2-3ft, value=1,else=0)	-0.338	-4.143	N.A.	N.A.	N.A.	N.A.	N.A.
Shoulder width dummy (if shoulder width center is >1ft and <9ft, value=1,else=0)	-2.331	-6.350	N.A.	N.A.	N.A.	N.A.	N.A.
Degree of curvature	N.A.	N.A.	Normal	0.052	34.301	0.024	16.791
Roadside Variables							
Proportion of guardrail length on a segment is 90-100%	-0.155	-2.565	N.A.	N.A.	N.A.	N.A.	N.A.
Rock-out cropping length on a segment	-0.784	-2.910	N.A.	N.A.	N.A.	N.A.	N.A.
Tree group dummy variable (1 if tree group exists, 0 otherwise)	0.082	2.213	N.A.	N.A.	N.A.	N.A.	N.A.
State Route Dummies							
SR12 dummy (1 if SR=12, 0 otherwise)	0.336	10.395	N.A.	N.A.	N.A.	N.A.	N.A.
SR21 dummy (1 if SR=21, 0 otherwise)	-0.874	-12.022	N.A.	N.A.	N.A.	N.A.	N.A.
SR23 dummy (1 if SR=23, 0 otherwise)	-0.599	-5.338	N.A.	N.A.	N.A.	N.A.	N.A.
SR25 dummy (1 if SR=25, 0 otherwise)	-0.293	-4.645	N.A.	N.A.	N.A.	N.A.	N.A.
SR26 dummy (1 if SR=26, 0 otherwise)	0.520	10.295	N.A.	N.A.	N.A.	N.A.	N.A.

[13] N.A. means not applicable. Parameter values are either fixed across observations for variables with "constant parameters," or defined by distributions for variables with "random parameters."

Table F.13 (continued): Model for Random Parameter Negative Binomial Estimation Crashes Involving One Vehicle Type Crash Frequency

	Constant Parameter		Random Parameter				
Variable: involving one vehicle	Mean	T-statistic	Distribu-tion	Mean	T-statistic	Standard Deviation	T-statistic
SR27 dummy (1 if SR=27, 0 otherwise)	-0.388	-5.159	N.A.	N.A.	N.A.	N.A.	N.A.
SR28 dummy (1 if SR=28, 0 otherwise)	-0.346	-6.082	N.A.	N.A.	N.A.	N.A.	N.A.
SR31 dummy (1 if SR=31, 0 otherwise)	-0.554	-3.861	N.A.	N.A.	N.A.	N.A.	N.A.
SR97 dummy (1 if SR=97, 0 otherwise)	0.509	15.880	N.A.	N.A.	N.A.	N.A.	N.A.
SR124 dummy (1 if SR=124, 0 otherwise)	0.436	5.859	N.A.	N.A.	N.A.	N.A.	N.A.
SR127 dummy (1 if SR=127, 0 otherwise)	-0.451	-3.172	N.A.	N.A.	N.A.	N.A.	N.A.
SR129 dummy (1 if SR=129, 0 otherwise)	-0.919	-7.906	N.A.	N.A.	N.A.	N.A.	N.A.
SR150 dummy (1 if SR=150, 0 otherwise)	-0.355	-2.343	N.A.	N.A.	N.A.	N.A.	N.A.
SR504 dummy (1 if SR=504, 0 otherwise)	-0.495	-5.667	N.A.	N.A.	N.A.	N.A.	N.A.
SR542 dummy (1 if SR=542, 0 otherwise)	0.543	9.688	N.A.	N.A.	N.A.	N.A.	N.A.
SR970 dummy (1 if SR=970, 0 otherwise)	1.026	6.203	N.A.	N.A.	N.A.	N.A.	N.A.
SR432532 dummy (1 if SR=432 or SR=532, 0 otherwise)	-0.958	-4.738	N.A.	N.A.	N.A.	N.A.	N.A.
SR123169 dummy (1 if SR=123 or SR=169, 0 otherwise)	-1.187	-9.834	N.A.	N.A.	N.A.	N.A.	N.A.
SR261142 dummy (1 if SR=261 or SR=142, 0 otherwise)	-0.697	-5.981	N.A.	N.A.	N.A.	N.A.	N.A.
SR26022 dummy (1 if SR=260 or SR=22, 0 otherwise)	-0.582	-5.821	N.A.	N.A.	N.A.	N.A.	N.A.

Table F.13 (continued): Model for Random Parameter Negative Binomial Estimation Crashes Involving One Vehicle Type Crash Frequency

	Constant Parameter		Random Parameter				
Variable: involving one vehicle	Mean	T-statistic	Distribu-tion	Mean	T-statistic	Standard Deviation	T-statistic
SR108109 dummy (1 if SR=108 or SR=109, 0 otherwise)	0.180	2.580	N.A.	N.A.	N.A.	N.A.	N.A.
Scale parameter for over-dispersion	0.222	74.197					
Convergent log-likelihood for fixed parameter negative binomial	-91,605.45						
Log-likelihood at random parameter negative binomial convergence	-85,936.88						
Number of observations	426,546 (47,394 segments with 9 year panel)						

Table F.14: Model for Random Parameter Negative Binomial Estimation Crashes Involving Two Vehicle Type Crash Frequency

	Constant Parameter		Random Parameter				
Variable	Mean	T-statistic	Distribu-tion	Mean	T-statistic	Standard Deviation	T-statistic
Constant: involving two vehicle	N.A. [14]	N.A.	Normal	-8.355	-47.978	2.495	62.932
Logarithm of length of segment in miles	N.A.	N.A.	Normal	1.588	56.012	0.194	27.144
Logarithm of ADT	1.836	57.035	N.A.	N.A.	N.A.	N.A.	N.A.
Roadway Geometrics							
Number of lanes increasing direction	-3.171	-11.182	N.A.	N.A.	N.A.	N.A.	N.A.
Number of lanes decreasing direction	-4.259	-14.951	N.A.	N.A.	N.A.	N.A.	N.A.
Rate of vertical curvature/5280	-0.524	-3.410	N.A.	N.A.	N.A.	N.A.	N.A.
Degree of curvature	0.279	58.937	N.A.	N.A.	N.A.	N.A.	N.A.
Shoulder width dummy (if shoulder width center is >1ft and <9ft, value=1,else=0)	-6.755	-7.302	N.A.	N.A.	N.A.	N.A.	N.A.
Horizontal curve central angle	N.A.	N.A.	Normal	-0.008	-23.600	0.006	21.142
Roadside Variables							
Proportion of tree group length on a segment is 90-100%	-0.277	-1.736	N.A.	N.A.	N.A.	N.A.	N.A.
State Route Dummies							
SR21 dummy (1 if SR=21, 0 otherwise)	-0.703	-3.485	N.A.	N.A.	N.A.	N.A.	N.A.
SR23 dummy (1 if SR=23, 0 otherwise)	-1.371	-3.342	N.A.	N.A.	N.A.	N.A.	N.A.
SR127 dummy (1 if SR=127, 0 otherwise)	-1.470	-2.931	N.A.	N.A.	N.A.	N.A.	N.A.
SR129 dummy (1 if SR=129, 0 otherwise)	-4.019	-14.464	N.A.	N.A.	N.A.	N.A.	N.A.
SR542 dummy (1 if SR=542, 0 otherwise)	1.393	10.774	N.A.	N.A.	N.A.	N.A.	N.A.
Scale parameter for over-dispersion	0.029	72.584					
Convergent log-likelihood for fixed parameter negative binomial	-43,974.23						
Log-likelihood at random parameter negative binomial convergence	-43,223.41						
Number of observations	426,546 (47,394 segments with 9 year panel)						

[14] N.A. means not applicable. Parameter values are either fixed across observations for variables with "constant parameters," or defined by distributions for variables with "random parameters."

Table F.15: Model for Random Parameter Negative Binomial Estimation Crashes Involving Three Vehicle Type Crash Frequency

	Constant Parameter		Random Parameter				
Variable: involving three vehicles	Mean	T-statistic	Distribu-tion	Mean	T-statistic	Standard Deviation	T-statistic
Constant	N.A. [15]	N.A.	Normal	-15.462	-22.81	2.831	18.36
Logarithm of length of segment in miles	1.554	18.07	N.A.	N.A.	N.A.	N.A.	N.A.
Logarithm of ADT	N.A.	N.A.	Normal	2.247	20.18	0.263	17.81
Roadway Geometrics							
Rate of vertical curvature/5280	-4.355	-4.95	N.A.	N.A.	N.A.	N.A.	N.A.
Degree of curvature	0.059	5.05	N.A.	N.A.	N.A.	N.A.	N.A.
Number of lanes increasing direction	N.A.	N.A.	Normal	-8.050	15.95	0.993	13.91
State Route Dummies							
SR542 dummy (if SR542,value=1, else =0)	2.236	8.85	N.A.	N.A.	N.A.	N.A.	N.A.
SR532 dummy (if SR532,value=1, else =0)	4.879	7.65	N.A.	N.A.	N.A.	N.A.	N.A.
SR906 dummy (if SR906,value=1, else =0)	7.376	6.40	N.A.	N.A.	N.A.	N.A.	N.A.
Scale parameter for over-dispersion	0.008	23.20	N.A.	N.A.	N.A.	N.A.	N.A.
Convergent log-likelihood for fixed parameter negative binomial	-7,177.248						
Log-likelihood at random parameter negative binomial convergence	-6,964.300						
Number of observations	426,546 (47,394 segments with 9 year panel)						

[15] N.A. means not applicable. Parameter values are either fixed across observations for variables with "constant parameters," or defined by distributions for variables with "random parameters."

Table F.16: Model for Random Parameter Negative Binomial Estimation Crashes Involving Four Vehicle Type Crash Frequency

	Constant Parameter		Random Parameter				
Variable: involving four vehicles	Mean	T-statistic	Distribution	Mean	T-statistic	Standard Deviation	T-statistic
Constant	N.A.[16]	N.A.	Normal	Normal	-18.352	-5.49	1.680
Logarithm of length of segment in miles	N.A.	N.A.	Normal	Normal	1.833	4.87	0.297
Logarithm of ADT	N.A.	N.A.	Normal	Normal	2.509	5.32	0.615
Roadway Geometrics							
Algebraic difference in gradients	0.233	2.65	N.A.	N.A.	N.A.	N.A.	N.A.
Shoulder width dummy (if shoulder width right is 4-5ft and shoulder width left is 2-3ft, value=1,else=0)	3.036	2.45	N.A.	N.A.	N.A.	N.A.	1.96
Number of lanes increasing direction	N.A.	N.A.	Normal	-12.782	-4.64	2.070	4.91
State Route Dummies							
SR22 dummy (if SR22,value=1, else =0)	4.422	2.50	N.A.	N.A.	N.A.	N.A.	N.A.
SR503 dummy (if SR503,value=1, else =0)	3.001	2.40	N.A.	N.A.	N.A.	N.A.	N.A.
Scale parameter for over-dispersion	0.002	10.38					
Convergent log-likelihood for fixed parameter negative binomial	-1,264.927						
Log-likelihood at random parameter negative binomial convergence	-1,250.263						
Number of observations	426,546 (47,394 segments with 9 year panel)						

[16] N.A. means not applicable. Parameter values are either fixed across observations for variables with "constant parameters," or defined by distributions for variables with "random parameters."

Table F.17: Model for Random Parameter Negative Binomial Estimation Crashes Involving Five Vehicle Type Crash Frequency

	Constant Parameter		Random Parameter				
Variable	Mean	T-statistic	Distribution	Mean	T-statistic	Standard Deviation	T-statistic
Constant: involving five vehicles	N.A. [17]	N.A.	Normal	-22.348	-2.81	0.438	2.08
Logarithm of length of segment in miles	N.A.	N.A.	Normal	4.81	2.33	1.015	2.24
Logarithm of ADT	2.451	2.09	N.A.	N.A.	N.A.	N.A.	N.A.
State Route Dummies							
SR=432532 dummy (if SR= 432 or 532,value=1, else=0)	5.088	1.91	N.A.	N.A.	N.A.	N.A.	N.A.
SR970 dummy (if SR970,value=1, else =0)	1.364	2.14	N.A.	N.A.	N.A.	N.A.	N.A.
Scale parameter for over-dispersion	0.0002	3.49					
Convergent log-likelihood for fixed parameter negative binomial	-1,263.79						
Log-likelihood at random parameter negative binomial convergence	-1,658.68						
Number of observations	426,546 (47,394 segments with 9 year panel)						

Table F.18: Model for Random Parameter Negative Binomial Estimation Crashes Involving Other Vehicle Type Crash Frequency

	Constant Parameter		Random Parameter				
Variable: other	Mean	T-statistic	Distribution	Mean	T-statistic	Standard Deviation	T-statistic
Logarithm of ADT	N.A.	N.A.	Normal	-2.026	-11.66	0.379	5.55
State Route Dummies							
SR507 dummy (if SR507,value=1, else =0)	5.843	5.27	N.A.	N.A.	N.A.	N.A.	N.A.
Scale parameter for over-dispersion	0.308	0.36					
Convergent log-likelihood for fixed parameter negative binomial	-103.35						
Log-likelihood at random parameter negative binomial convergence	-98.02						
Number of observations	426,546 (47,394 segments with 9 year panel)						

[17] N.A. means not applicable. Parameter values are either fixed across observations for variables with "constant parameters," or defined by distributions for variables with "random parameters."

Table F.19: Model for Random Parameter Negative Binomial Estimation Crashes Involving Rear-End Type Crash Frequency

	Constant Parameter		Random Parameter				
Variable: rear-end	Mean	T-statistic	Distribution	Mean	T-statistic	Standard Deviation	T-statistic
Constant	N.A. [18]	N.A.	Normal	-14.379	-42.77	2.259	40.1
Logarithm of length of segment in miles	N.A.	N.A.	Normal	1.617	35.66	0.534	34.69
Logarithm of ADT	N.A.	N.A.	Normal	2.304	42.33	0.17	35.09
Roadway Geometrics							
Shoulder width dummy (if shoulder width right is >10ft and shoulder width left is 4-5ft, value=1,else=0)	-5.83	-5.67	N.A.	N.A.	N.A.	N.A.	N.A.
Shoulder width dummy (if shoulder center is >1ft and <9ft, value=1,else=0)	-5.356	-6.74	N.A.	N.A.	N.A.	N.A.	1.96
Number of lanes increasing and decreasing direction	N.A.	N.A.	Normal	-3.968	-32.81	0.019	0.586
Degree of curvature	N.A.	N.A.	Normal	-0.083	-7.03	0.123	14.08
Roadside Variables							
Proportion of ditch on a segment is 90-100%	-0.349	-2.05	N.A.	N.A.	N.A.	N.A.	N.A.
Proportion of culvert on a segment is 90-100%	3.254	5.3	N.A.	N.A.	N.A.	N.A.	N.A.
Proportion of guardrail on a segment is 90-100%	-0.813	-3.98	N.A.	N.A.	N.A.	N.A.	N.A.
State Route Dummies							
SR141 dummy (if SR141,value=1, else =0)	1.405	3.75	N.A.	N.A.	N.A.	N.A.	N.A.
SR395 dummy (if SR395,value=1, else =0)	1.193	6.81	N.A.	N.A.	N.A.	N.A.	N.A.
SR3 dummy (if SR3,value=1, else =0)	1.788	11.49	N.A.	N.A.	N.A.	N.A.	N.A.
SR7 dummy (if SR7,value=1, else =0)	-0.566	-2.43	N.A.	N.A.	N.A.	N.A.	N.A.
SR432532 dummy (if SR=432 or 532,value=1, else=0)	N.A.	N.A.	Normal	3.032	11.17	0.433	1.94
Scale parameter for over-dispersion	0.035	45.72					
Convergent log-likelihood for fixed parameter negative binomial	-18,565.65						
Log-likelihood at random parameter negative binomial convergence	-17,689.75						
Number of observations	426,546 (47,394 segments with 9 year panel)						

[18] N.A. means not applicable. Parameter values are either fixed across observations for variables with "constant parameters," or defined by distributions for variables with "random parameters."

Table F.20: Model for Random Parameter Negative Binomial Estimation Crashes Involving Same Direction Side-Swipe Type Crash Frequency

	Constant Parameter		Random Parameter				
Variable: same direction side-swipe	Mean	T-statistic	Distribution	Mean	T-statistic	Standard Deviation	T-statistic
Constant	N.A. [19]	N.A.	Normal	-9.313	-8.73	1.163	10.58
Logarithm of length of segment in miles	N.A.	N.A.	Normal	2.796	12.98	0.994	13.11
Logarithm of ADT	N.A.	N.A.	Normal	1.806	11.73	0.057	5.83
Roadway Geometrics							
Average Lane width	0.127	2.57	N.A.	N.A.	N.A.	N.A.	N.A.
Shoulder width right	-0.053	-1.95	N.A.	N.A.	N.A.	N.A.	1.96
Total number of lanes	N.A.	N.A.	Normal	-4.264	-8.41	0.383	8.45
Degree of curvature	0.054	2.83	N.A.	N.A.	N.A.	N.A.	N.A.
Roadside Variables							
Proportion of fence length on segment is 90-100%	1.883	3.88	N.A.	N.A.	N.A.	N.A.	N.A.
State Route Dummies							
State route dummy (1 if route number is 26 or 702, 0 otherwise)	1.447	3.70	N.A.	N.A.	N.A.	N.A.	N.A.
State route dummy (1 if route number is 108 or 109, 0 otherwise)	-2.500	-2.30	N.A.	N.A.	N.A.	N.A.	N.A.
Scale parameter for over-dispersion	0.004	14.51					
Log-likelihood for constant baseline parameter negative binomial convergence	-3,748.158						
Log-likelihood at random parameter negative binomial convergence	-3,677.756						
Number of observations	426,546 (47,394 segments with 9 year panel)						

[19] N.A. means not applicable. Parameter values are either fixed across observations for variables with "constant parameters," or defined by distributions for variables with "random parameters."

Table F.21: Model for Random Parameter Negative Binomial Estimation Crashes Involving Same Direction Turning Type Crash Frequency

	Constant Parameter		Random Parameter				
Variable: same direction turning	Mean	T-statistic	Distribution	Mean	T-statistic	Standard Deviation	T-statistic
Constant	-3.351	-2.139	N.A.	N.A.	N.A.	N.A.	N.A.
Logarithm of length of segment in miles	N.A. [20]	N.A.	Normal	2.431	8.533	0.859	8.570
Logarithm of ADT	1.152	6.216	N.A.	N.A.	N.A.	N.A.	N.A.
Roadway Geometrics							
Horizontal curve central angle	-0.006	-2.966	N.A.	N.A.	N.A.	N.A.	N.A.
Number of lanes increasing direction	N.A.	N.A.	Normal	-9.189	-5.280	1.794	8.362
Roadside Variables							
Fence dummy variable (1 if fence exists, 0 otherwise)	1.123	2.279	N.A.	N.A.	N.A.	N.A.	N.A.
Road approach dummy variable (1 if road approach exists, 0 otherwise)	2.652	5.316	N.A.	N.A.	N.A.	N.A.	N.A.
Proportion of guardrail length on a segment is 90-100%	-3.753	-1.728	N.A.	N.A.	N.A.	N.A.	N.A.
Scale parameter for over-dispersion	0.002	8.901					
Convergent log-likelihood for fixed parameter negative binomial	-3,320.20						
Log-likelihood at random parameter negative binomial convergence	-1,943.02						
Number of observations	426,546 (47,394 segments with 9 year panel)						

[20] N.A. means not applicable. Parameter values are either fixed across observations for variables with "constant parameters," or defined by distributions for variables with "random parameters."

Table F.22: Model for Random Parameter Negative Binomial Estimation Crashes Involving Same Direction Others Type Crash Frequency

	Constant Parameter		Random Parameter				
Variable: same direction others	Mean	T-statistic	Distribution	Mean	T-statistic	Standard Deviation	T-statistic
Constant	-6.351	-8.186	N.A.	N.A.	N.A.	N.A.	N.A.
Logarithm of length of segment in miles	N.A. [21]	N.A.	Normal	1.988	12.965	0.680	12.677
Logarithm of ADT	1.486	11.659	N.A.	N.A.	N.A.	N.A.	N.A.
Roadway Geometrics							
Number of lanes increasing direction	-7.388	-9.773	N.A.	N.A.	N.A.	N.A.	N.A.
Roadside Variables							
Proportion of roadside slope length on a segment is 60-70%	-4.470	-2.436	N.A.	N.A.	N.A.	N.A.	N.A.
State Route Dummies							
SR12 dummy (1 if SR=12, 0 otherwise)	0.687	2.613	N.A.	N.A.	N.A.	N.A.	N.A.
SR28 dummy (1 if SR=28, 0 otherwise)	0.965	2.254	N.A.	N.A.	N.A.	N.A.	N.A.
SR410 dummy (1 if SR=410, 0 otherwise)	0.688	1.603	N.A.	N.A.	N.A.	N.A.	N.A.
SR542 dummy (1 if SR=542, 0 otherwise)	1.599	3.640	N.A.	N.A.	N.A.	N.A.	N.A.
Scale parameter for over-dispersion	0.002	14.228					
Convergent log-likelihood for fixed parameter negative binomial	-4,526.84						
Log-likelihood at random parameter negative binomial convergence	-4,432.71						
Number of observations	426,546 (47,394 segments with 9 year panel)						

[21] N.A. means not applicable. Parameter values are either fixed across observations for variables with "constant parameters," or defined by distributions for variables with "random parameters."

Table F.23: Model for Random Parameter Negative Binomial Estimation Crashes Involving Head-On Type Crash Frequency

	Constant Parameter		Random Parameter				
Variable: head-on	Mean	T-statistic	Distribution	Mean	T-statistic	Standard Deviation	T-statistic
Constant	-9.389	-12.079	N.A.	N.A.	N.A.	N.A.	N.A.
Logarithm of length of segment in miles	N.A. [22]	N.A.	Normal	1.307	10.985	0.424	10.753
Logarithm of ADT	0.822	7.78	N.A.	N.A.	N.A.	N.A.	N.A.
Roadway Geometrics							
Degree of curvature	0.108	6.514	N.A.	N.A.	N.A.	N.A.	N.A.
Roadside Variables							
Drainage inlet dummy variable (1 if drainage inlet exists, 0 otherwise)	-2.308	-3.369	N.A.	N.A.	N.A.	N.A.	N.A.
State Route Dummies							
SR21 dummy (1 if SR=21, 0 otherwise)	-1.472	-2.521	N.A.	N.A.	N.A.	N.A.	N.A.
SR231 dummy (1 if SR=231, 0 otherwise)	-1.601	-1.934	N.A.	N.A.	N.A.	N.A.	N.A.
SR504 dummy (1 if SR=504, 0 otherwise)	-2.147	-2.007	N.A.	N.A.	N.A.	N.A.	N.A.
Scale parameter for over-dispersion	0.001	13.391					
Convergent log-likelihood for fixed parameter negative binomial	-4,820.28						
Log-likelihood at random parameter negative binomial convergence	-4,765.35						
Number of observations	426,546 (47,394 segments with 9 year panel)						

[22] N.A. means not applicable. Parameter values are either fixed across observations for variables with "constant parameters," or defined by distributions for variables with "random parameters."

Table F.24: Model for Random Parameter Negative Binomial Estimation Crashes Involving Opposite Direction Sideswipe Type Crash Frequency

	Constant Parameter		Random Parameter				
Variable: opposite direction sideswipe	Mean	T-statistic	Distribution	Mean	T-statistic	Standard Deviation	T-statistic
Constant	-4.251	-6.040	N.A.	N.A.	N.A.	N.A.	N.A.
Logarithm of length of segment in miles	N.A. [23]	N.A.	Normal	1.881	16.209	0.713	16.160
Logarithm of ADT	1.327	13.844	N.A.	N.A.	N.A.	N.A.	N.A.
Roadway Geometrics							
Number of lanes increasing direction	-8.139	-12.541	N.A.	N.A.	N.A.	N.A.	N.A.
Degree of curvature	0.113	9.123	N.A.	N.A.	N.A.	N.A.	N.A.
Roadside Variables							
Bridge rail dummy variable (1 if Bridge rail exists, 0 otherwise)	1.695	2.596	N.A.	N.A.	N.A.	N.A.	N.A.
Fence length on Segment	-1.457	-2.699	N.A.	N.A.	N.A.	N.A.	N.A.
State Route Dummies							
SR21 dummy (1 if SR=21, 0 otherwise)	-1.141	-1.833	N.A.	N.A.	N.A.	N.A.	N.A.
SR112 dummy (1 if SR=112, 0 otherwise)	1.318	4.148	N.A.	N.A.	N.A.	N.A.	N.A.
SR504 dummy (1 if SR=504, 0 otherwise)	-1.861	-2.130	N.A.	N.A.	N.A.	N.A.	N.A.
SR542 dummy (1 if SR=542, 0 otherwise)	1.755	5.294	N.A.	N.A.	N.A.	N.A.	N.A.
Scale parameter for over-dispersion	0.003	17.312					
Convergent log-likelihood for fixed parameter negative binomial	-6,825.41						
Log-likelihood at random parameter negative binomial convergence	-6,712.22						
Number of observations	426,546 (47,394 segments with 9 year panel)						

[23] N.A. means not applicable. Parameter values are either fixed across observations for variables with "constant parameters," or defined by distributions for variables with "random parameters."

Table F.25: Model for Random Parameter Negative Binomial Estimation Crashes Involving Opposite Direction Others Type Crash Frequency

	Constant Parameter		Random Parameter				
Variable: opposite direction others	Mean	T-statistic	Distribution	Mean	T-statistic	Standard Deviation	T-statistic
Constant	-4.801	-7.327	N.A.	N.A.	N.A.	N.A.	N.A.
Logarithm of length of segment in miles	0.983	13.978	N.A.	N.A.	N.A.	N.A.	N.A.
Logarithm of ADT	N.A. [24]	N.A.	Normal	1.147	15.681	0.074	10.255
Roadway Geometrics							
Number of lanes increasing direction	-7.113	-11.885	N.A.	N.A.	N.A.	N.A.	N.A.
Rate of vertical curvature/5280	-3.490	-3.730	N.A.	N.A.	N.A.	N.A.	N.A.
Shoulder width dummy (if shoulder width right is 4-5ft and shoulder width left is 2-3ft, value=1,else=0)	0.881	2.784	N.A.	N.A.	N.A.	N.A.	N.A.
Degree of curvature	N.A.	N.A.	Normal	0.081	8.255	0.036	4.636
Roadside Variables							
Proportion of curb length on a segment is 90-100%	2.965	5.220	N.A.	N.A.	N.A.	N.A.	N.A.
State Route Dummies							
SR12 dummy (1 if SR=12, 0 otherwise)	0.522	2.644	N.A.	N.A.	N.A.	N.A.	N.A.
SR542 dummy (1 if SR=542, 0 otherwise)	1.415	4.614	N.A.	N.A.	N.A.	N.A.	N.A.
Scale parameter for over-dispersion	0.002	18.253					
Convergent log-likelihood for fixed parameter negative binomial	-7,199.54						
Log-likelihood at random parameter negative binomial convergence	-7,109.80						
Number of observations	426,546 (47,394 segments with 9 year panel)						

[24] N.A. means not applicable. Parameter values are either fixed across observations for variables with "constant parameters," or defined by distributions for variables with "random parameters."

Table F.26: Model for Random Parameter Negative Binomial Estimation Crashes Involving Fixed Object Type Crash Frequency

	Constant Parameter		Random Parameter				
Variable: fixed object	Mean	T-statistic	Distribution	Mean	T-statistic	Standard Deviation	T-statistic
Constant	-2.840	-14.070	N.A.	N.A.	N.A.	N.A.	N.A.
Logarithm of length of segment in miles	N.A. [25]	N.A.	Normal	5.438	40.495	1.951	27.936
Logarithm of ADT	N.A.	N.A.	Normal	0.552	34.690	0.021	14.204
Roadway Geometrics							
Number of lanes increasing direction	-4.964	-27.412	N.A.	N.A.	N.A.	N.A.	N.A.
Degree of curvature	0.053	26.827	N.A.	N.A.	N.A.	N.A.	N.A.
Shoulder width dummy (if shoulder width right is 4-5ft and shoulder width left is 2-3ft, value=1,else=0)	-0.324	-3.020	N.A.	N.A.	N.A.	N.A.	N.A.
Shoulder width dummy (if shoulder width center is >1ft and <9ft, value=1,else=0)	-5.511	-12.020	N.A.	N.A.	N.A.	N.A.	N.A.
Algebraic difference in gradients, percent	N.A.	N.A.	Normal	-0.025	-4.261	0.047	9.647
Rate of vertical curvature/5280	N.A.	N.A.	Normal	-2.712	-13.523	2.281	13.320
Roadside Variables							
Guardrail dummy variable (1 if guardrail exists, 0otherwise)	0.751	8.007	N.A.	N.A.	N.A.	N.A.	N.A.
Proportion of guardrail length on a segment is 90-100%	-0.948	-7.664	N.A.	N.A.	N.A.	N.A.	N.A.
Tree group length on a segment	-0.983	-2.759	N.A.	N.A.	N.A.	N.A.	N.A.
Tree group dummy variable (1 if tree group exists, 0 otherwise)	0.461	6.389	N.A.	N.A.	N.A.	N.A.	N.A.
State Route Dummies							
SR3 dummy (1 if SR=3, 0 otherwise)	0.261	1.954	N.A.	N.A.	N.A.	N.A.	N.A.
SR6 dummy (1 if SR=6, 0 otherwise)	0.220	2.207	N.A.	N.A.	N.A.	N.A.	N.A.
SR7 dummy (1 if SR=7, 0 otherwise)	0.353	4.389	N.A.	N.A.	N.A.	N.A.	N.A.
SR12 dummy (1 if SR=12, 0 otherwise)	0.265	5.629	N.A.	N.A.	N.A.	N.A.	N.A.
SR18 dummy (1 if SR=18, 0 otherwise)	0.897	2.608	N.A.	N.A.	N.A.	N.A.	N.A.
SR21 dummy (1 if SR=21, 0 otherwise)	-1.314	-15.912	N.A.	N.A.	N.A.	N.A.	N.A.
SR22 dummy (1 if SR=22, 0 otherwise)	-0.608	-2.982	N.A.	N.A.	N.A.	N.A.	N.A.

[25] N.A. means not applicable. Parameter values are either fixed across observations for variables with "constant parameters," or defined by distributions for variables with "random parameters."

Table F.26 (Continued): Model for Random Parameter Negative Binomial Estimation Crashes Involving Fixed Object Type Crash Frequency

	Constant Parameter		Random Parameter				
Variable: fixed object	Mean	T-statistic	Distribution	Mean	T-statistic	Standard Deviation	T-statistic
SR23 dummy (1 if SR=23, 0 otherwise)	-0.947	-6.950	N.A.	N.A.	N.A.	N.A.	N.A.
SR26 dummy (1 if SR=26, 0 otherwise)	0.596	6.116	N.A.	N.A.	N.A.	N.A.	N.A.
SR27 dummy (1 if SR=27, 0 otherwise)	-0.619	-5.815	N.A.	N.A.	N.A.	N.A.	N.A.
SR31 dummy (1 if SR=31, 0 otherwise)	-1.023	-5.398	N.A.	N.A.	N.A.	N.A.	N.A.
SR97 dummy (1 if SR=97, 0 otherwise)	0.475	8.295	N.A.	N.A.	N.A.	N.A.	N.A.
SR105 dummy (1 if SR=105, 0 otherwise)	0.351	2.479	N.A.	N.A.	N.A.	N.A.	N.A.
SR106 dummy (1 if SR=106, 0 otherwise)	0.446	3.252	N.A.	N.A.	N.A.	N.A.	N.A.
SR129 dummy (1 if SR=129, 0 otherwise)	-1.299	-9.197	N.A.	N.A.	N.A.	N.A.	N.A.
SR172 dummy (1 if SR=172, 0 otherwise)	-1.730	-4.403	N.A.	N.A.	N.A.	N.A.	N.A.
SR195 dummy (1 if SR=195, 0 otherwise)	0.370	3.432	N.A.	N.A.	N.A.	N.A.	N.A.
SR202 dummy (1 if SR=202, 0 otherwise)	-0.655	-4.332	N.A.	N.A.	N.A.	N.A.	N.A.
SR221 dummy (1 if SR=221, 0 otherwise)	-0.706	-3.276	N.A.	N.A.	N.A.	N.A.	N.A.
SR231 dummy (1 if SR=231, 0 otherwise)	-0.460	-4.956	N.A.	N.A.	N.A.	N.A.	N.A.
SR241 dummy (1 if SR=241, 0 otherwise)	0.517	3.310	N.A.	N.A.	N.A.	N.A.	N.A.
SR261 dummy (1 if SR=261, 0 otherwise)	-1.033	-6.908	N.A.	N.A.	N.A.	N.A.	N.A.
SR290 dummy (1 if SR=290, 0 otherwise)	-3.363	-4.732	N.A.	N.A.	N.A.	N.A.	N.A.
SR305 dummy (1 if SR=305, 0 otherwise)	-1.723	-7.488	N.A.	N.A.	N.A.	N.A.	N.A.
SR504 dummy (1 if SR=504, 0 otherwise)	-0.514	-4.603	N.A.	N.A.	N.A.	N.A.	N.A.
SR508 dummy (1 if SR=508, 0 otherwise)	0.389	2.671	N.A.	N.A.	N.A.	N.A.	N.A.
SR542 dummy (1 if SR=542, 0 otherwise)	0.684	9.092	N.A.	N.A.	N.A.	N.A.	N.A.
State route dummy (1 if SR=432 or SR=532, 0 otherwise)	-0.580	-2.435	N.A.	N.A.	N.A.	N.A.	N.A.
State route dummy (1 if SR=123 or SR=169, 0 otherwise)	-1.152	-6.867	N.A.	N.A.	N.A.	N.A.	N.A.

Table F.26 (Continued): Model for Random Parameter Negative Binomial Estimation Crashes Involving Fixed Object Type Crash Frequency

	Constant Parameter		Random Parameter				
Variable: fixed object	Mean	T-statistic	Distribution	Mean	T-statistic	Standard Deviation	T-statistic
State route dummy (1 if SR=24 or SR=165, 0 otherwise)	-0.375	-4.253	N.A.	N.A.	N.A.	N.A.	N.A.
Scale parameter for over-dispersion	0.054	70.995					
Convergent log-likelihood for fixed parameter negative binomial	-57,712.43						
Log-likelihood at random parameter negative binomial convergence	-57,559.62						
Number of observations	426,546 (47,394 segments with 9 year panel)						

Table F.27: Model for Random Parameter Negative Binomial Estimation Crashes Involving Entering at Angle Type Crash Frequency

	Constant Parameter		Random Parameter				
Variable: entering at angle	Mean	T-statistic	Distribution	Mean	T-statistic	Standard Deviation	T-statistic
Constant	-21.780	-17.573	N.A.	N.A.	N.A.	N.A.	N.A.
Logarithm of length of segment in miles	0.456	4.851	N.A.	N.A.	N.A.	N.A.	N.A.
Logarithm of ADT	N.A. [26]	N.A.	Normal	1.523	14.012	0.179	11.543
Roadway Geometrics							
Number of lanes increasing direction	N.A.	N.A.	Normal	-5.388	-7.756	1.016	9.361
Average lane width	0.668	8.272	N.A.	N.A.	N.A.	N.A.	N.A.
Rate of vertical curvature/5280	-3.404	-1.567	N.A.	N.A.	N.A.	N.A.	N.A.
Degree of curvature	N.A.	N.A.	Normal	-0.090	-3.211	0.059	2.613
Roadside Variables							
Road approach dummy variable (1 if road approach exists, 0 otherwise)	2.341	6.165	N.A.	N.A.	N.A.	N.A.	N.A.
State Route Dummies							
SR26 dummy (1 if SR=26, 0 otherwise)	1.140	3.544	N.A.	N.A.	N.A.	N.A.	N.A.
SR97 dummy (1 if SR=97, 0 otherwise)	-1.222	-2.281	N.A.	N.A.	N.A.	N.A.	N.A.
SR195 dummy (1 if SR=195, 0 otherwise)	-2.769	-2.804	N.A.	N.A.	N.A.	N.A.	N.A.
Scale parameter for over-dispersion	0.002	15.410					
Convergent log-likelihood for fixed parameter negative binomial	-2,221.27						
Log-likelihood at random parameter negative binomial convergence	-2,155.22						
Number of observations	426,546 (47,394 segments with 9 year panel)						

[26] N.A. means not applicable. Parameter values are either fixed across observations for variables with "constant parameters," or defined by distributions for variables with "random parameters."

Table F.28: Model for Random Parameter Negative Binomial Estimation Crashes Involving Animal Type Crash Frequency

	Constant Parameter		Random Parameter				
Variable: animal	Mean	T-statistic	Distribu-tion	Mean	T-statistic	Standard Deviation	T-statistic
Constant	-2.717	-11.597	N.A.	N.A.	N.A.	N.A.	N.A.
Logarithm of length of segment in miles	1.508	67.596	N.A.	N.A.	N.A.	N.A.	N.A.
Logarithm of ADT	N.A. [27]	N.A.	Normal	0.351	16.789	0.148	59.770
Roadway Geometrics							
Horizontal curve central angle	0.001	4.411	N.A.	N.A.	N.A.	N.A.	N.A.
Average lane width	-0.065	-3.711	N.A.	N.A.	N.A.	N.A.	N.A.
Shoulder width dummy (if shoulder width center is >1ft and <9ft, value=1,else=0)	-6.864	-13.822	N.A.	N.A.	N.A.	N.A.	N.A.
Degree of curvature	N.A.	N.A.	Normal	-0.107	-10.917	0.060	9.494
Roadside Variables							
Proportion of guardrail length on a segment is 90-100%	-0.342	-2.382	N.A.	N.A.	N.A.	N.A.	N.A.
Tree group dummy variable (1 if tree group exists, 0 otherwise)	0.307	3.857	N.A.	N.A.	N.A.	N.A.	N.A.
State Route Dummies							
SR3 dummy (1 if SR=3, 0 otherwise)	0.464	3.259	N.A.	N.A.	N.A.	N.A.	N.A.
SR6 dummy (1 if SR=6, 0 otherwise)	0.696	4.937	N.A.	N.A.	N.A.	N.A.	N.A.
SR9 dummy (1 if SR=9, 0 otherwise)	-1.159	-8.604	N.A.	N.A.	N.A.	N.A.	N.A.
SR12 dummy (1 if SR=12, 0 otherwise)	0.811	13.196	N.A.	N.A.	N.A.	N.A.	N.A.
SR18 dummy (1 if SR=18, 0 otherwise)	-2.057	-5.677	N.A.	N.A.	N.A.	N.A.	N.A.
SR21 dummy (1 if SR=21, 0 otherwise)	-0.973	-6.074	N.A.	N.A.	N.A.	N.A.	N.A.
SR26 dummy (1 if SR=26, 0 otherwise)	1.096	12.349	N.A.	N.A.	N.A.	N.A.	N.A.
SR97 dummy (1 if SR=97, 0 otherwise)	1.154	19.094	N.A.	N.A.	N.A.	N.A.	N.A.
SR124 dummy (1 if SR=124, 0 otherwise)	1.496	10.754	N.A.	N.A.	N.A.	N.A.	N.A.
SR129 dummy (1 if SR=129, 0 otherwise)	-0.960	-3.859	N.A.	N.A.	N.A.	N.A.	N.A.

[27] N.A. means not applicable. Parameter values are either fixed across observations for variables with "constant parameters," or defined by distributions for variables with "random parameters."

Table F.28 (Continued): Model for Random Parameter Negative Binomial Estimation Crashes Involving Animal Type Crash Frequency

	Constant Parameter		Random Parameter				
Variable: animal	Mean	T-statistic	Distribu-tion	Mean	T-statistic	Standard Deviation	T-statistic
SR161 dummy (1 if SR=161, 0 otherwise)	-1.266	-3.665	N.A.	N.A.	N.A.	N.A.	N.A.
SR195 dummy (1 if SR=195, 0 otherwise)	0.401	3.248	N.A.	N.A.	N.A.	N.A.	N.A.
SR243 dummy (1 if SR=243, 0 otherwise)	-1.534	-3.635	N.A.	N.A.	N.A.	N.A.	N.A.
SR260 dummy (1 if SR=260, 0 otherwise)	-2.237	-3.675	N.A.	N.A.	N.A.	N.A.	N.A.
SR261 dummy (1 if SR=261, 0 otherwise)	-1.559	-5.752	N.A.	N.A.	N.A.	N.A.	N.A.
SR395 dummy (1 if SR=395, 0 otherwise)	1.501	16.278	N.A.	N.A.	N.A.	N.A.	N.A.
SR510 dummy (1 if SR=510, 0 otherwise)	-2.545	-2.274	N.A.	N.A.	N.A.	N.A.	N.A.
SR539 dummy (1 if SR=539, 0 otherwise)	-2.773	-2.433	N.A.	N.A.	N.A.	N.A.	N.A.
SR542 dummy (1 if SR=542, 0 otherwise)	-0.459	-2.246	N.A.	N.A.	N.A.	N.A.	N.A.
SR900 dummy (1 if SR=900, 0 otherwise)	-1.631	-3.240	N.A.	N.A.	N.A.	N.A.	N.A.
SR970 dummy (1 if SR=970, 0 otherwise)	2.641	10.861	N.A.	N.A.	N.A.	N.A.	N.A.
State route dummy (1 if SR=123 or SR=169, 0 otherwise)	-1.214	-4.740	N.A.	N.A.	N.A.	N.A.	N.A.
Scale parameter for over-dispersion	0.106	36.832					
Convergent log-likelihood for fixed parameter negative binomial	-24,601.53						
Log-likelihood at random parameter negative binomial convergence	-24,006.55						
Number of observations	426,546 (47,394 segments with 9 year panel)						

Table F.29: Model for Random Parameter Negative Binomial Estimation Crashes Involving Bicycle or Pedestrian Type Crash Frequency

	Constant Parameter		Random Parameter				
Variable: bicycle+pedestrian	Mean	T-statistic	Distribution	Mean	T-statistic	Standard Deviation	T-statistic
Constant	-10.149	-8.036	N.A. [28]	N.A.	N.A.	N.A.	N.A.
Logarithm of length of segment in miles	0.954	4.678	N.A.	N.A.	N.A.	N.A.	N.A.
Logarithm of ADT	1.270	4.955	N.A.	N.A.	N.A.	N.A.	N.A.
Roadway Geometrics							
Number of lanes increasing direction	N.A.	N.A.	Normal	-5.150	-5.093	0.893	5.027
State Route Dummies							
SR542 dummy (1 if SR=542, 0 otherwise)	2.302	3.225	N.A.	N.A.	N.A.	N.A.	N.A.
Scale parameter for over-dispersion	0.004	5.417					
Convergent log-likelihood for fixed parameter negative binomial	-1,821.36						
Log-likelihood at random parameter negative binomial convergence	-1,225.76						
Number of observations	426,546 (47,394 segments with 9 year panel)						

[28] N.A. means not applicable. Parameter values are either fixed across observations for variables with "constant parameters," or defined by distributions for variables with "random parameters."

Table F.30: Model for Random Parameter Negative Binomial Estimation Crashes Involving Entering/Leaving Driveway Type Crash Frequency

	Constant Parameter		Random Parameter				
Variable: entering/leaving driveway	Mean	T-statistic	Distribu-tion	Mean	T-statistic	Standard Deviation	T-statistic
Constant	-7.029	-17.134	N.A. [29]	N.A.	N.A.	N.A.	N.A.
Logarithm of length of segment in miles	1.500	21.966	N.A.	N.A.	N.A.	N.A.	N.A.
Logarithm of ADT	N.A.	N.A.	Normal	1.196	18.987	0.464	25.957
Roadway Geometrics							
Number of lanes increasing direction	-7.769	-21.130	N.A.	N.A.	N.A.	N.A.	N.A.
Degree of curvature	-0.102	-5.365	N.A.	N.A.	N.A.	N.A.	N.A.
Roadside Variables							
Proportion of ditch on a segment is 90-100%	-2.455	-3.704	N.A.	N.A.	N.A.	N.A.	N.A.
Fence length on a segment	-2.487	-3.988	N.A.	N.A.	N.A.	N.A.	N.A.
Proportion of guardrail length on segment is 90-100%	-1.573	-3.698	N.A.	N.A.	N.A.	N.A.	N.A.
Proportion of roadside slope length on segment is 80-90%	-3.420	-3.031	N.A.	N.A.	N.A.	N.A.	N.A.
Proportion of roadside slope length on segment is 90-100%	-2.002	-5.239	N.A.	N.A.	N.A.	N.A.	N.A.
State Route Dummies							
SR195 dummy (1 if SR=195, 0 otherwise)	-3.421	-6.671	N.A.	N.A.	N.A.	N.A.	N.A.
SR305 dummy (1 if SR=305, 0 otherwise)	-5.065	-3.530	N.A.	N.A.	N.A.	N.A.	N.A.
Scale parameter for over-dispersion	0.018	0.001					
Convergent log-likelihood for fixed parameter negative binomial	-9,112.51						
Log-likelihood at random parameter negative binomial convergence	-8,778.05						
Number of observations	426,546 (47,394 segments with 9 year panel)						

[29] N.A. means not applicable. Parameter values are either fixed across observations for variables with "constant parameters," or defined by distributions for variables with "random parameters."

Table F.31: Model for Random Parameter Negative Binomial Estimation Crashes Involving Other Type Crash Frequency

	Constant Parameter		Random Parameter				
Variable: Other	Mean	T-statistic	Distribution	Mean	T-statistic	Standard Deviation	T-statistic
Constant	N.A. [30]	N.A.	Normal	-4.980	-13.474	1.457	30.081
Logarithm of length of segment in miles	N.A.	N.A.	Normal	0.149	3.320	0.088	17.801
Logarithm of ADT	N.A.	N.A.	Normal	1.597	28.876	0.554	29.987
Roadside Variables							
Proportion of ditch length on a segment is 90-100%	-0.512	-1.929	N.A.	N.A.	N.A.	N.A.	N.A.
Proportion of roadside slope length on a segment is 90-100%	0.369	2.343	N.A.	N.A.	N.A.	N.A.	N.A.
State Route Dummies							
SR12 dummy (1 if SR=12, 0 otherwise)	1.037	8.209	N.A.	N.A.	N.A.	N.A.	N.A.
SR14 dummy (1 if SR=14, 0 otherwise)	1.307	8.925	N.A.	N.A.	N.A.	N.A.	N.A.
SR17 dummy (1 if SR=17, 0 otherwise)	0.621	2.878	N.A.	N.A.	N.A.	N.A.	N.A.
SR21 dummy (1 if SR=21, 0 otherwise)	-1.354	-4.080	N.A.	N.A.	N.A.	N.A.	N.A.
SR27 dummy (1 if SR=27, 0 otherwise)	-1.272	-3.014	N.A.	N.A.	N.A.	N.A.	N.A.
SR28 dummy (1 if SR=28, 0 otherwise)	0.588	2.677	N.A.	N.A.	N.A.	N.A.	N.A.
SR97 dummy (1 if SR=97, 0 otherwise)	1.671	12.544	N.A.	N.A.	N.A.	N.A.	N.A.
SR104 dummy (1 if SR=104, 0 otherwise)	2.008	5.651	N.A.	N.A.	N.A.	N.A.	N.A.
SR203 dummy (1 if SR=203, 0 otherwise)	1.584	4.311	N.A.	N.A.	N.A.	N.A.	N.A.
SR821 dummy (1 if SR=821, 0 otherwise)	2.060	6.955	N.A.	N.A.	N.A.	N.A.	N.A.
Scale parameter for over-dispersion	0.023	18.703					
Convergent log-likelihood for fixed parameter negative binomial	-9,754.88						
Log-likelihood at random parameter negative binomial convergence	-8,213.49						
Number of observations	426,546 (47,394 segments with 9 year panel)						

[30] N.A. means not applicable. Parameter values are either fixed across observations for variables with "constant parameters," or defined by distributions for variables with "random parameters."

Table F.32: Model for Random Parameter Negative Binomial Estimation Crashes Involving Overturn Type Crash Frequency

	Constant Parameter		Random Parameter				
Variable: overturn	Mean	T-statistic	Distribution	Mean	T-statistic	Standard Deviation	T-statistic
Constant	-1.294	-4.227	N.A.	N.A.	N.A.	N.A.	N.A.
Logarithm of length of segment in miles	N.A. [31]	N.A.	Normal	1.631	58.577	0.552	0.009
Logarithm of ADT	N.A.	N.A.	Normal	0.215	9.214	0.002	0.881
Roadway Geometrics							
Average lane width	-0.139	-5.770	N.A.	N.A.	N.A.	N.A.	N.A.
Shoulder width dummy (if shoulder width center is >1ft and <9ft, value=1,else=0)	-5.461	-10.720	N.A.	N.A.	N.A.	N.A.	N.A.
Shoulder width dummy (if shoulder width right is 8-9ft and shoulder width left is >10ft, value=1,else=0)	-1.456	-2.630	N.A.	N.A.	N.A.	N.A.	N.A.
Horizontal curve central angle	0.001	4.980	N.A.	N.A.	N.A.	N.A.	N.A.
Degree of curvature	0.059	19.512	N.A.	N.A.	N.A.	N.A.	N.A.
Roadside Variables							
Curb dummy variable (1 if curb slope exists, 0 otherwise)	-0.883	-3.241	N.A.	N.A.	N.A.	N.A.	N.A.
Proportion of guardrail length on segment is 90-100%	-0.616	-4.297	N.A.	N.A.	N.A.	N.A.	N.A.
Proportion of roadside slope length on segment is 90-100%	-0.262	-3.469	N.A.	N.A.	N.A.	N.A.	N.A.
State Route Dummies							
SR17 dummy (1 if SR=17, 0 otherwise)	0.396	3.678	N.A.	N.A.	N.A.	N.A.	N.A.
SR18 dummy (1 if SR=18, 0 otherwise)	-1.024	-3.456	N.A.	N.A.	N.A.	N.A.	N.A.
SR21 dummy (1 if SR=21, 0 otherwise)	-1.089	-7.503	N.A.	N.A.	N.A.	N.A.	N.A.
SR25 dummy (1 if SR=25, 0 otherwise)	-0.589	-4.189	N.A.	N.A.	N.A.	N.A.	N.A.
SR26 dummy (1 if SR=26, 0 otherwise)	0.870	7.854	N.A.	N.A.	N.A.	N.A.	N.A.

[31] N.A. means not applicable. Parameter values are either fixed across observations for variables with "constant parameters," or defined by distributions for variables with "random parameters."

Table F.32 (Continued): Model for Random Parameter Negative Binomial Estimation Crashes Involving Overturn Type Crash Frequency

	Constant Parameter		Random Parameter				
Variable: overturn	Mean	T-statistic	Distribu-tion	Mean	T-statistic	Standard Deviation	T-statistic
SR97 dummy (1 if SR=97, 0 otherwise)	0.859	12.427	N.A.	N.A.	N.A.	N.A.	N.A.
SR106 dummy (1 if SR=106, 0 otherwise)	-0.747	-2.433	N.A.	N.A.	N.A.	N.A.	N.A.
SR112 dummy (1 if SR=112, 0 otherwise)	-0.334	-2.141	N.A.	N.A.	N.A.	N.A.	N.A.
SR124 dummy (1 if SR=124, 0 otherwise)	0.695	5.097	N.A.	N.A.	N.A.	N.A.	N.A.
SR195 dummy (1 if SR=195, 0 otherwise)	1.407	12.026	N.A.	N.A.	N.A.	N.A.	N.A.
SR221 dummy (1 if SR=221, 0 otherwise)	0.867	4.125	N.A.	N.A.	N.A.	N.A.	N.A.
SR231 dummy (1 if SR=231, 0 otherwise)	-0.377	-2.205	N.A.	N.A.	N.A.	N.A.	N.A.
SR241 dummy (1 if SR=241, 0 otherwise)	1.566	7.782	N.A.	N.A.	N.A.	N.A.	N.A.
SR243 dummy (1 if SR=243, 0 otherwise)	1.237	5.231	N.A.	N.A.	N.A.	N.A.	N.A.
SR272 dummy (1 if SR=272, 0 otherwise)	-1.722	-2.669	N.A.	N.A.	N.A.	N.A.	N.A.
SR290 dummy (1 if SR=290, 0 otherwise)	-1.895	-2.966	N.A.	N.A.	N.A.	N.A.	N.A.
SR504 dummy (1 if SR=504, 0 otherwise)	-0.671	-3.462	N.A.	N.A.	N.A.	N.A.	N.A.
SR507 dummy (1 if SR=507, 0 otherwise)	0.968	5.414	N.A.	N.A.	N.A.	N.A.	N.A.
SR821 dummy (1 if SR=821, 0 otherwise)	-0.814	-3.418	N.A.	N.A.	N.A.	N.A.	N.A.
Scale parameter for over-dispersion	0.061	34.397					
Convergent log-likelihood for fixed parameter negative binomial	-26,837.61						
Log-likelihood at random parameter negative binomial convergence	-25,518.07						
Number of observations	426,546 (47,394 segments with 9 year panel)						

Table F.33: Model for Random Parameter Negative Binomial Estimation Crashes Involving Truck Type Crash Frequency

	Constant Parameter		Random Parameter				
Variable: truck	Mean	T-statistic	Distribu-tion	Mean	T-statistic	Standard Deviation	T-statistic
Constant	N.A. [32]	N.A.	Normal	-1.843	-19.925	0.085	8.458
Logarithm of length of segment in miles	N.A.	N.A.	Normal	1.269	89.895	0.436	90.476
Logarithm of ADT	N.A.	N.A.	Normal	0.766	56.911	0.034	27.124
Roadway Geometrics							
Number of lanes increasing direction	-4.362	-87.653	N.A.	N.A.	N.A.	N.A.	N.A.
Shoulder width dummy (if shoulder width right is 4-5ft and shoulder width left is 2-3ft, value=1,else=0)	-0.239	-2.279	N.A.	N.A.	N.A.	N.A.	N.A.
Shoulder width dummy (if shoulder width right is >10ft and shoulder width left is 2-3ft, value=1,else=0)	-1.124	-2.721	N.A.	N.A.	N.A.	N.A.	N.A.
Shoulder width dummy (if shoulder width center is >1ft and <9ft, value=1,else=0)	-3.640	-11.058	N.A.	N.A.	N.A.	N.A.	N.A.
Rate of vertical curvature/5280	N.A.	N.A.	Normal	-0.950	-8.425	0.988	9.777
Degree of curvature	N.A.	N.A.	Normal	0.053	24.269	0.044	20.412
Roadside Variables							
Guardrail dummy variable (1 if guardrail exists, 0 otherwise)	0.226	4.053	N.A.	N.A.	N.A.	N.A.	N.A.
Proportion of guardrail length on a segment is 90-100%	-0.311	-3.478	N.A.	N.A.	N.A.	N.A.	N.A.
Proportion of roadside slope length on a segment is 90-100%	-0.160	-3.350	N.A.	N.A.	N.A.	N.A.	N.A.
Rock-out cropping length on a segment	-1.106	-3.226	N.A.	N.A.	N.A.	N.A.	N.A.
State Route Dummies							

[32] N.A. means not applicable. Parameter values are either fixed across observations for variables with "constant parameters," or defined by distributions for variables with "random parameters."

SR3 dummy (1 if SR=3, 0 otherwise)	0.739	9.167	N.A.	N.A.	N.A.	N.A.	N.A.

Table F.33 (Continued): Model for Random Parameter Negative Binomial Estimation Crashes Involving Truck Type Crash Frequency

	Constant Parameter		Random Parameter				
Variable: truck	Mean	T-statistic	Distribu-tion	Mean	T-statistic	Standard Deviation	T-statistic
SR9 dummy (1 if SR=9, 0 otherwise)	-0.287	-4.082	N.A.	N.A.	N.A.	N.A.	N.A.
SR11 dummy (1 if SR=11, 0 otherwise)	-0.515	-3.724	N.A.	N.A.	N.A.	N.A.	N.A.
SR12 dummy (1 if SR=12, 0 otherwise)	0.467	14.150	N.A.	N.A.	N.A.	N.A.	N.A.
SR18 dummy (1 if SR=18, 0 otherwise)	0.384	2.571	N.A.	N.A.	N.A.	N.A.	N.A.
SR21 dummy (1 if SR=21, 0 otherwise)	-0.658	-7.051	N.A.	N.A.	N.A.	N.A.	N.A.
SR26 dummy (1 if SR=26, 0 otherwise)	0.615	8.878	N.A.	N.A.	N.A.	N.A.	N.A.
SR28 dummy (1 if SR=28, 0 otherwise)	-0.240	-3.353	N.A.	N.A.	N.A.	N.A.	N.A.
SR31 dummy (1 if SR=31, 0 otherwise)	-0.446	-2.500	N.A.	N.A.	N.A.	N.A.	N.A.
SR97 dummy (1 if SR=97, 0 otherwise)	0.630	15.077	N.A.	N.A.	N.A.	N.A.	N.A.
SR104 dummy (1 if SR=104, 0 otherwise)	0.700	5.607	N.A.	N.A.	N.A.	N.A.	N.A.
SR124 dummy (1 if SR=124, 0 otherwise)	0.538	5.229	N.A.	N.A.	N.A.	N.A.	N.A.
SR127 dummy (1 if SR=127, 0 otherwise)	-0.918	-4.465	N.A.	N.A.	N.A.	N.A.	N.A.
SR129 dummy (1 if SR=129, 0 otherwise)	-0.965	-6.754	N.A.	N.A.	N.A.	N.A.	N.A.
SR161 dummy (1 if SR=161, 0 otherwise)	-0.458	-3.073	N.A.	N.A.	N.A.	N.A.	N.A.
SR172 dummy (1 if SR=172, 0 otherwise)	-0.828	-2.508	N.A.	N.A.	N.A.	N.A.	N.A.
SR195 dummy (1 if SR=195, 0 otherwise)	0.306	3.810	N.A.	N.A.	N.A.	N.A.	N.A.
SR202 dummy (1 if SR=202, 0 otherwise)	-0.375	-3.345	N.A.	N.A.	N.A.	N.A.	N.A.
SR206 dummy (1 if SR=206, 0 otherwise)	0.611	4.631	N.A.	N.A.	N.A.	N.A.	N.A.
SR211 dummy (1 if SR=211, 0 otherwise)	0.473	2.804	N.A.	N.A.	N.A.	N.A.	N.A.
SR241 dummy (1 if SR=241, 0 otherwise)	0.401	2.733	N.A.	N.A.	N.A.	N.A.	N.A.
SR260 dummy (1 if SR=260, 0 otherwise)	-0.862	-3.978	N.A.	N.A.	N.A.	N.A.	N.A.
SR261 dummy (1 if SR=261, 0 otherwise)	-0.478	-3.018	N.A.	N.A.	N.A.	N.A.	N.A.
SR290 dummy (1 if SR=290, 0 otherwise)	-1.528	-5.473	N.A.	N.A.	N.A.	N.A.	N.A.
SR302 dummy (1 if SR=302, 0 otherwise)	-0.415	-2.616	N.A.	N.A.	N.A.	N.A.	N.A.

SR395 dummy (1 if SR=395, 0 otherwise)	0.389	5.622	N.A.	N.A.	N.A.	N.A.	N.A.

Table F.33 (Continued): Model for Random Parameter Negative Binomial Estimation Crashes Involving Truck Type Crash Frequency

	Constant Parameter		Random Parameter				
Variable: truck	Mean	T-statistic	Distribu-tion	Mean	T-statistic	Standard Deviation	T-statistic
SR410 dummy (1 if SR=410, 0 otherwise)	0.230	3.621	N.A.	N.A.	N.A.	N.A.	N.A.
SR503 dummy (1 if SR=503, 0 otherwise)	0.449	5.159	N.A.	N.A.	N.A.	N.A.	N.A.
SR504 dummy (1 if SR=504, 0 otherwise)	-0.612	-5.385	N.A.	N.A.	N.A.	N.A.	N.A.
SR510 dummy (1 if SR=510, 0 otherwise)	-0.833	-3.896	N.A.	N.A.	N.A.	N.A.	N.A.
SR542 dummy (1 if SR=542, 0 otherwise)	0.814	11.614	N.A.	N.A.	N.A.	N.A.	N.A.
SR906 dummy (1 if SR=906, 0 otherwise)	1.681	5.588	N.A.	N.A.	N.A.	N.A.	N.A.
State route dummy (1 if SR=502 or SR=730, 0 otherwise)	0.631	3.474	N.A.	N.A.	N.A.	N.A.	N.A.
State route dummy (1 if SR=432 or SR=532, 0 otherwise)	0.402	2.736	N.A.	N.A.	N.A.	N.A.	N.A.
State route dummy (1 if SR=123 or SR=169, 0 otherwise)	-0.854	-6.838	N.A.	N.A.	N.A.	N.A.	N.A.
State route dummy (1 if SR=241 or SR=65, 0 otherwise)	-0.137	-1.836	N.A.	N.A.	N.A.	N.A.	N.A.
Scale parameter for over-dispersion	0.106	82.585					
Convergent log-likelihood for fixed parameter negative binomial	-79,688.38						
Log-likelihood at random parameter negative binomial convergence	-75,449.80						
Number of observations	426,546 (47,394 segments with 9 year panel)						

Table F.34: Model for Random Parameter Negative Binomial Estimation Crashes Involving One Park/One Move Type Crash Frequency

	Constant Parameter		Random Parameter				
Variable: One park/ One move	Mean	T-statistic	Distribu-tion	Mean	T-statistic	Standard Deviation	T-statistic
Constant	-7.499	-8.167	N.A.	N.A.	N.A.	N.A.	N.A.
Logarithm of length of segment in miles	N.A. [33]	N.A.	Normal	2.029	9.116	0.826	8.902
Logarithm of ADT	N.A.	N.A.	Normal	1.284	7.182	0.037	2.949
Roadway Geometrics							
Number of lanes Increasing	-5.799	-7.026	N.A.	N.A.	N.A.	N.A.	N.A.
Roadside Variables							
Proportion of Roadside slope length on segment is 90-100%	-2.203	-3.101	N.A.	N.A.	N.A.	N.A.	N.A.
Proportion of Tree group on a segment is 90-100%	2.389	3.312	N.A.	N.A.	N.A.	N.A.	N.A.
State Route Dummies							
SR11Dummy (1 if SR=11, 0 otherwise)	2.955	3.543	N.A.	N.A.	N.A.	N.A.	N.A.
Scale parameter for over-dispersion	0.001	8.561					
Convergent log-likelihood for fixed parameter negative binomial	-3,199.50						
Log-likelihood at random parameter negative binomial convergence	-2,102.26						
Number of observations	426,546 (47,394 segments with 9 year panel)						

[33] N.A. means not applicable. Parameter values are either fixed across observations for variables with "constant parameters," or defined by distributions for variables with "random parameters."

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