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National Traffic Speeds Survey II: 2009

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16. Abstract

A field survey was conducted during spring and summer 2009 as a longitudinal repetition to a similar effort undertaken in 2007. The goal was to measure travel speeds and prepare nationally representative speed estimates for all types of motor vehicles on freeways, arterial highways, and collector roads across the United States. Over 10 million vehicle speeds were measured at 627 sites included in the geographic cluster sample of 20 primary sampling units (PSUs). Each PSU was a city, county, or group of two or three counties representing combinations of regions of the United States, level of urbanization, and type of topography (flat, hilly, mountainous). Speeds were acquired on randomly drawn road segments on limited access highways, major and minor arterial roads, and collector roads. Speed measurement sites were selected in road segments with low, medium, or high degrees of horizontal and vertical curvature or gradient.

Overall, speeds of free-flow traffic on freeways averaged 70.5 mph and were approximately 17 mph higher than on major arterials, which at 53.3 mph were in turn about 6 mph higher than the mean speed of 47.0 mph on minor arterials and collector roads. Most traffic exceeded the speed limits. Seventy-one percent of traffic on limited access roads and about 56% of traffic on arterials and collectors exceeded the speed limit. About 16% of traffic exceeded the speed limit by 10 mph or more on freeways, arterials, and collector roads.

Speeds of passenger vehicle size classes were generally higher than for medium trucks.

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Executive Summary

The purpose of this project was to conduct a field survey to measure driving speeds for all types of motor vehicles on freeways, arterial highways, and collector roads across the United States and to produce national estimates of travel speeds for various types of roads and vehicles. This study, performed in spring 2009, was the follow-on wave of a similar study performed in 2007.

The speed survey employed a three-stage sample design. The first stage consisted of a geographic cluster sample of primary sampling units (PSUs), which can be a city, county, or group of two or three counties. PSUs were chosen to represent a range of combinations of regions of the United States, level of urbanization, and type of topography (flat, hilly, mountainous). The second stage was a sample of short road segments drawn from all segments in each PSU. After field visits to document the characteristics at each site, the third stage selected a subsample of eligible sites for speed data collection.

The second and third stages of sampling were done during the spring and summer of 2007. The second stage selected a preliminary sample of sites in each PSU that was considerably larger than the actual quantity desired. All horizontal and vertical curve road segments, which were relatively rare compared to the more common straight and flat sections, were retained, while only a subsample of the more common situations were retained in the sample. Preliminary determination of rare (sites with curvature) and common (straight) site types was done using geographic information systems (GIS) technologies. Determination of actual vertical curvature and gradient was possible only by field staff observation and measurement. Site documenters were equipped with global positioning system (GPS)-enabled laptop computers specially programmed with site location and curvature measurement routines to aid in determining which candidate sites to retain in the sample. This resulted in higher sampling rates for sites with "rare" characteristics and lower sampling rates for sites with "common" characteristics (e.g., local roads not near intersections and not on curves) than would have occurred with completely randomized selection.

Speeds were acquired on randomly drawn road segments on limited access highways, major and minor arterial roads, and collector roads. Speed measurement sites selected in road segments with various degrees of straight, curved, flat, and hilly geometry under the 2007 study were revisited during this 2009 study. In all, 20 to 60 sites were selected in each PSU for a total of approximately 720 sites for speed data collection.

Speed data were collected during spring of 2009 at the same sites from which data were collected during the summer of 2007. Speeds on arterials were measured using small, self-contained, on-road sensors (Nu-Metrics Hi-Stars) that Westat, Inc., data collectors temporarily placed on the road surface for a single 24-hour period in each lane at each road site. Speeds on limited access highways were collected using trailer-mounted, side-fire radar devices (Wavetronix SmartSensor HD) in 2009 instead of the Hi-Stars used in 2007. A census was taken of all vehicles traversing each site during the deployment period.

The following are the principal findings and conclusions from the 2009 wave of the National Travel Speed Survey and comparisons between the 2007 and 2009 data collections.

1. A total of 10,721,095 vehicle speeds were recorded in the 2009 survey wave. There were 5,705,044 constrained vehicles (those within 5 seconds of the preceding vehicles) while 5,016,051 were free-flow vehicles.

2. For all flow conditions and vehicle types combined (free-flow and constrained), there was little difference between 2007 and 2009 speeds measured on arterial roads and collector roads (less than 1 mph difference). However, mean and 85th-percentile speeds on limited access roads were approximately 4.5 mph higher in 2009 than 2007.

3. The change between the 2007 and 2009 speeds was greater for free-flow vehicles. Mean speeds on limited access roads were approximately 5.8 mph higher in 2009 (70.5 mph) than 2007 (64.7 mph), but 85th-percentile speeds were just 4.2 mph higher.

4. Standard deviation of free-flow traffic speed, a measure of the spread in the distribution of speeds, ranged from about 8 to 9 mph on freeways (14% of the mean) to 11 mph on minor arterials/collectors (23% of the mean). Compared to 2007, the standard deviations in 2009 are tighter, with the greatest reductions occurring on limited access roadways.

5. The increase in speeds for all traffic on freeways represents a 14-percentage-point increase in the proportion of vehicles on those roads exceeding the speed limit by more than 5 mph (now 44%) and a 4-percentage-point increase for vehicles exceeding the speed limit by more than 10 mph over the speed limit (now 19%). For free-flow vehicles, the proportion of vehicles traveling more than 5 mph over the speed limit was up 17 points (now 46%) and up 6 points (now 20%) for vehicles more than 10 mph over the limit.

6. Time of day had little influence on traffic speeds.

7. Period of light had little effect on travel speeds within each road condition.

8. Unlike the 2007 data, 2009 speeds on major arterials were not nearly as disparate by day of week. In 2009, mean speeds differed by only 3 to 5 mph across day of week on arterials, collectors, and limited access roads. In 2007, mean speeds on major arterials had a much broader range, differing by 3 to 10 mph.

9. For the limited access and minor arterial roadways, speeds were 1 to 7 mph higher on straight roads compared to moderately or sharply curved counterparts. On the other hand, speeds on major arterials were 5 to 6 mph lower for the straight sections than for the curvier counterparts.

10. In 2009, speeds on urban roads were lower than on roads in more suburban or rural locations for all road types. Vehicles on limited access roads, major arterials, and minor arterials/collectors in rural areas were 8 to 12 mph faster than on their counterparts in urban areas (i.e., slightly less pronounced than in 2007's 12 to 14 mph range).

11. The greatest increases in speeds from 2007 to 2009 on freeways were for passenger cars, light trucks, and medium-size trucks (up to 49 ft), where they increased by 5 to 7 mph. The 50 to 80-ft size class of big trucks also increased in speeds, but only around 3 mph. The biggest big trucks had little change in mean speed.

12. There was an interaction among curvature (both horizontal and vertical), road class, and vehicle size. In general, speeds decrease as curvature and gradient increase, especially for the largest trucks on minor arterials/collectors.

13. There was little influence of light condition on speed across combinations of vehicle size and road type. In 2007, the greatest difference between night and day speeds was associated with the largest trucks on major arterials, where speeds at night were about 1 to 2 mph higher than during daytime. This effect reversed in 2009, with daytime speeds about 1 to 2 mph higher than nighttime speeds.

14. A general increase in speeds measured between 2007 and 2009 may have been due to some differences in traffic and timing of the data collection waves. In 2007, the field period extended from May through mid-July due to long periods of bad weather. Coincidentally, many States have annual speed enforcement campaigns that begin at the end of May. In 2009, data collection was completed by the end of May. Thus, special speed enforcement campaigns were probably not nearly as prevalent during 2009. Also, much lower VMT levels were measured in 2009 than in 2007. Thus, there may have been less congestion, resulting in higher speeds.

1. Introduction and Background

Since the repeal of the National Maximum Speed Limit (NMSL) in 1995, the States are no longer required to collect or submit data on prevailing travel speeds to any Federal agency. As a consequence, it is far more difficult for an agency with a highway safety mission to track changes in travel speeds over time or to relate travel speed trends to crash trends. Yet the problem of speed and crashes remains severe. Approximately 31% of all crashes in 2008 were speeding-related crashes, resulting in 11,674 fatalities with an estimated cost of approximately $40.4 billion per year.[1] When speeding is defined as "driving too fast for conditions, or exceeding the posted speed limit," it is reported as a factor in 12% of all crashes and 31percent of all fatal crashes.[1] The crash data also indicate that the speeding-related fatality rate is nearly three times higher on local and collector roads than on interstate highways and that there has been an upward trend in the proportion of speeding-related fatalities since 2000.[2]

Another reason for acquiring data on travel speeds is to provide a means to nationally monitor the efficiency of various roadway types in terms of traffic flow and congestion. Concurrent with the goal of increasing the capacity of existing road systems is the concern that high-speed travel raises fuel consumption, a problem of increasing importance.

2. Study Overview

NHTSA has an interest in collecting nationally representative estimates of travel speeds on public roads. Much like the National Occupant Protection Use Survey (NOPUS), the National Travel Speed Survey (NTSS) aims to produce national and regional estimates of travel speeds for various types of roads and vehicles.

The purpose of this project was to conduct a field survey to measure driving speeds for all types of motor vehicles on freeways, arterial highways, and collector roads across the United States and produce nationally representative estimates of traffic speeds.

Development of national speed estimates and trends required a comprehensive, but economical, sample plan and field method to satisfy the requirements for collecting speeds. The recommended method was to use a cluster design similar to the annual NOPUS, which uses approximately 40 primary sampling units (PSUs) to estimate levels of safety restraint use on urban, suburban, exurban, and rural roads, or the National Automotive Sampling System (NASS), which uses a combination of PSUs where data collection methods are used to support estimates of crashes in the United States. These estimates of speeds are valuable for examining differences and trends for roadway and vehicle types and a variety of other travel conditions and may ultimately be able to tie those estimates back to nationally representative estimates of crashes. Statistical associations between travel speeds and crash risk may also be possible with access to detailed nationally representative crash data, including pre-crash speeds.

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[1] National Highway Traffic Safety Administration. (2009). *Traffic Safety Facts 2008 Data: Speeding*. (Report No. DOT HS 811 166). Washington, DC: National Highway Traffic Safety Administration. Available at http://www-nrd.nhtsa.dot.gov/Pubs/811166.PDF.

[2] Chen, C-L., Presentation at National Speed Data Collection Workshop, National Highway Traffic Safety Administration, August 26-27, 2004.

As in the 2007 NTSS, speeds were measured at from 20 to 60 sites in each of 20 PSUs. Each PSU is a city, county, or group of two or three counties. PSUs represented a range of combinations of regions of the United States, level of urbanization, and type of topography (flat, hilly, mountainous). Since site documentation/selection took place in 2007, only speed data collection was required in 2009. Speeds were acquired on limited access highways, major and minor arterial roads, and collector roads. Speed measurement sites were selected in road segments with various degrees of straight, curved, flat, and hilly geometry.

Data collection procedures were modified for 2009 to improve the efficiency, quality, and speed with which collection could be accomplished. Self-contained, on-road sensors (Nu-Metrics Hi-Stars) were temporarily placed on the road surface for a single 24-hour period at each arterial and collector road site, just as in 2007. However, in 2009, trailer-mounted, side-fire radar sensors were used for the limited access highway sites. Wavetronix SmartSensor devices were towed to each limited access site, deployed for 24 hours, and then moved to the next site. These devices were selected as an alternative to the Hi-Stars, in part, due to the fact that their deployment was typically performed with little or no disruption to highway traffic. In addition, there was no need for complex, costly, and time-consuming efforts to install and pick-up Hi-Stars from these busy, multi-lane roads.

The sample in this study was not designed to support estimates of speeds for any specific State, county, or community. Consequently, data collection locations are not named in this report. The data are intended to be used by NHTSA to examine broad trends in speeds on various roadway types, by various vehicle types, etc.

3. Sample Design

The set of sample PSUs for this survey were nearly all of those selected for the National Motor Vehicle Crash Causation Survey (NMVCCS) by NHTSA. After selection of PSUs, the sample design proceeded with two additional stages. In the 2007 wave of the survey, it was unknown which segments were gradient/curves in each PSU; consequently, more segments than needed were sampled during the field Phase I site documentation. In that stage, senior field staff visited each sampled segment, determined whether a Hi-Star could be placed at a site, classified it in terms of gradient and horizontal curvature, and marked the beginning of the segment so that it could be easily located in the Phase II speed data collection effort if the site was drawn for speed data collection. At the same time, the staff member's GPS-equipped computer precisely tracked and recorded the person's geographic position and elevation as he/she drove through each segment.

For the final stage of sampling, the curvature/gradient data collected in Phase I were used to classify a non-crash site as curvy/high gradient (CG) site, or non-curvy/low gradient (non-CG) site. CG sites were those that were at or above a certain threshold for curvature or/and were at or above a certain threshold for gradient. Non-CG sites were those that did not meet the threshold level for curvature or gradient. Sites for which field staff concluded a Hi-Star could not be placed were considered non-responding sites. In the final stage of sampling, all other crash sites and CG sites were included with certainty in the Phase II sample, while non-CG sites were subsampled to obtain the pre-determined total sample size for a given PSU. Based on information from the 2007 field data collection, six sites were removed from the 2009 sample. These sites were identified as high crime areas by local law enforcement who recommended that the data collection equipment not be left unsupervised for 24 hours. The logic

behind the analytical approach and details of the design and site selection process are presented in more detail in Appendix A.

Descriptions of site selection and Phase I Site Documentation begin on page A-5 (Appendix A).

3.1. Speed Data Collection

The data collection for the 2009 effort evolved from the procedures used in 2007. During the earlier installment, Hi-Stars were used to collect speed data at all sites. However, at high-volume sites (e.g., limited access highway sites), that method often came at great expense in terms of complexity, coordination with local officials, traffic control, installation time, and safety of field personnel. The 2009 effort used Wavetronix SmartSensors to replace the Hi-Stars on the limited access highways. Section 3.1.2 describes the Wavetronix SmartSensors, their capabilities, and limitations in more detail.

3.1.1 Recruitment and Training

Thirteen data collectors and several backup personnel were recruited from a pool of field staff to complete the study. Data collectors needed to show a certain level of proficiency with computers, a high degree of reliability and responsibility, and some potential or past experience in field data collection. Seven field supervisors were responsible for collecting data at all the limited access sites in each PSU as well as oversee data collection on the arterials and collector roads. Field supervisors were selected based on their past experience in the 2007 TSS and their ability to handle pickup trucks and the trailers on which the Wavetronix devices were mounted. Because field supervisors had greater responsibility for supervising, managing, and assisting data collectors with any questions about site locations and the use of the Hi-Stars, they attended 4 days of training to obtain the required expertise in equipment use, data downloading, site control, scheduling adjustments, and data collection quality control tasks. Thirteen data collectors and four backups attended a 2-day training session. The supervisors' last 2 days of training coincided with the field data collectors' training, which concentrated on the use of Hi-Star data collection devices and all the supporting procedures involved in collecting and transmitting those data back to the office for analysis.

Data collector training involved an overview of the study's purpose and its importance to highway safety; instruction on the programming, installation, and use of the Hi-Star devices; recharging and preparing all equipment for use in the field; methods for coordination with local authorities; use of a custom software application for documenting the data collection efforts and verification of the site information; procedures for transmitting data back to the home office; troubleshooting procedures for equipment, motorists, and coordination with the local enforcement officers; and safety techniques when working on the side of the road. The classroom lecture was followed by actual field practice, where each of the 20 fieldworkers was required to program, deploy, and retrieve the data collection equipment assigned to them (Wavetronix or Hi-Stars). These practice sessions included oversight by the project staff so that each data collector received individual attention.

Wavetronix training involved screening/qualification and training of the field supervisors related to their need to be able to drive and back up a pickup and trailer, deal with parking or retrieval situations they might encounter, deploy the unit, retrieve, and calibrate the Wavetronix sensor to ensure maximum performance. In addition, supervisors received additional training on communicating with office staff for various aspects of remote communication and troubleshooting issues. For each deployment of the trailers, the pickups had to be unhitched, programmed, and left for 24 hours of data

collection. Supervisors had to be willing and able to perform this and all the other tasks associated with the use and care of the trailers before they were selected to perform this job. All of the supervisors had served as [Hi-Star] data collectors or supervisors for the 2007 data collection effort.

Field supervisors were instructed to make scheduled and unscheduled visits to each data collector to evaluate his/her performance in the field. Each data collector was required to contact the field supervisor every night to report on the number of sites completed, data that had been submitted, any problems with data collection, etc. The field supervisors, in turn, contacted the Field Director each night to provide information on the status of each scheduled site and on their data collectors' performance.

Additionally, the use of the Wavetronix devices for this year's collection necessitated a longer and more involved training exercise for supervisors, who held the additional responsibility of collecting data at all the limited access sites in each PSU.

3.1.2 Instrumentation

Data collectors and field supervisors were equipped with laptops and GPS receivers to help them navigate to the selected sites and perform quality control, verifying that data were collected at the appropriate locations.

Nu-Metrics Hi-Stars

Each data collector was also given all of the equipment necessary to program and deploy 10 Nu-Metrics Hi-Stars. This included Hi-Star chargers, serial programming cables, Hi-Star covers, duct and mastic tape, and a variety of other tools and supplies.

Nu-Metrics Hi-Stars are small, self-contained devices that are placed on the roadway to both measure and store individual vehicle data for the vehicles that pass over them as vehicles travel along road segments. The device uses magnetometers to measure the disturbance in the surrounding ambient magnetic field caused by the vehicles passage overhead and then interprets and saves the speed and length of each vehicle for later analysis (see Appendix B). They are programmed to start and end data collection at specified dates and times. They are temporarily attached to road surfaces by tape or masonry anchors and left unattended for the period during which observation is desired. After the data collection period is complete, they are retrieved from the roadway, and the data are read from the device and stored in a database for analysis and/or transmission.

Hi-Stars were identified as the best alternative for this data collection effort prior to the 2007 data collection effort. At a minimum, the equipment selected for this study needed to be able to collect data on each individual vehicle in each lane in the traffic stream for at least 24 hours. To perform the required analyses, data needed to include individual vehicle speeds, vehicle type (cars, trucks, etc. based on length, wheelbase or number of axles), time of day, date, and separation time or distance between vehicles. In 2007 there were many challenges involved in the deployment of Hi-Stars, including coordination and complexity of installing and retrieving large numbers of Hi-Stars at many of the limited access highway sites, and the loss of a relatively small number of Hi-Stars due to damage or disappearance. Even though they were relatively easy to install and retrieve, they still required that traffic be stopped or diverted for each lane in which a device was deployed. Also, the high volume and

speeds of vehicles for these limited access highway situations occasionally resulted in dislodgement and loss.

One hundred forty-four Hi-Star NC-200 units were purchased in 2007 for the purpose of this study (see Figure 1). All units were brought up to the newest versions of firmware and software prior to the 2009 collection effort. All of the equipment and software was pre-tested to confirm the best procedures for data collection on the scale necessary for this project and to verify functionality of all the units prior to sending them to the field for use in 2009. Additional testing and calibration was performed at a local automotive test track prior to the 2009 deployment to verify functionality and to identify any units that were not performing well in terms of accuracy, programmability, or battery life.

Figure 1. Nu-Metrics Hi-Star, Model NC-200

Data collectors were provided a database to store the information included in the nightly reports and any other details regarding contact that took place between the home office and field staff. This standard reporting protocol helped to quickly identify trends in data collection or field staff problems and support decisions with clear and concise information.

Wavetronix

Because of the safety risks and deployment challenges of collecting limited access highway data in 2007 with the Nu-Metric Hi-Stars, self-contained trailers carrying Wavetronix side-fire radar devices were selected to collect data on the limited access roadways in 2009. The goal of using the Wavetronix was to maintain the level of accuracy in the data from the Hi-Stars while eliminating some of the coordination, safety, and efficiency issues associated with deploying and retrieving Hi-Stars on limited access highways. The Wavetronix systems appeared to address all these issues for the 2009 effort.

The Wavetronix were part of a trailer-mounted system rented from a national vendor. Each trailer's components were powered by solar-charged batteries. The Wavetronix sensor was mounted on an electronic actuator that allowed adjustment of its pitch, perpendicular to the road at the top of a

telescoping mast that was elevated 16 feet above the ground. Inside the secure battery/control box at the base of the mast was an interface box that provided PC access to the data collected on the Wavetronix and a cellular modem capable of providing remote access to the Wavetronix for calibration, data download, and other necessary functions. A Web camera was attached to the PC, which allowed virtual visits from the office for system troubleshooting when necessary.

Figure 2. Wavetronix Trailer

In addition to the hardware allowing local operation and control of the Wavetronix systems, each was equipped with a cellular modem. This modem allowed remote control of the system and access to data and calibration parameters. The PC was connected to the modem and operated using a remote desktop situation. This allowed all the functionality of the PC to be controlled from Westat's main offices when necessary. That control included calibration, setup, collection, and data upload. In cases where there were time-sensitive issues, Westat staff could take control remotely to ensure efficiency in the collection process and then deal with operator issues when it was convenient and non-disruptive to data collection.

3.1.3 Site Coordination

Coordinating with area police and other State officials began months before the actual data collection. All of the necessary approvals, request for work permits, and coordination were completed to ensure adequate lead time for a number of jurisdictions in which navigation and approval were especially difficult. Area police and other local officials identified during the previous effort were approached and asked to assist with traffic control during deployment and retrieval of the data collection devices (Hi-Stars or Wavetronix) in each PSU. Typically, several additional calls or e-mails from project staff at Westat or in the field were required to coordinate with the authority responsible for managing the effort for any given roadway within a PSU as well as the individual responsible within that authority when positions may have changed over the past 2 years.

Immediately following training, data collectors contacted each police jurisdiction to confirm the schedule for data collection in their areas. Any problems or special considerations for coordination were immediately directed to the home office.

Installation and removal of Hi-Star devices on surface streets normally required less than 1 minute on each lane. During a typical visit to a site, data collectors secured a Hi-Star to each lane in the selected roadway using strips of mastic tape or, in some cases, masonry anchors. Generally, either installation method worked well, with losses due to theft being relatively minimal (i.e., less than 5% over the study duration). The assistance of the police or highway department jurisdiction responsible for the road was needed to control traffic for several minutes at each location for deployment and then 24 hours later for removal of these devices. For arterials and collector roads, briefly stopping traffic in each lane permitted data collectors to affix the Hi-Stars. Removal required another brief stop of traffic.

Installation and removal of the Wavetronix device at sites on limited access roadways no longer required the State or county DOTs to stop traffic. Instead of needing DOT vehicles with arrow boards and crash attenuators in temporary moving work zone configurations or police creating rolling backups to provide data collectors a window to tape the devices to the road, the Wavetronix trailers could simply pull off on the shoulder with little or no disruption to traffic operations. As a courtesy, all field workers contacted the local authority responsible for the road segment where the site was located and provided them with a schedule and exact location for each deployment.

3.1.4 Data Collection

Since different devices were used to collect limited access highway data for the 2009 effort, the data collection and transmission operations were somewhat different for each method. The sections that follow outline the differences and methods used for each.

3.1.4.1 Arterials and Collectors

After coordinating an installation and removal time with local authorities, data collectors programmed each Hi-Star with information uniquely identifying where and when it was to be deployed. This information included State, city, county, roadway name, lane number and direction, speed limit, and start and end date and time for data collection (see Figure 3). After programming the Hi-Stars, each device was packaged to promote quick and proper installation/removal, minimizing the data collector exposure or impediments to passing traffic and to protect the unit from the elements during its deployment. It was also labeled with lane and direction information so that the data collector could easily identify which Hi-Star needed to be deployed in any given lane at a glance when deploying the units. Figure 4 shows one of the Hi-Stars deployed at a rural two-lane site. Note the red “X” painted on the road by the site documenter during the site selection phase of the 2007 effort to indicate the intended Hi-Star location. The Hi-Star appears as a dark patch in the center of the adjacent lane. Data collectors met police, sheriff, or highway department authorities capable of providing traffic control or diversion services for the period necessary for them to install and remove the Hi-Stars in each lane of a given site. With the assistance of the authorities, data collectors were usually able to stop or divert traffic and install or remove the Hi-Stars in a matter of a few seconds per lane.

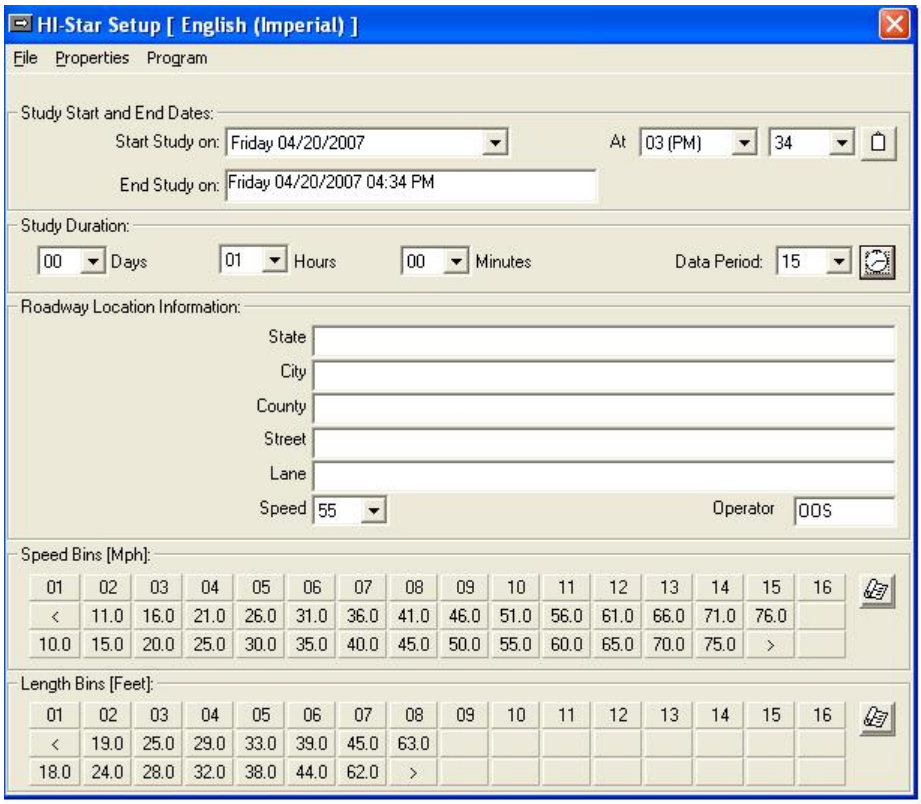

Figure 3. Hi-Star Programming Interface

Figure 4. Deployed Hi-Star and "X" at a Two-Lane Site

All of the selected data collection sites were geocoded, and PSU-level maps for each of the data collectors and field supervisors were developed that identified the location of each site and its geographic proximity to other sites within a PSU. The paper maps were supplemented by commercially available software running on the laptops, allowing data collectors to navigate to each site with turn-by-turn directions. Data collection was scheduled with local authorities for every day of the week. If the coordinated time was missed by the traffic control authorities, rescheduling was required. Sites were rescheduled if there was adverse weather that would affect traffic speeds. Depending on the number of

lanes being measured at a given site, a missed deployment appointment (e.g., due to a police emergency, bad weather, etc.) often meant several hours of delay. This delay was a function of the need to coordinate a new time with the authorities and then re-program and re-package the Hi-Stars before deployment could occur, the latter portion taking several minutes per device/lane.

Similar coordination and traffic control was required again after 24 hours of data collection to remove the Hi-Stars. After retrieval of the Hi-Stars, the data collectors downloaded the information to their laptop computers and transmitted the data to Westat's home office. Hi-Stars were recharged every night in preparation for data collection the next day.

Custom software was developed to assist in the process of deployment and retrieval of the Hi-Stars to allow field supervisors and office staff to track the status of deployments and to determine if the data were being collected in a timely and complete fashion (see Figure **5** and Figure 6). For the data collectors, this provided a way to verify the information collected 2 years earlier by the site documenters and a means to provide information about the collection status. Electronically tracking the status of each site ensured immediate access of the status data by office staff to allow reassignment of collection duties or re-collection in cases where data problems were recognized. The most common types of problems were significantly less than 24 hours of data, a high percentage of 0mph speeds, and large differences in speed counts across lanes,

Figure 5. Site Verification and Data Collection Documentation Interface

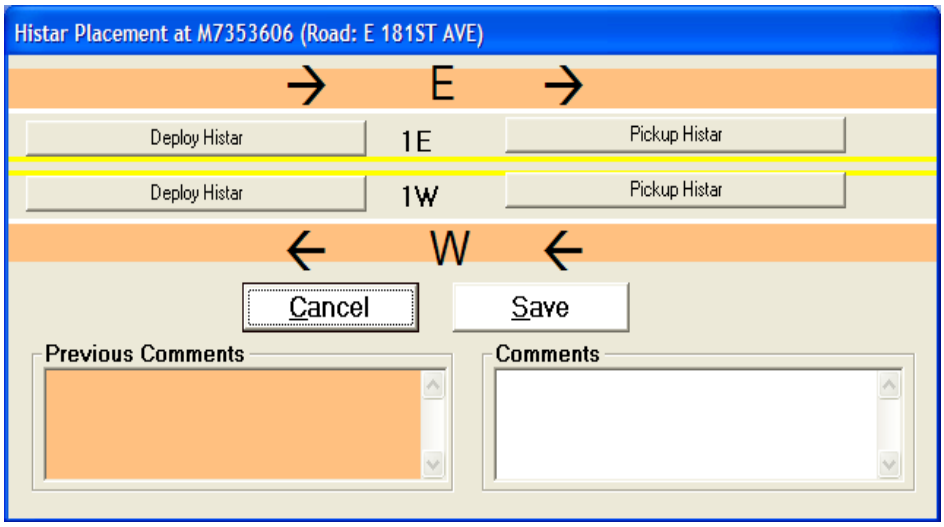

Figure 6. Hi-Star Deployment Schedule Tracking Interface

3.1.4.2 Limited Access Highways

At limited access highway sites, field supervisors would again coordinate with local authorities to schedule deployments. Even though the trailer-mounted Wavetronix were on or beyond the shoulder, it was important to inform police and/or DOT personnel that these devices were going to be used within the highway right of way. Supervisors would often scout successive sites and provide authorities with a plan for which sites would be collected on which days.

Upon arrival at a given data collection site, supervisors would pull out of the through lanes and position themselves as far out of the travel lanes as feasible for the collection. The Wavetronix were capable of monitoring up to 10 lanes of traffic over a range in excess of 200 feet of the trailer location. Supervisors were trained to position the trailers to allow themselves at least 15 to 20 feet of elevation above the road surface, depending on the roadside geometry, landscape, and obstructions. The trailers were parked in locations that provided for nearly vertical extension of the sensor mast and a perpendicular perspective of the road for the Wavetronix sensor. All field supervisors were advised to deploy units behind the protection of a barrier or guardrail. After selection of a suitable parking spot, the trailer was unhooked from the tow vehicle and set up and calibration were begun. Setup involved spreading and lowering the trailer outriggers, raising the mast, orienting solar panels, setting up safety barrels, and connecting the PC for calibration and data collection. At times the need for an appropriate parking spot did require the data collectors to deploy the Wavetronix unit at an alternative location to that in 2007. However, all data collectors were trained to select an alternate site that was similar in roadway geometry to the original 2007 site and not to move more than ¼ mile from the original site. When possible data collectors provided photos or diagrams of the alternate site. Figure 7 shows a typical configuration of one of the trailers during data collection.

Figure 7. Wavetronix Trailer During Data Collection Setup

For each deployment of the trailer, the supervisor was required to aim and calibrate the sensor head for collection. Initially, this meant setting the sensor software into aiming mode and listening to audible tones from the PC indicating when passing traffic was being properly detected and measured. A solid signal indicated when the aim was properly set. Once the aim was confirmed, the field supervisor calibrated the lanes. An electronically controlled actuator on the top of the mast allowed the pitch of the sensor to be adjusted up or down to fine tune the vertical aspect of the sensor aim. To aid this process, a small USB camera was temporarily mounted to the face of the sensor to allow visual aiming optimization across all the lanes. This aspect of the setup process was most critical and useful early in the data collection period. After a few deployments, data collectors became more adept at getting the pitch set with less input from this tool. Lane calibration was performed automatically by the sensor when placed in the proper mode. Lane calibration involved allowing a number of vehicles to pass while their speed, length, and distance from the sensor were measured and interpreted as lanes and vehicles for the impending data collection period. Figure 8 shows the display provided by the software as aiming and lane calibration take place. The software was designed to estimate lane configuration and then allow operators to confirm and name each lane. Supervisors needed to pay special attention to barriers and guardrails located in the center median. Occasionally, the presence of the barriers or guardrails would cause undesirable reflections of the radar during data collection, requiring the supervisor to identify an alternate location not too far from the original site. Once those aspects of the calibration were accomplished, the computer was simply placed in a per-vehicle data collection mode that captured the date, time, speed, vehicle length, lane, and sensor-to-vehicle distance. After 24 hours, data collectors returned to the trailer and manually terminated the data capture mode and collapsed the system to allow for transport to the next site.

In most cases, the Wavetronix unit allowed data collection to take place over one 24-hour period; however, at some locations the road geometry was such that the unit was not able to get a clear view of all lanes in both directions. At those sites data collection was completed over a 48-hour period. That is, 24 hours worth of data was collection for one direction of travel, then the unit was moved to the other side of the road, and 24 hours of speed data was collected for the opposing lanes.

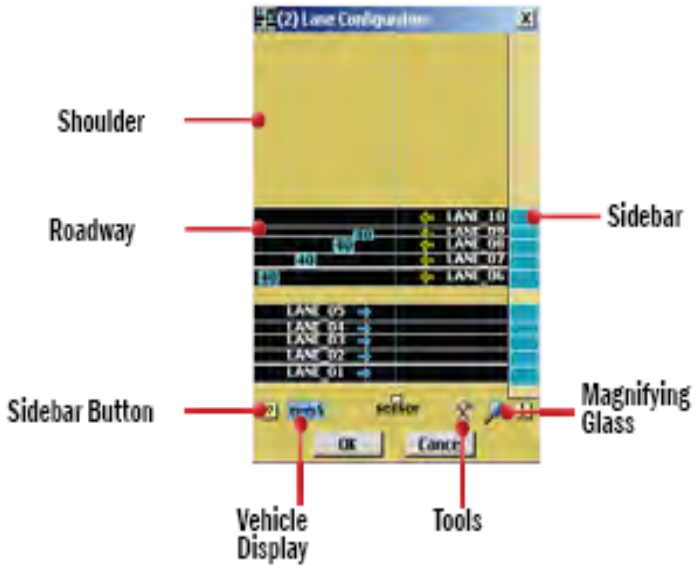

Figure 8. Automatic Lane Calibration Display

The presence of the PC and cellular modem with each trailer made it possible to not only perform calibration and data verifications locally, but also for Westat staff to check in on a given trailer and ensure that calibration had been done correctly and that data were being captured. There were several cases where issues were identified and corrected by Westat staff via remote access, eliminating the need for costly return trips by the supervisor to correct small issues in the setup or calibration of a given collection exercise.

3.1.5 Data Transmission

Data collectors transmitted the electronic data files for each site back to the home office using a secure FTP server connection. For Hi-Stars, this process was typically accomplished from hotels or other establishments offering high-speed internet access. These sites allowed data collectors to access the secure FTP portal and upload the relevant files each night after a collection. After ensuring that the data had been received, data on the server were removed so that only databases located within the firewall held the transmitted information. Raw data residing on the data collector's laptop were protected by usernames and passwords, which controlled not only access to the FTP server, but also access to the laptop user accounts. Supervisors typically used the same facilities to upload data from the Wavetronix. Additionally, the Wavetronix possessed the ability to upload data directly from the trailer using the on-board cellular modem as the conduit.

3.1.6 Data Quality Assurance

As data were transmitted from the field, raw data files were imported into databases for daily verification and cleaning. Also, as mentioned earlier, it was possible to check some calibrations and data via remote links to the Wavetronix trailers prior to formal uploading of that data to the server. This was not performed regularly, but only on occasions where supervisors noted problems with setup, calibration, or collection for a particular site or device. In terms of efficiency, this allowed confirmation of data quality prior to the expense of traveling to a remote collection site for data retrieval and/or transport.

Back in the Westat offices, a variety of manual and automated queries performed on the data allowed for quick assessment of the data's completeness as well as for determination of problems in the collection process. Every lane within a site was reviewed for the following descriptive statistics:

- Sample size,
- Mean and median speed,
- Standard deviation,
- Maximum and minimum speeds,
- Percentile speeds (75th, 85th, and 95th),
- Overall speed distribution, and
- The presence of "phantom" vehicles.

Phantom vehicles were usually identified as vehicles with speeds of 0 mph or above 100 mph, as well as those vehicles with lengths of less than 0 feet or greater than 100 feet. When anomalies, such as high percentages of vehicles with 0 mph speeds or speeds greater than 100 mph, were identified within the raw data for any lane, data collectors were instructed to redeploy the units for a second round of data collection. Anomalies, such as those described above, were typically the result of Hi-Stars moving during data collection or vehicles side swiping the unit. Sites were also revisited when specific anomalies were identified in any of the descriptive statistics (i.e., the mean speed of one lane was drastically different from the mean speeds of the other lane(s); sample sizes between lanes were drastically different; or there was an obvious failure of several of the Hi-Star units to collect data for the 24 hours.) After the daily integrity checks were performed, the data collectors were allowed to move on to other sites or PSUs.

For data collected with the Wavetronix, some similar anomalies were detected and filtered. In particular, there were some cases in which large numbers of vehicles with missing speeds were logged. These cases were typical for situations where the site included a poor vertical loft above the roadway for parking the trailer or where some surface (e.g., a guardrail or barrier) reflected vehicle radar signatures back to the Wavetronix instead of just the vehicles themselves. There were also situations in which naming of lanes was incorrect or where the collection site did not allow reliable collection of one or more lanes because of inadequate setback from the road edge or some other situation. Automated detection routines were put in place for a variety of these situations to identify potential problems, correct them remotely, and minimize the need for manual checks, corrections, or the need for a second attempt at collecting speed data at the site.

Once data collection was complete in all PSUs, the raw data went through a rigorous cleaning process and were merged with all of the descriptive information gathered during the site selection phase of the 2007 effort. For the all speed data, each lane within a site was cleaned separately. Each lane was reviewed for excessively high speeds (greater than 100 mph) and speeds of 0 mph (or missing values), as well as a negative vehicle length or a length greater than 100 ft. If a vehicle met one of these criteria, it was considered a phantom vehicle and removed from the data set. In turn, the headway and gap

measures were recalculated to reflect the new time differential between two consecutive vehicles. At this point, vehicles were also classified as free-flow vehicles, those with 5 seconds or greater difference between two consecutive vehicles, or not free flow. Once the individual records were cleaned for each lane within a site, the number of hours when data were collected was calculated for each lane. Note that to be considered a good lane data set, the time between the first recorded vehicle and the last recorded vehicle in the lane had to be at least 16 hours. It was possible for no vehicles to be recorded during some hours, in which case the lane's data were still considered good, even if up to 8 consecutive hours had no vehicle records (we assumed that this was likely due to no traffic on the road during that period rather than malfunctioning data collection equipment). Further, at least one vehicle had to be recorded in each of 12 hours (not necessarily consecutive) for the lane data set to be considered good. Whenever both of those conditions were met, we accepted the data and made no form of weighting adjustment. However, if there were fewer than 16 hours between the first and last vehicle recorded or fewer than 12 hours with at least one vehicle observation in each hour, we deemed that likely due to malfunctioning equipment and treated the lane as "non-response." In addition, lanes with an adequate number of hours with high percentages of vehicles with 0 mph or missing speeds or high percentages of vehicles with excessively high speeds were also flagged as "non-response" lanes. Lanes identified as "non-response" were excluded from further data analyses.

Sites were categorized as "good" if usable data were collected from most of the lanes on the roadway as discussed in the previous paragraph. There were 695 sites in the 2009 sample. Data were collected at 667 sites. Data were not collected at 28 sites due to construction or lack of cooperation from the local authorities.

One correction was applied to the data from the Hi-Stars. A linear correction was applied based on calibration trials run on the majority of the Hi-Star units prior to deployment. That calibration exercise involved a number of speed passes over each unit that was installed on a local drag strip. Parallel measures were taken with a Wavetronix sensor, GPS loggers riding in passing vehicles, and LIDAR. That calibration exercise revealed nearly perfect correlation between LIDAR, GPS, and Wavetronix devices, but a predictable error offset for the Hi-Stars. As such, a linear correction factor was set and applied to the Hi-Star data as part of the data processing for the 2009 data set.

4 Data Weighting and Sample Expansion

The steps in the weighting process for the survey are outlined below. Phase I refers to the site selection phase of the 2007 effort. Since the sites used in 2007 and 2009 were the same, the process and weighting for these steps remain valid. Phase II, which refers to the data collection phase of the 2007 effort, is analogous to the data collection performed in 2009. The steps include:

A. Inverse of the probability of selecting a PSU.
B. Inverse of the probability of selection of a site for Phase I.
C. Adjustment for site length (distance-based measure).
D. Non-response adjustment for Phase I.
E. Inverse of the probability of selection of a site for Phase II.
F. Non-response adjustment for non-observed sites in Phase II.
G. Adjustment for observations of less than 24 hours.
H. Adjustment for non-observed lanes in Phase II.
I. Balancing for unequal distribution of assignments by day of week.

J. Trimming of large weights.

Two sets of weights were produced. The first weight is for a "vehicle count" measure, and the second set is for a "distance-based" measure. The "vehicle count" measure is appropriate for estimating, for example, the mean speed of vehicles at a given instant in time or point along the road. It is not concerned with the distance that vehicles are traveling, and thus the length of an observation site does not figure into the weight.

The "distance-based" measure is appropriate for estimating the mean speed of vehicles according to the distance traveled by each vehicle. The length of an observation site must be included as a factor in the weighting. This measure is appropriate for describing total travel miles in relation to speed and is a more comprehensive representation of exposure to speed in everyday driving. Tables presented in this report are based on this distance-based measure.

The process is the same for the two weights, except for step C in the weighting (Section 4.3 below).

4.1 PSU Weight

We retained nearly all the PSUs that are in sample in the NMVCCS. The inverse of the probability of selection for the 18 NMVCCS PSUs retained with certainty and the two subsampled PSUs is given in Table 1. We denote this weight as $_{P_i}$.

Table 1. Creation of PSU Weights Based on NMVCCS and TSS Sampling of PSUs

PSU	NMVCCS PSU weight (NMVCCS_PSUWT)	Initial PSU conditional weight (TSS_PSUWT)	Final PSU baseweight (PSU_BWT)
2	27.1	1	27.1
3	2.5	0	0
4	13	1	13
5	22.1	1	22.1
6	5.5	0	0
8	24.4	1	24.4
9	19.7	1	19.7
11	38.1	1	38.1
12	25.2	1	25.2
13	77.9	1	77.9
41	19	0	0
43	36.7	1	36.7
45	41.4	1	41.4
48	155.9	1	155.9
49	4.9	1	4.9
72	2.4	3.03	7.27
73	22	1	22
74	8.4	1	8.4
75	32.3	1	32.3
76	105.3	1	105.3
78	55.3	1	55.3
79	1.7	0	0
81	9.6	1	9.6

4.2 Site Weights, Phase I

We consider only non-intersection sites, as intersection sites are not given weights. $S_{1,i,j}$ is the inverse of the probability of selection of the *j*th site in the *i*th PSU. Non-crash sites were selected with probability proportional to the length of the road segment. Crash sites for which speed or aggressive driving was indicated were sampled with certainty. Within each PSU, other crash sites were selected with equal probability.

The weight at this point in the process is $W_{1,i,j} = P_i * S_{1,i,j}$

4.3 Adjustment for Site Length

As discussed above, we have calculated two weights; each can be used for a separate set of tables. There may be additional weights used for specialized purposes at a later time. The first weight is a "count-based measure" that can be used to describe the average static vehicle density in relation to speed. The second weight, used in the set of tables in this report, is a "distance-based measure" that can be used to describe total travel miles in relation to speed. For the count-based measure, no additional adjustment is needed. For the distance-based measure, the weight is multiplied by the length of the site.

The distance-based weight is $W'_{i,j} = W_{i,j} * 1_j$, where 1_j is the length of the *j*th site.

4.4 Phase I Non-Response Adjustment

Non-response adjustment was done for each of a number of non-response cells, using a weighting cell non-response adjustment methodology. Sites were considered to be non-responsive for reasons such as being unpaved or under construction. Roads that were closed to traffic during the study period, driveways, and roundabouts were considered as ineligible for the study. To determine cells where non-response rates differed, an analysis was done using a software package called CHAID (Chi-squared Automatic Interaction Detector) separately for crash sites and non-crash sites. The variables found by CHAID to be useful in defining cells with differential response rates were PSU, road class, total lanes, and curvy/high gradient (CG) status.

The non-response adjustment factor for a given cell is

NR_1 = [å $W_{1,i,j}$ for respondents + å $W_{1,i,j}$ for non-respondents]/ [å $W_{1,i,j}$ for respondents]. (Note that this is the adjustment factor for the count-based measure. The formula for the distance-based measure is the same, except $W_{1,i,j}$ is replaced by $W_{1,i,j}$¢.)

The weight including this non-response adjustment factor is $W_{2,i,j} = W_{1,i,j} * NR_1$ for the count-based measure and $W_{2,i,j}$¢ $= W_{1,i,j}$¢ $* NR_1$¢ for the distance-based measure.

4.5 Site Weights, Phase II

A subsample of eligible non-crash sites that are non-CG from Phase I was selected for actual data collection in Phase II, while all crash sites and other non-crash sites were retained with certainty. $S_{2,i,j}$ for a particular class of sites (crash, CG, non-CG) is the ratio of Phase I sites to selected Phase II sites.

The weight including this weight factor is $W_{3,i,j} = W_{2,i,j} * S_{2,i,j}$ for the count-based measure and $W_{3,i,j} = W_{2,i,j} * S_{2,i,j}$ for the distance-based measure.

4.6 Non-Response Adjustment for Non-Observed Sites, Phase II

An adjustment was made for sites not included in the estimates in two stages. First, there was a non-response adjustment for observations that could not be performed due to bad weather conditions, inability to get police assistance, or other situations beyond our control. A CHAID analysis was again done to determine the definition of non-response cells. The variables found by CHAID to be related to the response rate and used in cell definition were PSU and total lanes.

The non-response adjustment factor for a given cell is N_2 = [å $W_{3,i,j}$ for respondents + å $W_{3,i,j}$ for non-respondents]/ [å $W_{3,i,j}$ for respondents]

The weight, including this stage of non-response adjustment, is $W_{4,i,j} = W_{3,i,j} * N_2$ .for the count-based measure and $W_{4,i,j} = W_{3,i,j} * N_3$ for the distance-based measure.

A second stage of non-response adjustment was possible for sites where data were collected, but for which data were insufficient. A site was considered to be usable if less than half of the lanes were considered to be "non-responding" lanes. (Section 3.3.6 provides the details about when a lane was considered to be responding and non-responding.) Sites not meeting this criterion were regarded as non-responding. The non-response adjustment factor for non-responding sites due to lane data problems is

$$N_3 = \left[\text{å } W_{4ij} \text{ for respondents} + \text{å } W_{4ij} \text{ for non - respondents}\right] / \left[\text{å } W_{4ij} \text{ for respondents}\right]$$

The weight, including this stage of non-response adjustment, is $W_{5ij} = W_{4ij} * N_3$ for the count-based measure and $W_{5,i,j} = W_{4,i,j} * N_3$ for the distance-based measure.

4.7 Adjustment for Non-Observed Lanes

A non-response adjustment was made for non-responding lanes at sites that were considered as responding sites. A lane was non-responding according to the definition of response and non-response described in Appendix A. Details of Sample Design Logic. We give an example of when a *site* was non-responding and a non-response adjustment was made as described in Section 4.6 and when a *lane* was non-responding and a non-response adjustment was made as described in this section. Suppose there are four lanes at a site. If three lanes were classified as non-responding, the site would be regarded as non-responding, and the site non-response adjustment described in the preceding section would be applied. If, however, only one of the four lanes was classified as non-responding, the site would be regarded as responding, and there would be a non-response adjustment for only the bad lane.

A very simple lane non-response adjustment was made, in which data for the good lanes from a given site were given larger weights to account for the lanes lacking good data. For a given site, let R be the number of lanes for which there was good data, and let T be the total number of lanes at the site. The non-response adjustment factor is then T/R.

The weight including this adjustment factor is $W_{6,i,j} = W_{5,i,j} * T/R$ for the count-based measure and $W_{6,i,j} = W_{5,i,j} * T/R$ for the distance-based measure.

4.8 Balancing by Day of Week

Ideally, the same number of sites would be observed each day of the week. For a variety of reasons, this might not always be the case. To adjust for unequal number of observations between week days and the weekend, two factors were formed: D_1 = 5/7*(weighted number total sites observed)/ (weighted number weekday sites observed) and D_2 = 2/7*(weighted number total sites observed)/ (weighted number weekend sites observed). The factor D_1 was applied to sites observed on weekdays and D_2 was applied to sites observed on weekends. Weekend observations were defined as sites for which the initiation of data collection at a given site occurred between 3 p.m. on a Friday and 3 p.m. on a Sunday, with weekday observations consisting of all other sites.

The weight, including this adjustment factor, is $W_{7,i,j} = W_{6,i,j} * D_k$ .for the count-based measure and $W_{7,i,j} = W_{6,i,j} * D_k$ for the distance-based measure.

4.9 Trimming Large Weights

Very large weights lead to high sampling errors. Thus, we used normal Westat procedures for reducing the largest weights. Looking at all vehicle weights in CG sites, those weights that were more than 4.5 times the median weight for vehicles in this group as a whole were reduced to 4.5 times the mean weight. Similarly, looking at all vehicle weights in non-CG sites, those weights that were more than 4.5 times the median weight for the group as a whole were similarly reduced. However, we also avoided letting more than 5% of all vehicles have their weights trimmed. Thus, in some cases, weights that exceeded the threshold of 4.5 times the median were not trimmed, and in those situations, weights were only trimmed back to the level of the largest non-trimmed weight. Trimming was done separately for the count-based weights and for the distance-based weights. Table 2, below, shows the percentages of weights that were trimmed.

$W_{8,i,j} = W_{7,i,j} * T$, where $T = 1.0$ for most vehicles and a value less than 1.0 for those vehicle weights requiring trimming.

$W'_{8,i,j} = W'_{7,i,j} * T'$, where T' is less than 1.0 for those vehicle weights requiring trimming and 1.0 otherwise.

Table 2. Percent of Weights That Were Trimmed

		Curvy/ high gradient %	Non-curvy/ low gradient %
Count-based	Crash sites	0	3.9
	Non-crash sites	.7	5.2
Distance-based	Crash sites	1.3	7.1
	Non-crash sites	<.1	.9

The process of trimming slightly reduces the sum of total weights. Weights for all vehicles were slightly increased, separately for each of the four cells in Table 2, to restore the sum of weights prior to trimming. Let F_k be the factor applied.

The final weights are $W_{9,i,j} = W_{8,i,j} * F_k$

$$W'_{9,i,j} = W'_{8ij} * F_k$$

5. Results

Tabulations of weighted speed estimates and standard error values are provided in the following pages. Table naming indicates the levels of road classification, daylight condition, time of day, day of week, horizontal or vertical roadway curvature, vehicle length, urbanicity, number of lanes, etc. that each tabulation represents. In each case, tables are presented in pairs, with mean, median, 85th percentile, and 95th percentile values in one table immediately followed by a table with the standard deviations (SD) for the presented data. For all of the tables of results that follow, roadway classification uses the functional classification code (FCC) definitions represented by those found in the Geographic Data Technology (i.e., GDT) database.

Several definitions are provided here to guide the reader through the presentation of these data. First, a *standard error* value is presented with each of the weighted values presented in the cross-tabulations. This standard error of the estimate represents the bounds of the 95% confidence interval for the presented weighted estimate (i.e., the weighted estimate for that cross-tabulation). Each table provides the 2009 population estimate and its standard error. The standard error of the estimate is presented in parentheses next to the estimate. The next column r presents the value of the change relative to the 2007 estimate and standard error. That is, if the estimate for 2009 is higher, the change value will be a positive number. Conversely, if the estimate for 2009 is lower, the change value will be a negative number.

The *standard deviations* are presented as a companion table for each of the primary tables. These standard deviations provide a measure of the spread of the unweighted data above or below the unweighted mean value. Note that we have not presented the unweighted means in this report.

Overall, the data generally followed expected trends for the FCC class breakouts. That is, FCC-1 (limited access highways) typically showed a higher overall speed than FCC-2 (major arterials). In turn, FCC-2 road segments generally had higher speeds than most FCC-3 (minor arterials/collector) road segments.

The following sections point out the results by road class for the various other independent variables and combinations. Each breakout of the data discussed in the sections to follow expounds on the differences among the independent variable categories from the 2009 period as the primary focus of the discussion since it is these relative measures, not just the longitudinal differences, that are of interest and concern in shaping speed management policy.

5.1 Road Class

Overall speeds and proportions of vehicles exceeding the posted speed limit are presented for all traffic in Table 3 and for free-flow traffic in Table 4. In this report, the term free flow is defined on an individual vehicle basis, not on the flow regime of the roadway. Thus, a free-flow vehicle is defined as a vehicle with headway greater than 5 seconds. In general, the speed estimates for both flow conditions are quite comparable, with both typically falling within .6 to 1.5 mph of each other for all road classes. Traffic speeds on limited access roads average about 17 mph faster than on major arterials, which in turn are 5 to 6 mph faster than on minor arterials and collector roads. For both the free-flow and all-traffic cases, the limited access highway estimates increased substantially in 2009 compared to 2007. That is, they went up by between 6 and 5 mph, respectively. The other FCC road classes showed moderate slowing tendencies over the two data collection periods.

Table 3. Overall Speeds by Road Class (All Traffic)

	FCC ROAD CLASS							
	1 Limited access		2 Major arterial		3 Minor arterial/collector		Total	
	Speed		Speed		Speed		Speed	
	2009	Change	2009	Change	2009	Change	2009	Change
	Est. (SE)	Est. (SE)	Est. (SE)	Est. (SE)	Est. (SE)	Est. (SE)	Est. (SE)	Est. (SE)
Mean	69.0 (1.2)	4.6 (1.0)	51.9 (1.2)	-0.5 (0.5)	46.4 (1.1)	0.0 (0.4)	57.3 (1.3)	2.3 (0.9)
Median	70.0 (2.1)	5.4 (2.0)	52.0 (1.3)	-0.7 (1.1)	45.6 (1.3)	0.4 (0.6)	58.0 (1.9)	2.4 (1.4)
Quantile (0.85)	77.5 (1.1)	4.4 (1.2)	62.5 (1.6)	-0.8 (0.9)	57.1 (1.8)	-0.6 (0.7)	73.5 (2.0)	4.7 (1.8)
Quantile (0.95)	81.0 (0.8)	2.4 (0.8)	68.9 (1.7)	-0.5 (1.3)	64.7 (1.6)	-0.6 (1.1)	79.0 (1.5)	4.0 (1.3)

Table 4 shows the overall speed distributions by the three FCC classes for vehicles designated as free flow. All tables and graphs that follow in this report represent unconstrained or free-flow vehicles. Standard deviations are presented in Table 5. In 2009, the 85th percentile values of these speeds range from about 7-11 mph above the mean, while the 95th percentiles are from about 11-19 mph above the mean. These numbers did not differ from those of 2007, where the 85th percentile values of these speeds range from about 9-12 mph above the mean, while the 95th percentiles are from about 12-19 mph above the mean.

Despite the higher mean speeds on the limited access roadways, the standard deviations for these roads were not largely different than for arterials or collectors in 2009. At about 8 mph on limited access roadways, the standard deviation was about 12% of the mean, while for arterials and collectors, it was about 10 mph, or 19-22% of the mean. In 2007, at about 12 mph on limited access roadways, the standard deviation was about 16% of the mean, while for arterials and collectors, it was in the range of about 14-16 mph, or 25-30% of the mean.

Table 4. Overall Speeds by Road Class (Free-Flow)

	FCC ROAD CLASS							
	1 Limited access		2 Major arterial		3 Minor arterial/ collector		Total	
	Speed		Speed		Speed		Speed	
	2009	Change	2009	Change	2009	Change	2009	Change
	Est. (SE)	Est. (SE)	Est. (SE)	Est. (SE)	Est. (SE)	Est. (SE)	Est. (SE)	Est. (SE)
Mean	70.5 (1.0)	5.8 (0.7)	53.3 (1.2)	-0.3 (0.6)	47.0 (1.2)	0.2 (0.4)	56.4 (1.5)	1.9 (0.7)
Median	70.8 (0.8)	6.0 (0.8)	53.4 (1.3)	-0.7 (1.0)	46.1 (1.4)	0.3 (0.6)	56.0 (2.0)	1.0 (0.9)
Quantile (0.85)	78.0 (1.6)	4.2 (1.4)	63.7 (1.5)	-0.8 (0.7)	57.8 (2.0)	-0.5 (0.7)	73.0 (1.6)	4.5 (1.2)
Quantile (0.95)	81.8 (0.7)	2.6 (0.7)	70.1 (1.5)	-0.5 (1.3)	65.6 (1.7)	-0.4 (1.0)	79.0 (1.4)	3.9 (1.1)

Figure 9 shows the overall speeds for free-flow traffic for the 2009 collection period. The arrows below each box plot show the change relative to the 2007 values for the same data, while the oval indicates that there was no change between the 2007 and 2009 data for that particular measure. The overall values for limited access highway data were well above those from 2007. In contrast, the major arterials and minor arterial/collector categories showed few or no changes from year to year.

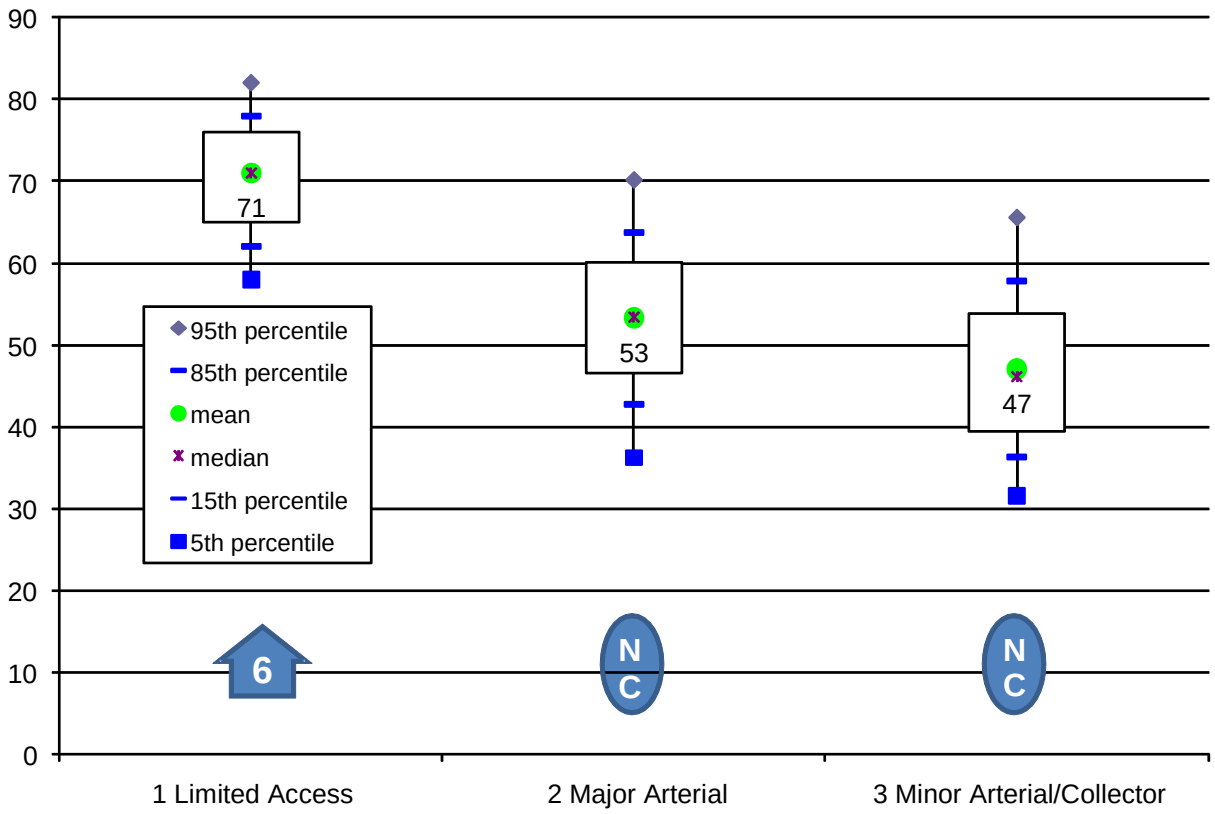

Figure 9. Overall Speeds by Road Class, 2009 (Free-Flow) (Arrows show change from 2007)

Table 5 provides the standard deviations of both free-flow and all-traffic conditions and shows only a small difference in the values for free-flow overall traffic datasets between 2007 and 2009. As in 2007, the 2009 standard deviations of both free-flow and all-traffic conditions show only a small difference in the values for free-flow over all-traffic datasets.

Table 5. Standard Deviations for the Values Reported in Table 3 and Table 4

	FCC ROAD CLASS							
	1 Limited access		2 Major arterial		3 Minor arterial/collector		Total	
	Speed Value Std Dev		Speed Value Std Dev		Speed Value Std Dev		Speed Value Std Dev	
Flow condition	2009	Change	2009	Change	2009	Change	2009	Change
Free-Flow	8.11	-1.03	10.33	-0.43	10.46	-0.44	14.21	1.22
All Traffic	9.07	0.13	10.52	-0.15	10.30	-0.34	14.33	1.41

Like the speed estimates, in 2009 the proportions of speeding vehicles shown in Table 6 and Table 7 were very similar for free-flow and overall conditions. Table 6 shows the proportion of all vehicles exceeding the speed limit on each road class. As expected, since the speed estimates increased for the limited access highway class from 2007 to 2009, the percent change here also shows a large increase of drivers exceeding the posted speed limit. In 2007, for example, 16% of all vehicles traveling on limited access roadways exceeded the posted speed limit by 10 mph. In 2009, this percentage increased to 19. For the other road types, proportions of drivers exceeding the posted speed limit decreased slightly in 2009 compared to 2007.

Table 6. Proportion of Traffic Exceeding Speed Limit by Road Class (All Traffic)

	FCC ROAD CLASS							
	1 Limited access		2 Major arterial		3 Minor arterial/collector		Total	
	Mean Estimate		Mean Estimate		Mean Estimate		Mean Estimate	
	2009	Change	2009	Change	2009	Change	2009	Change
% Exceeding speed limit by any amount	71%	19%	55%	-4%	57%	-2%	63%	7%
% Exceeding speed limit by > 5 mph	44%	14%	30%	-2%	31%	-2%	37%	5%
% Exceeding speed limit by > 10 mph	19%	4%	12%	-1%	14%	-1%	16%	1%

Table 7 shows the proportion of free-flow vehicles exceeding the speed limit on each road class. Overall, 63% of free-flow vehicles exceeded the speed limit on all roadways. This was a 7% increase when compared to 2007 (56%). In addition, 16% of drivers in all the road classes were observed exceeding the posted speed limits by more than 10 mph. This was only a 1% increase from 2007. Figure 10 provides a graphical depiction of the values listed in Table 7.

Table 7. Proportion of Traffic Exceeding Speed Limit by Road Class (Free-Flow)

	FCC ROAD CLASS							
	1 Limited access		2 Major arterial		3 Minor arterial/collector		Total	
	Mean Estimate		Mean Estimate		Mean Estimate		Mean Estimate	
	2009	Change	2009	Change	2009	Change	2009	Change
% Exceeding speed limit by any amount	72%	23%	56%	-4%	59%	-2%	63%	7%
% Exceeding speed limit by > 5 mph	46%	17%	31%	-3%	33%	-2%	37%	4%
% Exceeding speed limit by > 10 mph	20%	6%	13%	-2%	15%	-1%	16%	1%

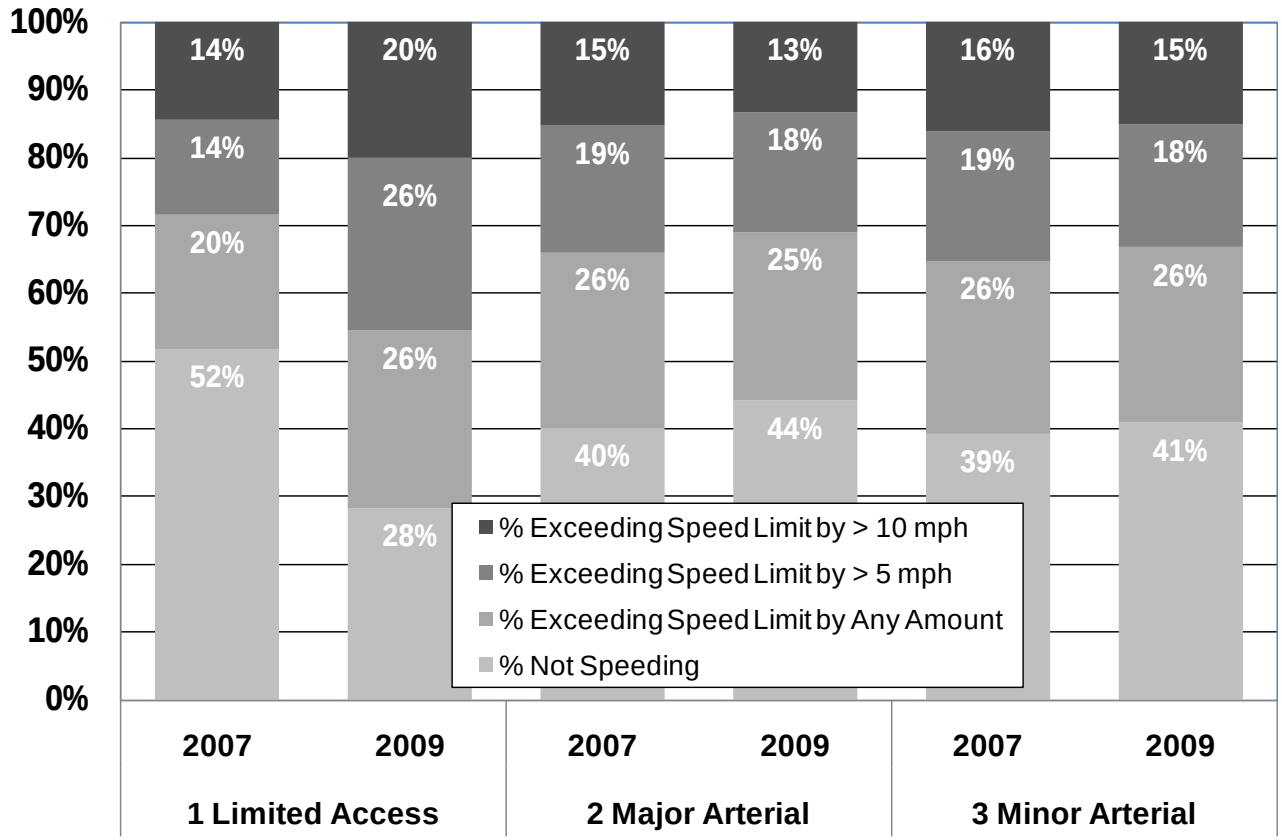

Figure 10. Proportion of Traffic Exceeding the Speed Limit by Road Class (Free-Flow)

Table 4 through Table 7 show only small differences in the values for free-flow and all-traffic conditions. Since the goal of this portion of the data collection effort was to determine the speeds chosen by drivers on given roadway classes as a function of various other independent factors, it seems prudent to concentrate on the portion of the data that represents drivers' speed when not constrained by

other drivers in proximity. For that reason, the remainder of the data tabulations and discussion of relationships of those factors will concentrate on the free-flow dataset.

5.2 Time of Day

There was very little variation in speeds by time of day, as shown in Table 8. Relative to the other road types, the greatest variations in speeds appear to be on the smallest roads (minor arterial/collectors), though the means were not significantly different across time periods. The year-to-year variations are in line with the overall trends, where measured speeds were greatest on limited access roadways as compared to the other road types. However, there are minimal shifts as a result of the time-of-day variations across all road types. Figure 11 provides a graphic view of speeds by time of day. Table 9 shows the standard deviations for the speed values across the time of day. Standard deviation variations show little difference due to time of day or year. The most notable observation is the overall standard deviation for the limited access roadways was reduced from 9.1 in 2007 to 8.1 in 2009.

Table 8. Speed by Road Type and Time of Day (Free-Flow)

		FCC ROAD CLASS							
		1 Limited access		2 Major arterial		3 Minor arterial/collector		Total	
		Speed		Speed		Speed		Speed	
		2009	Change	2009	Change	2009	Change	2009	Change
TIMEDAY		Est. (SE)	Est. (SE)	Est. (SE)	Est. (SE)	Est. (SE)	Est. (SE)	Est. (SE)	Est. (SE)
1 Late night (0000-0559)	Mean	68.6 (0.9)	4.8 (0.6)	53.4 (1.3)	-0.7 (0.6)	48.7 (1.2)	0.3 (0.4)	59.4 (1.3)	2.4 (0.7)
	Median	68.0 (1.0)	4.1 (0.8)	53.1 (1.7)	-0.9 (1.1)	48.1 (1.5)	0.4 (0.7)	61.0 (1.5)	3.0 (1.1)
	Quantile (0.85)	76.2 (1.1)	3.6 (0.7)	63.9 (1.8)	-0.7 (0.8)	59.6 (1.7)	-0.4 (0.6)	73.0 (1.5)	3.6 (1.5)
	Quantile (0.95)	80.4 (0.8)	2.4 (0.8)	70.7 (1.4)	-0.6 (1.9)	66.9 (1.2)	-0.4 (0.7)	78.0 (2.7)	2.6 (2.5)
2 Morning peak 3 hrs (0600-0859)	Mean	70.9 (1.0)	5.7 (0.8)	54.4 (1.4)	-0.1 (0.7)	48.3 (1.2)	0.2 (0.5)	57.0 (1.5)	1.9 (0.8)
	Median	71.0 (2.6)	5.7 (2.1)	54.6 (1.4)	-0.6 (0.9)	47.5 (1.5)	0.4 (0.7)	56.7 (2.1)	1.3 (1.2)
	Quantile (0.85)	78.3 (0.7)	4.1 (0.6)	64.9 (1.7)	-0.3 (1.3)	59.2 (1.9)	-0.2 (0.8)	73.0 (1.6)	4.2 (1.5)
	Quantile (0.95)	82.3 (0.8)	2.7 (0.8)	71.4 (1.6)	0.3 (2.0)	66.9 (1.5)	-0.1 (1.3)	79.0 (1.3)	3.7 (1.3)
3 Mid-day 7 hrs (0900-1559)	Mean	71.0 (1.0)	6.1 (0.7)	53.1 (1.1)	-0.4 (0.5)	46.8 (1.3)	0.2 (0.4)	56.0 (1.5)	1.9 (0.8)
	Median	71.9 (2.1)	6.9 (1.9)	53.4 (1.3)	-0.6 (0.9)	46.0 (1.4)	0.5 (0.5)	55.3 (2.0)	0.7 (1.0)
	Quantile (0.85)	78.7 (1.4)	4.7 (1.2)	63.5 (1.4)	-0.9 (0.7)	57.7 (1.9)	-0.5 (0.7)	73.0 (1.7)	4.8 (1.4)
	Quantile (0.95)	82.0 (0.8)	2.7 (0.8)	69.9 (1.5)	-0.7 (1.2)	65.2 (1.8)	-0.6 (0.9)	79.0 (1.5)	4.0 (1.2)
4 Evening peak 3 hrs (1600-1859)	Mean	71.2 (1.2)	6.1 (1.0)	53.6 (1.3)	-0.4 (0.6)	47.0 (1.4)	0.1 (0.4)	55.6 (1.6)	1.5 (0.8)
	Median	72.0 (1.3)	6.7 (1.1)	53.9 (1.4)	-0.7 (1.1)	46.0 (1.5)	0.1 (0.8)	54.6 (2.1)	0.2 (0.8)
	Quantile (0.85)	78.9 (0.3)	4.5 (0.6)	64.1 (1.6)	-1.0 (0.7)	57.9 (2.2)	-0.7 (0.8)	73.0 (1.7)	4.7 (1.4)
	Quantile (0.95)	82.5 (0.8)	2.5 (1.1)	70.5 (1.7)	-0.6 (1.1)	65.6 (1.9)	-0.7 (1.1)	79.0 (1.3)	3.9 (1.1)
5 Early night 5 hrs (1900-2359)	Mean	69.9 (1.0)	5.6 (0.7)	52.3 (1.1)	-0.2 (0.6)	46.0 (1.0)	0.1 (0.4)	56.2 (1.4)	2.0 (0.8)
	Median	69.9 (1.8)	5.3 (1.5)	52.1 (1.2)	-0.6 (1.4)	45.0 (1.1)	0.2 (0.5)	56.0 (2.0)	1.4 (1.1)
	Quantile (0.85)	77.6 (0.9)	4.2 (0.8)	62.6 (1.7)	-0.6 (0.7)	56.4 (1.6)	-0.6 (0.7)	73.0 (1.7)	4.7 (1.5)
	Quantile (0.95)	81.2 (0.7)	2.5 (0.6)	69.1 (1.7)	-0.4 (1.0)	63.9 (1.6)	-0.7 (0.7)	78.0 (3.1)	3.0 (3.2)
Total	Mean	70.5 (1.0)	5.8 (0.7)	53.3 (1.2)	-0.3 (0.6)	47.0 (1.2)	0.2 (0.4)	56.4 (1.5)	1.9 (0.7)
	Median	70.8 (0.8)	6.0 (0.8)	53.4 (1.3)	-0.7 (1.0)	46.1 (1.4)	0.3 (0.6)	56.0 (2.0)	1.0 (0.9)
	Quantile (0.85)	78.0 (1.6)	4.2 (1.4)	63.7 (1.5)	-0.8 (0.7)	57.8 (2.0)	-0.5 (0.7)	73.0 (1.6)	4.5 (1.2)
	Quantile (0.95)	81.8 (0.7)	2.6 (0.7)	70.1 (1.5)	-0.5 (1.3)	65.6 (1.7)	-0.4 (1.0)	79.0 (1.4)	3.9 (1.1)

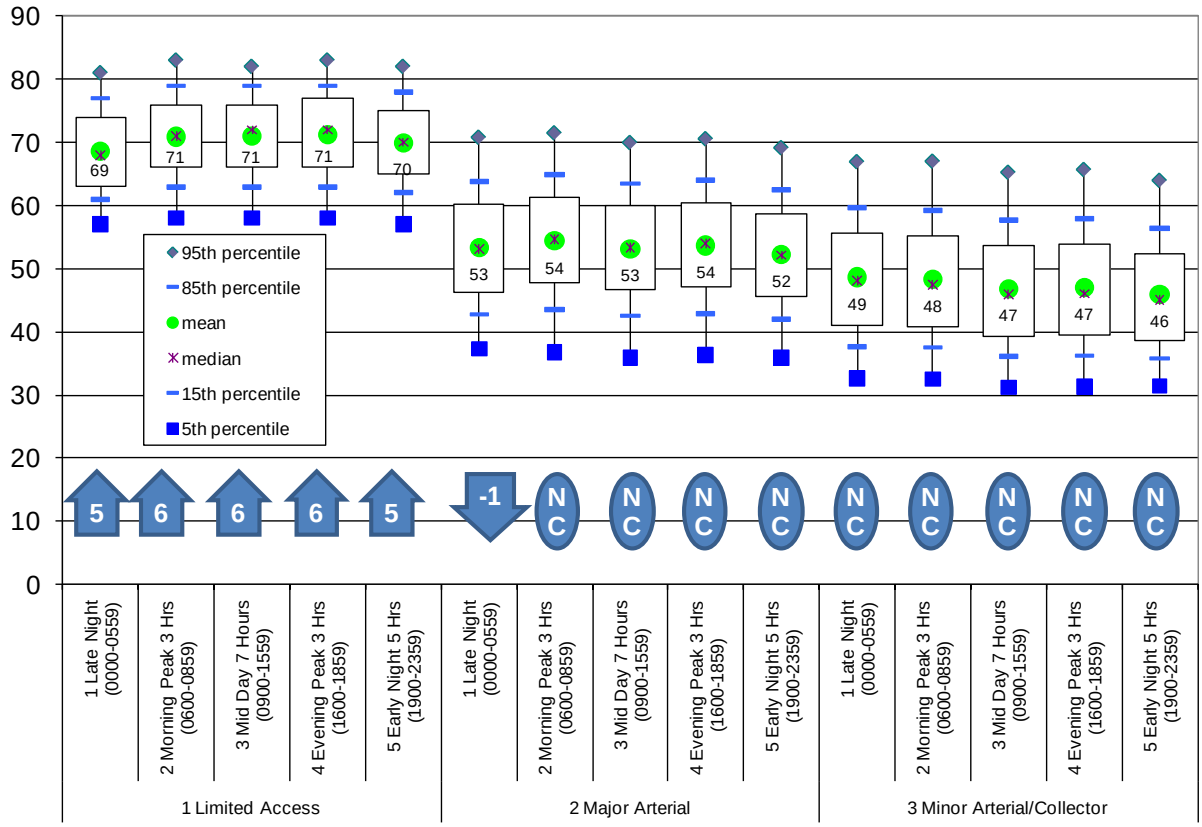

Figure 11. Speed by Road Type and Time of Day, 2009 (Free-Flow)
(Arrows show change from 2007)

Table 9. Standard Deviations for the Values Reported in Table 8

	FCC ROAD CLASS							
	1 Limited access		2 Major arterial		3 Minor art/collector		Total	
	Speed Value (Std Dev)		Speed Value (Std Dev)		Speed Value (Std Dev)		Speed Value (Std Dev)	
TIMEDAY	**2009**	**Change**	**2009**	**Change**	**2009**	**Change**	**2009**	**Change**
1 Late night (0000-0559)	7.7	-1.1	10.2	-0.2	10.5	-0.4	13.0	1.0
2 Morning peak 3 hrs (0600-0859)	8.1	-1.1	10.5	-0.5	10.5	-0.3	13.9	1.1
3 Mid-day 7 hrs (0900-1559)	7.9	-1.3	10.3	-0.4	10.5	-0.5	14.3	1.2
4 Evening peak 3 hrs (1600-1859)	9.2	-0.3	10.4	-0.6	10.6	-0.5	14.5	1.3
5 Early night 5 hrs (1900-2359)	7.7	-1.3	10.0	-0.4	10.1	-0.4	14.2	1.2
Total	8.1	-1.0	10.3	-0.4	10.5	-0.4	14.2	1.2

5.3 Light Condition

Table 10 and Table 11 present daytime versus nighttime speeds and standard deviations. Evening Civil twilight, the time when there is still enough light for objects to be distinguished and artificial illumination is not necessary, occurred between 9 p.m. in the southernmost location and 9:30 p.m. in the northernmost location during the 2007 field period, and between 8:40 p.m. and 9 p.m. during the 2009 field period. Therefore, daytime was defined as 6 a.m. – 9 p.m. Again, the differences are extremely small (i.e., 1 to 2 mph) between period of light conditions within each road type in 2009. This pattern is identical to that observed in 2007, where the changes were between 1 to 2mph. The standard deviations for the individual road types have decreased over those of 2007 with speeds on limited access roadways showing the greatest change of 1. Figure 12 provides a graphic view of the statistics from Table 10.

Table 10. Speed by Road Type and Light Condition (during May 2009) (Day=6 a.m. to 9 p.m. Night=9 p.m. to 6 a.m.) (Free-Flow)

		FCC ROAD CLASS							
		1 Limited access		2 Major arterial		3 Minor art/collector		Total	
		Speed		Speed		Speed		Speed	
		2009	**Change**	**2009**	**Change**	**2009**	**Change**	**2009**	**Change**
LIGHT CONDITION		Est. (SE)	Est. (SE)	Est. (SE)	Est. (SE)	Est. (SE)	Est. (SE)	Est. (SE)	Est. (SE)
1 Day (0600-2059)	Mean	71.0 (1.0)	6.0 (0.7)	53.4 (1.2)	-0.3 (0.6)	47.0 (1.3)	0.1 (0.4)	56.1 (1.5)	1.8 (0.8)
	Median	71.9 (2.0)	6.8 (1.9)	53.5 (1.3)	-0.8 (1.1)	46.1 (1.4)	0.3 (0.6)	55.4 (2.1)	0.7 (1.0)
	Quantile (0.85)	78.8 (1.2)	4.6 (1.0)	63.9 (1.4)	-0.7 (0.6)	57.8 (2.0)	-0.5 (0.7)	73.0 (1.6)	4.6 (1.3)
	Quantile (0.95)	82.1 (0.8)	2.7 (0.8)	70.3 (1.5)	-0.5 (1.3)	65.6 (1.7)	-0.4 (1.0)	79.0 (1.3)	3.9 (1.1)
2 Night (2100-0559)	Mean	68.9 (1.0)	5.1 (0.7)	52.6 (1.2)	-0.4 (0.6)	47.1 (1.1)	0.3 (0.4)	58.0 (1.4)	2.3 (0.7)
	Median	68.9 (1.1)	5.0 (0.9)	52.3 (1.5)	-0.7 (1.3)	46.2 (1.3)	0.5 (0.6)	59.0 (2.0)	2.5 (1.2)
	Quantile (0.85)	76.5 (0.9)	3.8 (0.6)	63.0 (1.8)	-0.7 (0.6)	57.7 (1.7)	-0.5 (0.7)	73.0 (1.3)	4.2 (0.9)
	Quantile (0.95)	80.5 (0.8)	2.5 (0.7)	69.8 (1.7)	-0.3 (1.4)	65.2 (1.4)	-0.6 (0.5)	78.0 (1.1)	3.0 (1.2)
Total	Mean	70.5 (1.0)	5.8 (0.7)	53.3 (1.2)	-0.3 (0.6)	47.0 (1.2)	0.2 (0.4)	56.4 (1.5)	1.9 (0.7)
	Median	70.8 (0.8)	6.0 (0.8)	53.4 (1.3)	-0.7 (1.0)	46.1 (1.4)	0.3 (0.6)	56.0 (2.0)	1.0 (0.9)
	Quantile (0.85)	78.0 (1.6)	4.2 (1.4)	63.7 (1.5)	-0.8 (0.7)	57.8 (2.0)	-0.5 (0.7)	73.0 (1.6)	4.5 (1.2)
	Quantile (0.95)	81.8 (0.7)	2.6 (0.7)	70.1 (1.5)	-0.5 (1.3)	65.6 (1.7)	-0.4 (1.0)	79.0 (1.4)	3.9 (1.1)

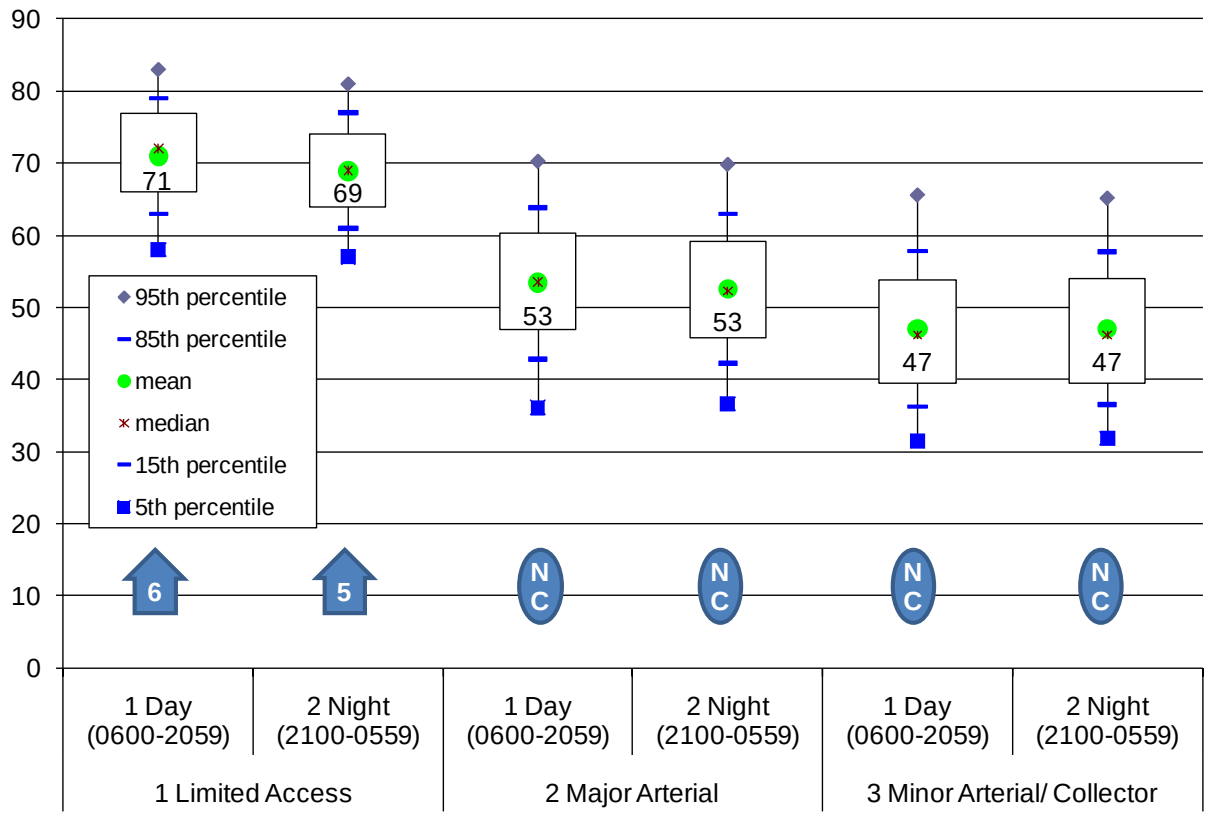

Figure 12. Speed by Road Type and Light Condition, 2009 (Free-Flow)
(Arrows show change from 2007)

Table 11. Standard Deviations for the Values Reported in Table 10

	FCC ROAD CLASS							
	1 Limited access		2 Major arterial		3 Minor art/collector		Total	
	Speed Value Std Dev		Speed Value Std Dev		Speed Value Std Dev		Speed Value Std Dev	
LIGHT CONDITION	**2009**	**Change**	**2009**	**Change**	**2009**	**Change**	**2009**	**Change**
1 Day (0600-2059)	8.2	-1.0	10.4	-0.5	10.5	-0.5	14.3	1.2
2 Night (2100-0559)	7.7	-1.1	10.0	-0.2	10.3	-0.4	13.6	1.1
Total	8.1	-1.0	10.3	-0.4	10.5	-0.4	14.2	1.2

5.4 Day of Week

Variations attributable to the day of the week are presented in Table 12 and Table 13. Speeds on the limited access roadways climbed substantially from their 2007 levels, while changes for the other two road types were less predictable. Unlike the 2007 data, 2009 speeds on major arterials were not nearly as disparate by day of week. In 2007, data showed differences on the order of 10 mph on major arterials, the 2009 data show mean variations of less than 4 mph between days. In addition, in 2007, speeds on limited access roadways showed little difference across day of week (2 mph). In 2009, the day-to-day variation on limited access roadways increased to 5 mph. Figure 13 provides a graphic view of the statistics from Table 12.

Table 12. Speed by Road Type and Day of Week (Free-Flow)

		FCC ROAD CLASS							
		1 Limited access		2 Major arterial		3 Minor art/collector		Total	
		Speed		Speed		Speed		Speed	
		2009	**Change**	**2009**	**Change**	**2009**	**Change**	**2009**	**Change**
DAYWEEK		Est. (SE)	Est. (SE)	Est. (SE)	Est. (SE)	Est. (SE)	Est. (SE)	Est. (SE)	Est. (SE)
Mon	Mean	67.6 (1.6)	1.9 (1.2)	52.2 (5.6)	-2.4 (3.8)	46.5 (2.5)	-1.0 (2.6)	52.5 (2.1)	-1.9 (1.9)
	Median	66.9 (1.6)	0.9 (1.3)	52.3 (7.4)	-3.1 (4.6)	45.2 (2.5)	-1.7 (2.7)	51.9 (3.7)	-2.8 (2.9)
	Quantile (0.85)	75.0 (1.1)	-0.1 (1.1)	65.1 (5.9)	0.0 (4.7)	58.2 (3.9)	-0.4 (3.1)	67.2 (1.9)	-0.8 (2.8)
	Quantile (0.95)	79.6 (0.9)	-1.4 (1.3)	71.5 (5.2)	0.4 (5.7)	65.9 (3.9)	0.9 (2.8)	74.2 (1.7)	-0.9 (2.0)
Tue	Mean	70.2 (2.2)	5.6 (2.7)	55.4 (1.3)	3.2 (2.0)	46.9 (2.0)	-0.3 (4.3)	54.1 (2.2)	-1.3 (2.8)
	Median	70.6 (1.9)	6.4 (2.7)	55.3 (1.5)	3.2 (2.1)	46.6 (2.2)	1.1 (3.5)	53.4 (2.2)	-2.1 (2.5)
	Quantile (0.85)	77.3 (1.1)	3.2 (1.9)	63.9 (0.9)	0.2 (1.8)	56.7 (2.5)	-3.0 (7.7)	69.0 (4.6)	-0.6 (5.3)
	Quantile (0.95)	80.9 (1.1)	0.7 (2.0)	69.9 (1.0)	-0.2 (2.1)	63.3 (2.8)	-7.8 (11.2)	76.0 (2.8)	-0.6 (3.8)
Wed	Mean	67.6 (1.6)	4.3 (2.6)	52.5 (2.6)	-6.4 (3.7)	47.1 (3.9)	-3.1 (4.2)	53.8 (1.5)	-1.0 (1.9)
	Median	67.6 (1.4)	4.2 (2.8)	52.7 (2.2)	-6.2 (3.3)	45.4 (3.1)	-4.1 (3.2)	53.4 (2.1)	-1.9 (2.4)
	Quantile (0.85)	75.2 (1.7)	1.7 (2.9)	62.4 (2.6)	-3.4 (2.6)	59.0 (7.4)	-3.3 (8.3)	69.0 (2.5)	1.9 (2.7)
	Quantile (0.95)	79.5 (1.9)	0.1 (2.6)	68.9 (2.7)	-1.3 (3.2)	66.4 (8.0)	-3.7 (9.2)	75.0 (2.3)	0.9 (2.2)
Thu	Mean	69.8 (1.9)	4.2 (1.6)	52.7 (6.3)	-2.1 (6.5)	49.2 (2.9)	5.1 (2.7)	57.9 (2.8)	8.0 (3.4)
	Median	69.8 (2.6)	3.9 (2.2)	54.0 (5.3)	-1.5 (5.9)	48.4 (4.0)	4.8 (3.8)	59.0 (3.8)	10.2 (4.6)
	Quantile (0.85)	77.8 (1.4)	4.1 (1.4)	64.9 (5.1)	-1.6 (6.3)	62.2 (4.4)	8.5 (4.0)	74.0 (2.8)	10.0 (3.6)
	Quantile (0.95)	81.9 (1.3)	2.6 (1.4)	71.6 (5.0)	-2.2 (7.0)	70.0 (3.6)	9.9 (2.9)	79.0 (2.6)	7.0 (2.4)
Fri	Mean	71.4 (1.4)	6.3 (1.1)	54.0 (4.4)	2.3 (3.9)	46.1 (1.6)	-1.6 (2.1)	60.1 (2.1)	3.0 (3.4)
	Median	71.1 (1.7)	5.8 (1.1)	53.7 (5.0)	3.0 (4.6)	45.4 (2.0)	-1.6 (2.9)	63.0 (3.0)	4.4 (5.5)
	Quantile (0.85)	78.4 (1.4)	5.1 (1.2)	64.5 (4.8)	2.2 (5.5)	56.7 (1.7)	-3.3 (2.9)	76.0 (1.3)	6.0 (1.2)
	Quantile (0.95)	82.4 (1.4)	4.4 (1.4)	70.6 (4.3)	1.3 (5.4)	63.5 (1.9)	-2.8 (3.3)	81.0 (1.5)	5.4 (1.3)
Sat	Mean	72.3 (2.7)	7.9 (2.9)	51.7 (3.6)	-4.5 (4.3)	47.2 (1.6)	2.4 (2.1)	55.7 (3.3)	-0.1 (4.7)
	Median	72.8 (2.7)	8.6 (2.9)	51.9 (4.3)	-4.4 (4.4)	47.3 (1.7)	3.8 (2.5)	53.9 (3.1)	-3.6 (5.1)
	Quantile (0.85)	79.0 (1.1)	5.3 (1.7)	60.3 (3.0)	-5.4 (3.2)	56.8 (1.9)	0.6 (3.4)	73.3 (6.1)	3.4 (6.7)
	Quantile (0.95)	82.5 (1.0)	3.1 (1.9)	65.8 (2.3)	-6.3 (3.1)	63.2 (2.7)	0.0 (3.4)	79.0 (2.5)	2.6 (3.4)
Sun	Mean	71.6 (1.5)	8.3 (3.7)	55.3 (3.4)	6.4 (7.0)	44.9 (1.0)	-0.9 (3.4)	59.0 (4.6)	7.7 (5.1)
	Median	72.5 (1.8)	8.9 (4.7)	54.0 (4.9)	6.2 (7.8)	44.9 (1.0)	0.2 (3.0)	59.6 (8.5)	9.6 (9.2)
	Quantile (0.85)	78.8 (0.3)	5.9 (3.7)	65.2 (4.1)	4.9 (10.1)	53.6 (0.8)	-2.9 (5.3)	75.8 (3.5)	10.0 (5.5)
	Quantile (0.95)	82.3 (0.7)	4.3 (4.0)	71.9 (3.3)	3.9 (11.0)	59.5 (1.3)	-4.6 (5.1)	80.0 (1.6)	7.0 (4.0)
Total	Mean	70.5 (1.0)	5.8 (0.7)	53.3 (1.2)	-0.3 (0.6)	47.0 (1.2)	0.2 (0.4)	56.4 (1.5)	1.9 (0.7)
	Median	70.8 (0.8)	6.0 (0.8)	53.4 (1.3)	-0.7 (1.0)	46.1 (1.4)	0.3 (0.6)	56.0 (2.0)	1.0 (0.9)
	Quantile (0.85)	78.0 (1.6)	4.2 (1.4)	63.7 (1.5)	-0.8 (0.7)	57.8 (2.0)	-0.5 (0.7)	73.0 (1.6)	4.5 (1.2)
	Quantile (0.95)	81.8 (0.7)	2.6 (0.7)	70.1 (1.5)	-0.5 (1.3)	65.6 (1.7)	-0.4 (1.0)	79.0 (1.4)	3.9 (1.1)

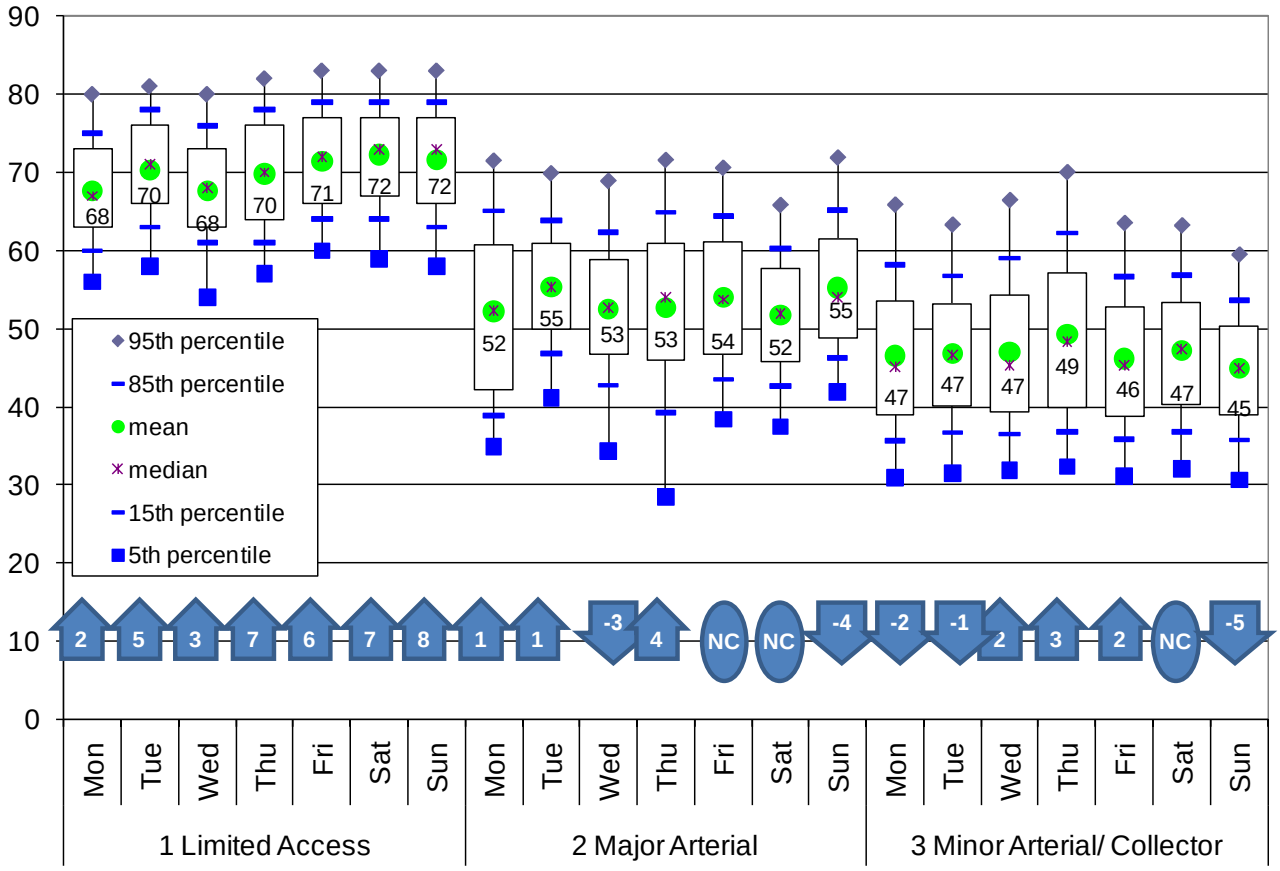

Figure 13. Speed by Road Type and Day of Week, 2009 (Free-Flow)
(Arrows show change from 2007)

Table 13. Standard Deviations for the Values Reported in Table 12

	FCC ROAD CLASS							
	1 Limited access		2 Major arterial		3 Minor art/collector		Total	
	Speed Value Std Dev		Speed Value Std Dev		Speed Value Std Dev		Speed Value Std Dev	
DAYWEEK	**2009**	**Change**	**2009**	**Change**	**2009**	**Change**	**2009**	**Change**
Mon	8.0 (-1.7)	-1.7 (10.9)	11.7 (0.8)	0.8 (10.5)	10.7 (0.3)	0.3 (12.9)	13.1 (0.2)	0.2 (0.0)
Tue	8.6 (-0.6)	-0.6 (10.9)	8.8 (-2.1)	-2.1 (12.2)	9.7 (-2.4)	-2.4 (13.2)	12.9 (-0.3)	-0.3 (0.0)
Wed	9.0 (-0.8)	-0.8 (7.4)	10.2 (2.8)	2.8 (11.5)	10.8 (-0.7)	-0.7 (12.0)	13.2 (1.2)	1.2 (0.0)
Thu	8.4 (0.0)	0.0 (11.8)	12.5 (0.7)	0.7 (9.4)	11.8 (2.4)	2.4 (12.7)	14.5 (1.8)	1.8 (0.0)
Fri	7.4 (-0.9)	-0.9 (9.9)	10.0 (0.1)	0.1 (11.3)	10.1 (-1.3)	-1.3 (12.6)	14.8 (2.2)	2.2 (0.0)
Sat	7.5 (-1.6)	-1.6 (9.8)	8.8 (-1.0)	-1.0 (10.5)	9.7 (-0.8)	-0.8 (13.4)	14.0 (0.6)	0.6 (0.0)
Sun	7.8 (-2.2)	-2.2 (10.6)	9.3 (-1.3)	-1.3 (10.1)	8.9 (-1.2)	-1.2 (12.7)	14.6 (1.9)	1.9 (0.0)
Total	8.1 (-1.0)	-1.0 (10.8)	10.3 (-0.4)	-0.4 (10.9)	10.5 (-0.4)	-0.4 (13.0)	14.2 (1.2)	1.2 (0.0)

5.5 Horizontal Curvature

Table 14 and Table 15 highlight the influence of horizontal curvature on speed for the road classes. In 2007, the trends here were somewhat counterintuitive in that speeds on moderately curved segments of all road segments were 4 to 6 mph slower than straight segments, while speeds on sharply curved freeways, arterials, and collectors were higher than on moderately curved segments. For the 2009 data, trends seemed more predictable. For the limited access and minor arterial roadways, speeds were 2 to 8 mph higher on straight roads when compared to moderate or sharp counterparts. The major arterials showed some correction from 2007, but still held speed values that were 5 mph lower for the straight sections than for the curvier counterparts. The increases in the year-to-year speeds for the limited access roadways were evident here as well. Figure 14 provides a graphic view of the statistics from Table 14.

Table 14. Speed by Road Type and Horizontal Curvature Class (Free-Flow)

		FCC ROAD CLASS							
		1 Limited access		2 Major arterial		3 Minor art/collector		Total	
		Speed		Speed		Speed		Speed	
		2009	**Change**	**2009**	**Change**	**2009**	**Change**	**2009**	**Change**
HOR_ CURVERD CLASS		Est. (SE)	Est. (SE)	Est. (SE)	Est. (SE)	Est. (SE)	Est. (SE)	Est. (SE)	Est. (SE)
1 Straight	Mean	70.7 (1.0)	5.8 (0.7)	53.0 (1.2)	-0.3 (0.5)	47.7 (1.3)	0.1 (0.3)	56.7 (1.6)	1.7 (0.7)
	Median	70.9 (1.7)	5.8 (1.6)	53.0 (1.3)	-0.9 (1.3)	46.9 (1.4)	0.3 (0.6)	56.1 (2.2)	0.7 (1.1)
	Quantile (0.85)	78.7 (1.6)	4.7 (1.4)	63.5 (1.6)	-0.7 (0.8)	58.4 (2.1)	-0.6 (0.5)	73.0 (1.6)	4.2 (1.3)
	Quantile (0.95)	82.0 (0.7)	2.7 (0.8)	70.1 (1.6)	-0.3 (1.4)	66.1 (1.7)	-0.5 (1.0)	79.0 (1.3)	3.7 (1.1)
2 Moderate	Mean	68.9 (4.0)	8.3 (4.9)	58.5 (1.7)	-0.5 (1.8)	41.9 (1.8)	0.8 (1.3)	52.9 (3.4)	5.1 (3.1)
	Median	69.3 (4.7)	8.6 (5.1)	58.7 (2.1)	0.0 (2.4)	39.8 (1.7)	0.4 (1.5)	53.6 (5.0)	7.6 (4.4)
	Quantile (0.85)	76.9 (3.4)	6.6 (3.9)	65.7 (1.0)	-2.4 (3.6)	54.0 (3.2)	1.8 (2.3)	71.0 (6.0)	8.1 (6.1)
	Quantile (0.95)	80.3 (2.9)	4.7 (3.9)	70.8 (1.1)	-3.2 (3.6)	60.4 (2.4)	0.1 (2.0)	77.0 (5.1)	6.8 (5.0)
3 Sharp	Mean	68.6 (1.8)	4.7 (2.1)	58.2 (-)	-1.0 (-)	41.1 (1.8)	-1.0 (1.2)	54.3 (5.0)	1.3 (3.7)
	Median	67.8 (2.6)	4.2 (2.1)	58.2 (-)	-1.1 (-)	39.0 (1.3)	-0.6 (1.9)	57.5 (11.9)	1.9 (7.8)
	Quantile (0.85)	74.9 (1.9)	2.9 (3.1)	65.1 (-)	-3.9 (-)	52.6 (5.2)	-1.8 (2.4)	72.0 (3.5)	3.8 (4.7)
	Quantile (0.95)	78.4 (1.3)	1.1 (4.8)	69.8 (-)	-5.9 (-)	59.5 (4.4)	-1.5 (1.7)	77.0 (2.9)	3.0 (3.0)
Total	Mean	70.5 (1.0)	5.8 (0.7)	53.3 (1.2)	-0.3 (0.6)	47.0 (1.2)	0.2 (0.4)	56.4 (1.5)	1.9 (0.7)
	Median	70.8 (0.8)	6.0 (0.8)	53.4 (1.3)	-0.7 (1.0)	46.1 (1.4)	0.3 (0.6)	56.0 (2.0)	1.0 (0.9)
	Quantile (0.85)	78.0 (1.6)	4.2 (1.4)	63.7 (1.5)	-0.8 (0.7)	57.8 (2.0)	-0.5 (0.7)	73.0 (1.6)	4.5 (1.2)
	Quantile (0.95)	81.8 (0.7)	2.6 (0.7)	70.1 (1.5)	-0.5 (1.3)	65.6 (1.7)	-0.4 (1.0)	79.0 (1.4)	3.9 (1.1)

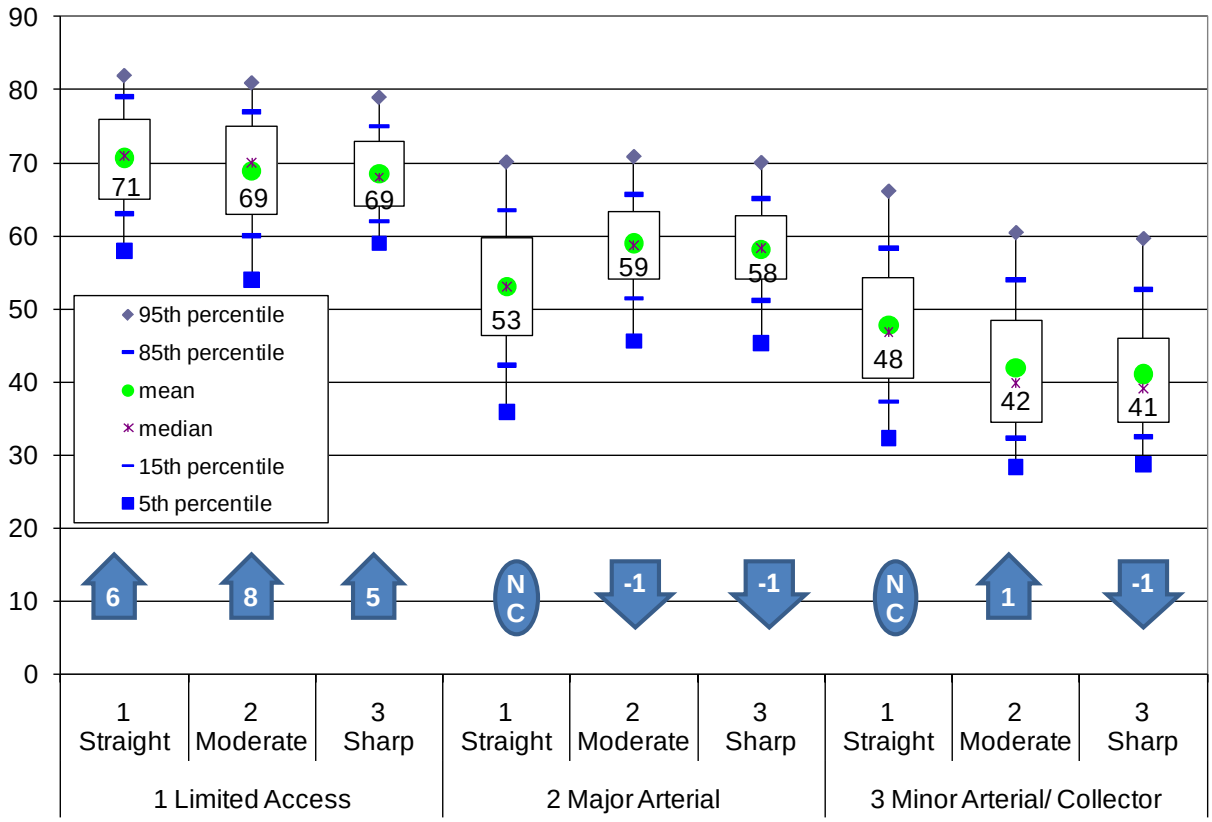

Figure 14. Speed by Road Type and Horizontal Curvature Class, 2009 (Free-Flow) (Arrows show change from 2007)

Table 15. Standard Deviations for Values Reported in Table 14

	FCC ROAD CLASS							
	1 Limited access		2 Major arterial		3 Minor art/collector		Total	
	Speed Value Std Dev		Speed Value Std Dev		Speed Value Std Dev		Speed Value Std Dev	
HOR_CURVERDCLASS	**2009**	**Change**	**2009**	**Change**	**2009**	**Change**	**2009**	**Change**
1 Straight	8.1	-1.0	10.4	-0.4	10.3	-0.5	14.0	1.2
2 Moderate	8.6	-0.9	7.8	-1.1	10.1	0.1	15.4	2.1
3 Sharp	6.4	-2.0	7.2	-2.7	9.4	-0.7	15.6	1.4
Total	8.1	-1.0	10.3	-0.4	10.5	-0.4	14.2	1.2

5.6 Vertical Curvature

Table 16 and Table 17 show the influence of vertical curvature gradient on the speeds for the road classes. When comparing the speeds measured in 2007 and 2009, the relative differences in speeds on vertical curves on the limited access roadways were most pronounced at the extremes (flat and steep inclines) with the moderate hills showing less of an increase than in 2007. Although the differences in speeds for major arterials were less compared to 2007, the differences noted on the minor arterials and collectors became more pronounced under steep conditions. That is, when comparing speeds on flat

and steep roadways, speeds on steep minor arterials showed a greater difference relative to speeds on their less hilly counterparts. It is also notable that the standard deviations for moderately hilly limited access roadways and steep, major arterials decreased substantially. Once again, speeds on limited access roadways were significantly higher in 2009 relative to 2007. Figure 15 provides a graphic view of the statistics from Table 16.

Table 16. Speed by Road Type and Vertical Curvature Class (Free-Flow)

		FCC ROAD CLASS							
		1 Limited access		2 Major arterial		3 Minor art/collector		Total	
		Speed		Speed		Speed		Speed	
		2009	**Change**	**2009**	**Change**	**2009**	**Change**	**2009**	**Change**
VER_CURVERD CLASS		Est. (SE)	Est. (SE)	Est. (SE)	Est. (SE)	Est. (SE)	Est. (SE)	Est. (SE)	Est. (SE)
1 Flat	Mean	70.6 (1.0)	5.8 (0.7)	53.3 (1.2)	-0.3 (0.5)	47.1 (1.2)	0.1 (0.4)	56.7 (1.5)	2.0 (0.8)
	Median	70.9 (1.2)	5.9 (1.2)	53.4 (1.3)	-0.7 (1.0)	46.4 (1.3)	0.4 (0.5)	56.4 (2.1)	1.2 (1.1)
	Quantile (0.85)	78.0 (2.1)	4.1 (2.0)	63.7 (1.6)	-0.7 (0.6)	57.8 (1.9)	-0.6 (0.8)	73.0 (1.8)	4.3 (1.5)
	Quantile (0.95)	81.9 (0.7)	2.5 (0.8)	70.1 (1.5)	-0.4 (1.2)	65.6 (1.7)	-0.4 (1.2)	79.0 (1.3)	3.8 (1.0)
2 Moderate	Mean	66.7 (-)	3.7 (-)	52.6 (-)	-2.4 (-)	46.9 (4.1)	1.1 (1.5)	50.7 (3.4)	-0.9 (2.2)
	Median	65.7 (-)	3.0 (-)	52.2 (-)	-3.2 (-)	44.8 (4.5)	1.3 (1.9)	49.8 (5.9)	-3.0 (4.7)
	Quantile (0.85)	71.8 (-)	1.4 (-)	57.8 (-)	-2.0 (-)	59.5 (5.3)	0.2 (3.4)	65.0 (4.6)	0.0 (0.8)
	Quantile (0.95)	75.7 (-)	0.6 (-)	62.6 (-)	-0.1 (-)	66.5 (4.7)	1.3 (1.8)	70.9 (4.0)	0.4 (1.3)
3 Steep	Mean	68.6 (-)	7.6 (-)	55.6 (10.9)	-0.6 (2.9)	39.7 (2.7)	-1.7 (0.9)	44.5 (4.4)	-1.6 (0.8)
	Median	68.5 (-)	7.6 (-)	57.0 (11.8)	-0.3 (3.5)	39.5 (3.7)	-2.1 (1.7)	42.6 (3.1)	-0.9 (1.2)
	Quantile (0.85)	74.5 (-)	6.9 (-)	67.4 (14.2)	-4.4 (7.1)	47.6 (3.3)	-0.5 (1.3)	58.4 (10.3)	-0.9 (2.7)
	Quantile (0.95)	78.0 (-)	5.4 (-)	73.3 (14.6)	-5.6 (6.1)	52.6 (3.8)	-0.3 (1.0)	67.1 (12.0)	-3.9 (3.4)
Total	Mean	70.5 (1.0)	5.8 (0.7)	53.3 (1.2)	-0.3 (0.6)	47.0 (1.2)	0.2 (0.4)	56.4 (1.5)	1.9 (0.7)
	Median	70.8 (0.8)	6.0 (0.8)	53.4 (1.3)	-0.7 (1.0)	46.1 (1.4)	0.3 (0.6)	56.0 (2.0)	1.0 (0.9)
	Quantile (0.85)	78.0 (1.6)	4.2 (1.4)	63.7 (1.5)	-0.8 (0.7)	57.8 (2.0)	-0.5 (0.7)	73.0 (1.6)	4.5 (1.2)
	Quantile (0.95)	81.8 (0.7)	2.6 (0.7)	70.1 (1.5)	-0.5 (1.3)	65.6 (1.7)	-0.4 (1.0)	79.0 (1.4)	3.9 (1.1)

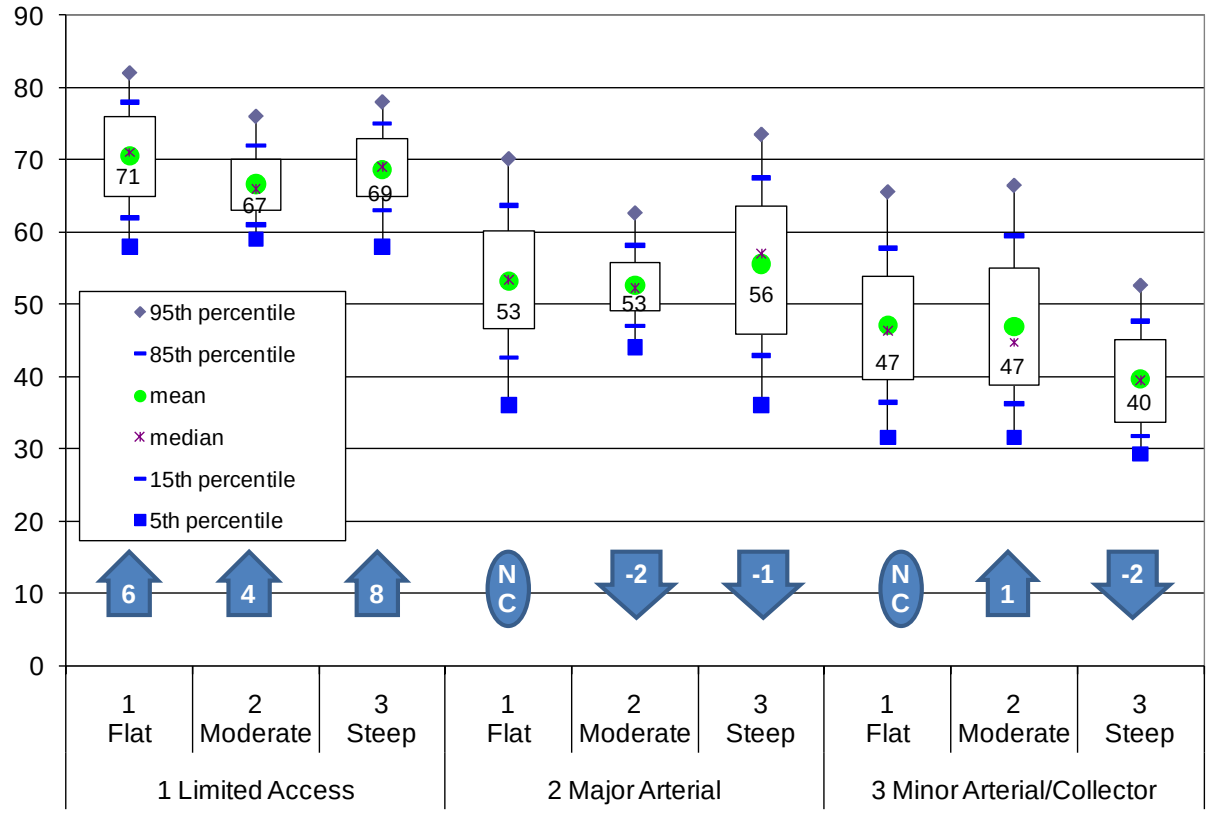

Figure 15. Speed by Road Type and Vertical Curvature Class, 2009 (Free-Flow) (Arrows show change from 2007)

Table 17. Standard Deviations for Values Reported in Table 16

	FCC ROAD CLASS							
	1 Limited access		2 Major arterial		3 Minor art/collector		Total	
	Speed Value Std Dev		Speed Value Std Dev		Speed Value Std Dev		Speed Value Std Dev	
VER_CURVERDCLASS	**2009**	**Change**	**2009**	**Change**	**2009**	**Change**	**2009**	**Change**
1 Flat	8.1	-1.1	10.4	-0.4	10.4	-0.5	14.2	1.2
2 Moderate	5.5	-1.7	5.8	0.7	11.0	0.0	12.3	-0.1
3 Steep	7.2	0.2	11.8	-2.2	7.5	0.4	11.7	-0.2
Total	8.1	-1.0	10.3	-0.4	10.5	-0.4	14.2	1.2

5.7 Urbanicity

The effect of urbanicity (the degree to which a geographical unit is urban) on various roadway classes is shown in Table 18 and Table 19. In 2009, speeds on urban roads are lower than on roads in more suburban or rural locations for all road types. Vehicles on limited access roads, major arterials, and minor arterials/collectors in rural areas are 8 to 12 mph faster than on their counterparts in urban areas (i.e., slightly less pronounced than in 2007's 12 to 14 mph). There were only minor changes in speeds for major arterials and minor arterials from 2007. However, limited access roadways and major

arterials in urban locations showed a 4 to 9 mph increase in speeds over 2007 speeds. As one might expect, the distribution plots also show the typical wide spread of speeds for limited access roadways in urban settings. Standard errors were not computed for two of the urban classes and one of the rural classes due to sample limitations. Again, the greatest overall increases were for the limited access roadways for all urbanicity conditions. Figure 17 provides a graphic view of the statistics from Table 18.

Table 18. Speed by Road Type by Urbanicity (Urban, Urban/Suburban, Suburban, Rural) (Free-Flow)

		FCC ROAD CLASS							
		1 Limited access		2 Major arterial		3 Minor art/collector		Total	
		Speed		Speed		Speed		Speed	
		2009	**Change**	**2009**	**Change**	**2009**	**Change**	**2009**	**Change**
URBANICITY		Est. (SE)	Est. (SE)	Est. (SE)	Est. (SE)	Est. (SE)	Est. (SE)	Est. (SE)	Est. (SE)
1 Urban	Mean	61.5 (-)	8.7 (-)	47.3 (3.8)	3.6 (-)	39.8 (2.8)	0.6 (1.2)	44.3 (4.9)	3.6 (4.1)
	Median	63.2 (-)	5.4 (-)	46.9 (3.7)	3.8 (-)	39.7 (2.8)	0.9 (1.3)	42.3 (3.5)	2.5 (2.3)
	Quantile (0.85)	70.6 (-)	4.8 (-)	53.7 (5.5)	3.3 (-)	47.2 (3.6)	-0.1 (1.2)	57.2 (10.3)	7.4 (9.4)
	Quantile (0.95)	74.9 (-)	5.2 (-)	58.9 (6.7)	3.1 (-)	52.7 (4.0)	-0.1 (1.5)	67.0 (12.9)	8.3 (14.7)
2 Urban-Suburban	Mean	71.6 (1.1)	6.0 (0.8)	54.7 (1.8)	-0.7 (0.8)	47.8 (1.6)	0.1 (0.3)	57.8 (1.9)	2.3 (0.8)
	Median	72.0 (1.3)	6.2 (1.2)	54.4 (1.9)	-1.0 (1.4)	47.2 (1.7)	0.2 (0.7)	57.3 (2.9)	1.7 (1.4)
	Quantile (0.85)	78.8 (0.9)	4.4 (1.3)	63.9 (2.7)	-0.6 (0.9)	58.3 (2.4)	-0.3 (0.9)	74.0 (2.0)	5.0 (2.0)
	Quantile (0.95)	82.0 (0.9)	2.2 (1.3)	70.1 (3.1)	-0.1 (2.0)	65.8 (2.2)	0.2 (1.1)	79.0 (1.1)	3.6 (1.3)
3 Suburban	Mean	67.4 (0.5)	4.6 (1.1)	47.5 (3.1)	1.1 (0.8)	44.5 (1.4)	0.5 (1.1)	53.2 (1.3)	1.3 (1.7)
	Median	66.8 (0.5)	3.9 (1.4)	47.2 (3.1)	1.2 (1.0)	43.5 (1.6)	0.7 (1.1)	52.1 (2.5)	0.6 (3.1)
	Quantile (0.85)	74.9 (0.7)	3.3 (0.4)	58.8 (3.6)	1.7 (1.2)	54.3 (2.2)	0.0 (2.1)	70.0 (2.3)	3.3 (2.3)
	Quantile (0.95)	79.3 (0.7)	2.6 (0.6)	66.1 (4.2)	2.2 (1.7)	61.0 (2.5)	-1.5 (1.8)	76.0 (1.0)	3.0 (0.9)
4 Rural	Mean	73.0 (-)	6.3 (-)	54.8 (2.1)	-1.5 (0.5)	51.9 (6.2)	-1.3 (1.0)	58.5 (6.2)	0.2 (3.2)
	Median	73.0 (-)	6.5 (-)	55.7 (1.2)	-1.3 (0.5)	52.2 (8.5)	-1.6 (2.2)	59.0 (7.3)	-0.3 (4.4)
	Quantile (0.85)	80.4 (-)	4.4 (-)	66.0 (0.7)	-1.9 (1.3)	64.0 (6.3)	-1.6 (0.8)	74.0 (8.9)	2.9 (5.2)
	Quantile (0.95)	84.3 (-)	2.5 (-)	72.2 (0.8)	-2.3 (1.6)	70.2 (3.9)	-2.5 (1.7)	80.0 (8.1)	2.1 (4.9)
Total	Mean	70.5 (1.0)	5.8 (0.7)	53.3 (1.2)	-0.3 (0.6)	47.0 (1.2)	0.2 (0.4)	56.4 (1.5)	1.9 (0.7)
	Median	70.8 (0.8)	6.0 (0.8)	53.4 (1.3)	-0.7 (1.0)	46.1 (1.4)	0.3 (0.6)	56.0 (2.0)	1.0 (0.9)
	Quantile (0.85)	78.0 (1.6)	4.2 (1.4)	63.7 (1.5)	-0.8 (0.7)	57.8 (2.0)	-0.5 (0.7)	73.0 (1.6)	4.5 (1.2)
	Quantile (0.95)	81.8 (0.7)	2.6 (0.7)	70.1 (1.5)	-0.5 (1.3)	65.6 (1.7)	-0.4 (1.0)	79.0 (1.4)	3.9 (1.1)

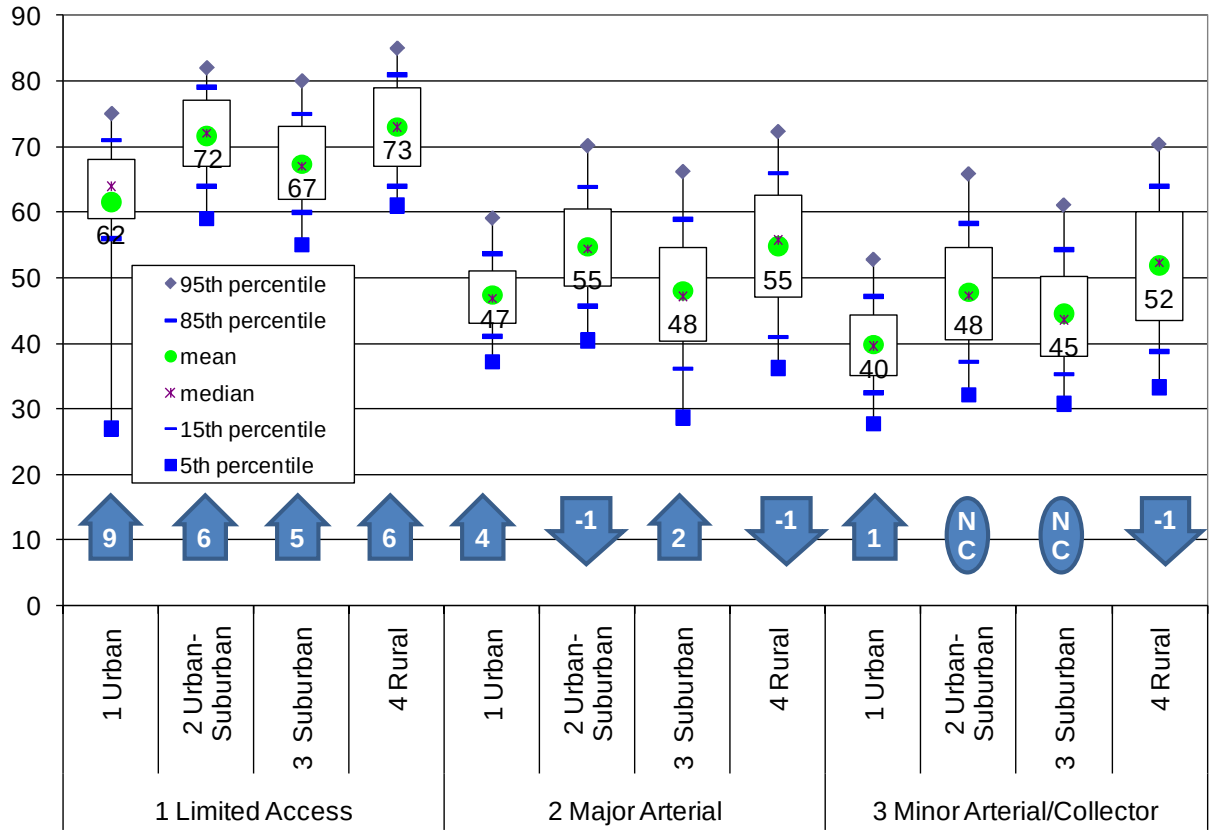

Figure 16. Speed by Road Type by Urbanicity, 2009 (Free-Flow)
(Arrows show change from 2007)

Table 19. Standard Deviations for Values Reported in Table 18

	FCC ROAD CLASS							
	1 Limited access		2 Major arterial		3 Minor art/collector		Total	
	Speed Value Std Dev		Speed Value Std Dev		Speed Value Std Dev		Speed Value Std Dev	
URBANICITY	**2009**	**Change**	**2009**	**Change**	**2009**	**Change**	**2009**	**Change**
1 Urban	12.9	-2.4	6.7	0.1	7.6	-0.3	11.6	2.3
2 Urban-Suburban	7.5	-1.5	9.1	-0.1	10.4	-0.1	14.0	1.4
3 Suburban	8.1	-0.7	11.2	0.6	9.3	-0.6	14.1	1.0
4 Rural	7.8	-1.3	11.1	-0.4	11.4	-0.7	13.6	1.2
Total	8.1	-1.0	10.3	-0.4	10.5	-0.4	14.2	1.2

5.8 Vehicle Length

Table 20 and Table 21 indicate the influence of vehicle length on speed for the various road classes. Vehicles in length classes 1 and 2 are passenger vehicles and light trucks; categories 3 and 4 are generally medium trucks, and classes 5 and 6 are heavy trucks/combinations vehicles. Again, speeds on the limited access roadways are up substantially (i.e., generally 5 to 6 mph) from the levels

measured in 2007. While speeds on limited access roadways for most vehicle lengths have increased over the 2007 levels, passenger vehicles seem to show the greatest increase in mean speeds (65 mph in 2007 to 71 mph in 2009). Another interesting trend is the moderate increase in speeds from 2007 for medium trucks (55 mph to 58 mph) while the heavy and combination trucks show a moderate drop in speeds for both major arterials and minor arterials/collectors. In addition, speeds of heavy trucks and combination trucks were unchanged from year to year. Figure 17 provides a graphic view of the statistics from Table 20.

Table 20. Speed by Road Type by Vehicle Length Class (<20, 20-29, 30-39, 40-49, 50-79, 80-100) (Free-Flow)

		FCC ROAD CLASS							
		1 Limited access		2 Major arterial		3 Minor art/collector		Total	
		Speed		Speed		Speed		Speed	
		2009	**Change**	**2009**	**Change**	**2009**	**Change**	**2009**	**Change**
VEH_LENGTH		Est. (SE)	Est. (SE)	Est. (SE)	Est. (SE)	Est. (SE)	Est. (SE)	Est. (SE)	Est. (SE)
1 (<20 ft)	Mean	71.3 (1.3)	6.6 (1.0)	51.1 (0.9)	-1.4 (0.7)	45.0 (1.0)	-0.8 (0.5)	54.9 (1.6)	2.1 (1.0)
	Median	71.9 (1.4)	6.8 (1.3)	51.3 (1.0)	-1.4 (1.4)	44.2 (1.2)	-0.5 (0.7)	53.4 (2.0)	0.7 (1.2)
	Quantile (0.85)	78.8 (1.3)	5.0 (1.2)	60.8 (1.2)	-2.2 (0.6)	55.2 (1.5)	-1.3 (1.1)	73.0 (2.2)	5.6 (2.0)
	Quantile (0.95)	82.4 (1.1)	3.4 (1.0)	66.5 (1.3)	-2.7 (1.0)	62.1 (1.7)	-2.2 (1.1)	79.0 (1.3)	4.8 (1.1)
2 (20-29 ft)	Mean	71.8 (1.0)	4.7 (0.7)	56.7 (1.4)	-1.9 (0.5)	50.7 (1.4)	-2.1 (0.5)	58.1 (1.2)	-2.0 (0.8)
	Median	72.6 (1.2)	5.3 (1.1)	57.0 (1.6)	-2.6 (0.5)	50.1 (1.6)	-3.8 (0.9)	57.7 (1.4)	-3.3 (0.9)
	Quantile (0.85)	78.9 (0.2)	2.5 (0.8)	67.1 (1.5)	-1.9 (1.2)	62.0 (1.9)	-2.5 (1.1)	73.7 (1.7)	1.1 (1.5)
	Quantile (0.95)	82.2 (0.5)	0.4 (0.8)	73.2 (1.3)	-2.1 (1.4)	69.4 (1.5)	-2.5 (1.3)	79.0 (0.4)	0.4 (0.6)
3 (30-39 ft)	Mean	67.6 (1.0)	6.1 (0.9)	56.3 (1.2)	3.1 (0.9)	51.4 (1.2)	2.2 (0.5)	57.7 (1.0)	2.8 (0.5)
	Median	67.7 (0.8)	6.3 (1.0)	56.3 (1.4)	1.8 (1.5)	50.8 (1.7)	1.5 (1.3)	58.0 (1.3)	2.5 (0.8)
	Quantile (0.85)	75.9 (0.3)	5.6 (0.6)	67.6 (1.2)	3.9 (1.0)	62.9 (1.1)	1.8 (0.9)	71.2 (1.3)	4.4 (1.3)
	Quantile (0.95)	79.9 (0.6)	3.7 (0.8)	75.0 (0.8)	4.5 (0.8)	71.3 (1.0)	3.2 (1.8)	77.3 (1.5)	4.0 (1.6)
4 (40-49 ft)	Mean	66.7 (0.9)	6.5 (0.7)	56.2 (1.0)	2.6 (0.9)	51.9 (1.6)	2.3 (0.3)	59.0 (1.0)	3.8 (0.8)
	Median	66.7 (0.9)	6.4 (0.8)	56.8 (1.2)	2.4 (0.8)	52.1 (1.8)	2.1 (1.3)	60.0 (1.1)	4.4 (1.1)
	Quantile (0.85)	74.5 (0.7)	5.6 (0.6)	66.1 (0.8)	2.5 (1.1)	62.2 (1.0)	1.8 (0.8)	71.0 (1.1)	5.0 (1.2)
	Quantile (0.95)	78.3 (0.6)	3.9 (0.7)	72.6 (1.0)	3.0 (2.0)	69.1 (0.8)	2.4 (1.6)	76.0 (1.5)	4.1 (1.5)
5 (50-79 ft)	Mean	65.4 (1.4)	3.0 (0.4)	55.8 (1.4)	-0.3 (0.5)	52.9 (2.2)	-0.2 (0.7)	63.3 (1.4)	2.9 (0.4)
	Median	64.9 (1.9)	2.5 (1.3)	56.8 (1.4)	-0.1 (0.3)	54.3 (2.6)	0.1 (0.6)	64.0 (1.6)	3.0 (1.1)
	Quantile (0.85)	71.6 (1.3)	2.3 (0.6)	65.9 (0.6)	1.2 (1.4)	63.6 (1.1)	0.5 (1.1)	71.0 (2.4)	2.7 (2.0)
	Quantile (0.95)	75.3 (0.9)	1.1 (0.3)	72.1 (0.7)	2.1 (1.8)	69.3 (0.6)	1.2 (1.1)	75.0 (0.9)	1.8 (0.9)
6 (80-100 ft)	Mean	66.2 (1.7)	-0.4 (0.8)	58.5 (3.2)	-3.2 (3.3)	55.0 (2.2)	-2.2 (1.4)	64.9 (1.6)	-0.5 (0.8)
	Median	66.1 (1.5)	-0.4 (0.8)	59.5 (2.3)	-3.4 (1.7)	56.4 (1.2)	-2.1 (4.2)	66.0 (1.3)	0.2 (0.7)
	Quantile (0.85)	72.8 (2.0)	-1.4 (0.4)	66.6 (2.4)	-3.6 (5.9)	63.8 (0.6)	-4.7 (3.5)	72.9 (2.5)	-0.7 (1.3)
	Quantile (0.95)	76.7 (1.6)	-3.4 (1.6)	71.5 (2.8)	-3.5 (6.7)	70.0 (0.3)	-2.8 (2.7)	76.3 (1.6)	-3.2 (1.0)
Total	Mean	70.5 (1.0)	5.8 (0.7)	53.3 (1.2)	-0.3 (0.6)	47.0 (1.2)	0.2 (0.4)	56.4 (1.5)	1.9 (0.7)
	Median	70.8 (0.8)	6.0 (0.8)	53.4 (1.3)	-0.7 (1.0)	46.1 (1.4)	0.3 (0.6)	56.0 (2.0)	1.0 (0.9)
	Quantile (0.85)	78.0 (1.6)	4.2 (1.4)	63.7 (1.5)	-0.8 (0.7)	57.8 (2.0)	-0.5 (0.7)	73.0 (1.6)	4.5 (1.2)
	Quantile (0.95)	81.8 (0.7)	2.6 (0.7)	70.1 (1.5)	-0.5 (1.3)	65.6 (1.7)	-0.4 (1.0)	79.0 (1.4)	3.9 (1.1)

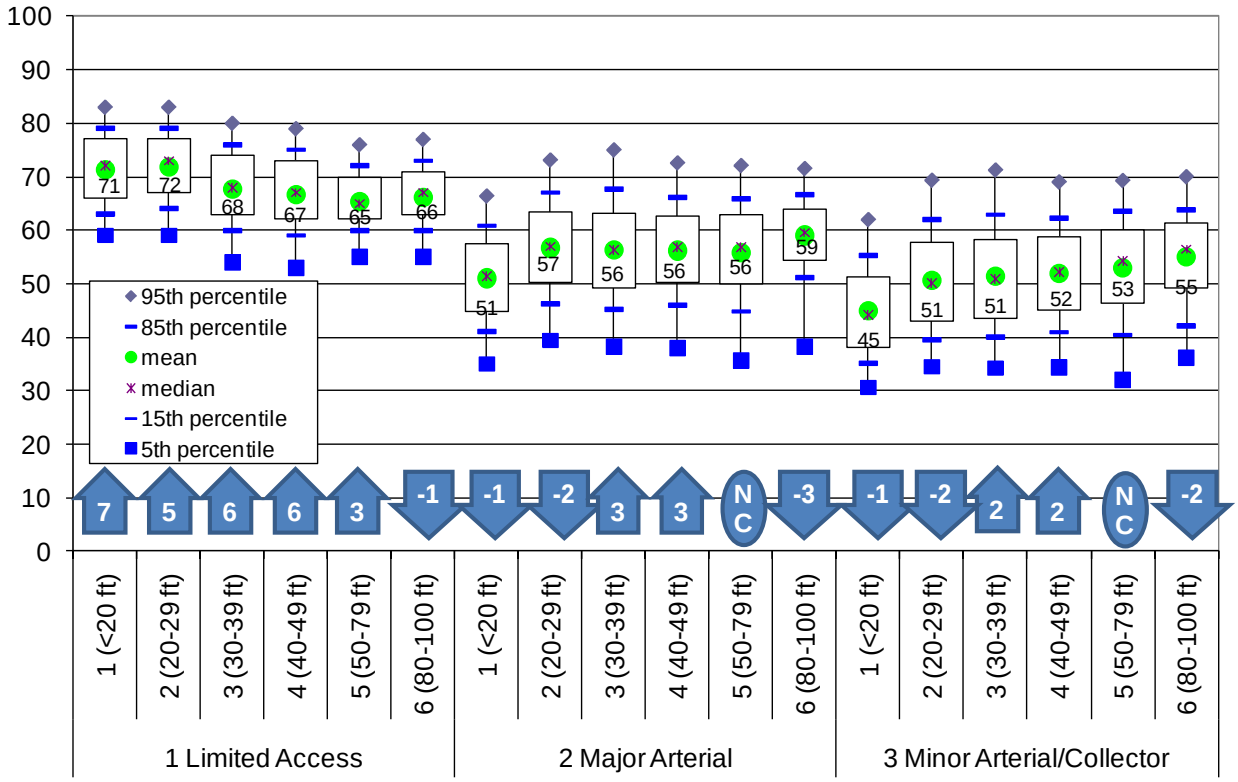

Figure 17. Speed by Road Type by Vehicle Length Class, 2009 (Free-Flow) (Arrows show change from 2007)

Table 21. Standard Deviations for Values Reported in Table 20

	FCC ROAD CLASS							
	1 Limited access		2 Major arterial		3 Minor art/collector		Total	
	Speed Value Std Dev		Speed Value Std Dev		Speed Value Std Dev		Speed Value Std Dev	
VEH_LENGTH	**2009**	**Change**	**2009**	**Change**	**2009**	**Change**	**2009**	**Change**
1 (<20 ft)	7.8	-1.5	9.7	-0.7	9.7	-0.7	14.8	1.8
2 (20-29 ft)	7.9	-1.3	10.2	-1.0	10.7	-1.4	13.2	0.7
3 (30-39 ft)	9.0	0.1	11.0	0.0	11.1	-0.4	12.5	0.7
4 (40-49 ft)	8.9	0.0	10.3	0.1	10.5	-0.1	11.8	0.9
5 (50-79 ft)	7.0	-0.1	10.7	1.5	11.1	1.0	9.0	0.4
6 (80-100 ft)	7.8	0.0	8.9	-1.0	10.1	-0.6	8.6	0.0
Total	8.1	-1.0	10.3	-0.4	10.5	-0.4	14.2	1.2

5.9 Horizontal and Vertical Curvature

Table 22 and Table 23 show cross-tabulations of the impact of various horizontal and vertical curvature categories within a roadway classification. A number of cells in Table 22 have relatively low levels of site representation, limiting the statistical confidence in the estimated speed values expressed in the cross-tabulation. Generally, greater horizontal and vertical curvature is associated with lower speeds and smaller roadway classes (i.e., minor arterials/collectors). The impact of hilliness (i.e., vertical curvature) on speeds is most pronounced on roads with moderate horizontal curvature. For the cases in which sufficient data were available for analysis of this interaction, year to year variation was relatively minimal with the exception of the limited access highway condition. Unfortunately, the number of sites where there is a combination of these extremes is small, precluding more detailed analyses. Figure 18 provides a graphic view of the statistics from Table 22.

Table 22. Speed by Road Type, Horizontal Curvature Class, and Vertical Curvature Class

			FCC ROAD CLASS							
			1 Limited access		2 Major arterial		3 Minor art/collector		Total	
			Speed		Speed		Speed		Speed	
			2009	**Change**	**2009**	**Change**	**2009**	**Change**	**2009**	**Change**
HOR_CURVERDCLASS	**VER_CURVERDCLASS**		Est. (SE)	Est. (SE)	Est. (SE)	Est. (SE)	Est. (SE)	Est. (SE)	Est. (SE)	Est. (SE)
1 Straight	1 Flat	Mean	70.7 (1.0)	5.8 (0.7)	53.0 (1.2)	-0.3 (0.5)	47.8 (1.2)	0.1 (0.3)	57.0 (1.6)	1.8 (0.8)
		Median	70.9 (1.7)	5.8 (1.6)	53.0 (1.3)	-0.8 (1.2)	47.1 (1.3)	0.3 (0.5)	56.5 (2.2)	1.0 (1.2)
		Quantile (0.85)	78.7 (1.6)	4.7 (1.4)	63.5 (1.6)	-0.6 (0.7)	58.4 (1.9)	-0.6 (0.6)	73.0 (2.5)	4.1 (2.1)
		Quantile (0.95)	82.0 (0.7)	2.7 (0.8)	70.1 (1.6)	-0.2 (1.4)	66.1 (1.7)	-0.6 (1.1)	79.0 (1.3)	3.6 (1.1)
	2 Moderate	Mean	-	-	52.6 (-)	-2.4 (-)	45.7 (5.9)	-0.2 (1.0)	46.7 (6.6)	-0.4 (1.1)
		Median	-	-	52.2 (-)	-3.2 (-)	43.3 (4.4)	0.3 (1.4)	45.0 (6.0)	-0.3 (2.5)
		Quantile (0.85)	-	-	57.8 (-)	-2.0 (-)	58.8 (11.9)	-1.9 (2.2)	58.7 (11.7)	-1.6 (1.7)
		Quantile (0.95)	-	-	62.6 (-)	-0.1 (-)	66.5 (14.4)	0.6 (1.7)	65.6 (13.7)	0.1 (1.1)
	3 Steep	Mean	68.6 (-)	7.6 (-)	56.1 (11.4)	-0.7 (3.1)	43.7 (2.8)	-1.5 (1.2)	49.1 (4.8)	-1.2 (2.1)
		Median	68.5 (-)	7.6 (-)	57.4 (12.1)	-0.3 (3.4)	43.5 (2.7)	-1.2 (1.7)	46.5 (2.9)	0.0 (2.1)
		Quantile (0.85)	74.5 (-)	6.9 (-)	67.6 (14.3)	-4.3 (7.0)	49.9 (3.5)	-0.5 (1.3)	62.1 (10.5)	-1.7 (3.0)
		Quantile (0.95)	78.0 (-)	5.4 (-)	73.3 (14.7)	-5.5 (6.1)	54.2 (3.7)	-0.8 (0.9)	69.7 (11.8)	-4.3 (3.0)
	Total	Mean	70.7 (1.0)	5.8 (0.7)	53.0 (1.2)	-0.3 (0.5)	47.7 (1.3)	0.1 (0.3)	56.7 (1.6)	1.7 (0.7)
		Median	70.9 (1.7)	5.8 (1.6)	53.0 (1.3)	-0.9 (1.3)	46.9 (1.4)	0.3 (0.6)	56.1 (2.2)	0.7 (1.1)
		Quantile (0.85)	78.7 (1.6)	4.7 (1.4)	63.5 (1.6)	-0.7 (0.8)	58.4 (2.1)	-0.6 (0.5)	73.0 (1.6)	4.2 (1.3)
		Quantile (0.95)	82.0 (0.7)	2.7 (0.8)	70.1 (1.6)	-0.3 (1.4)	66.1 (1.7)	-0.5 (1.0)	79.0 (1.3)	3.7 (1.1)
2 Moderate	1 Flat	Mean	68.9 (4.0)	8.3 (4.9)	58.6 (1.6)	-0.6 (1.8)	40.6 (1.7)	0.3 (1.5)	53.6 (3.7)	5.5 (3.5)
		Median	69.3 (4.7)	8.6 (5.1)	58.7 (2.1)	0.0 (2.4)	39.2 (1.3)	0.5 (1.4)	54.6 (5.8)	8.0 (5.6)
		Quantile (0.85)	76.9 (3.4)	6.6 (3.9)	65.7 (0.9)	-2.4 (3.6)	50.9 (4.2)	0.4 (2.6)	72.0 (6.0)	8.5 (6.0)
		Quantile (0.95)	80.3 (2.9)	4.7 (3.9)	70.8 (1.1)	-3.2 (3.6)	57.7 (3.1)	-1.9 (2.2)	78.0 (4.8)	7.1 (4.6)
	2 Moderate	Mean	-	-	-	-	54.2 (3.5)	3.4 (0.8)	54.2 (3.5)	3.4 (0.8)
		Median	-	-	-	-	54.6 (3.0)	4.0 (0.7)	54.6 (3.0)	4.0 (0.7)
		Quantile (0.85)	-	-	-	-	62.3 (3.7)	2.8 (1.4)	62.3 (3.7)	2.8 (1.4)
		Quantile (0.95)	-	-	-	-	68.2 (5.4)	3.4 (1.7)	68.2 (5.4)	3.4 (1.7)
	3 Steep	Mean	-	-	31.4 (-)	-1.7 (-)	34.9 (2.5)	-2.0 (1.4)	34.8 (2.4)	-2.0 (1.3)
		Median	-	-	30.9 (-)	-1.3 (-)	33.6 (2.6)	-2.9 (1.6)	33.6 (2.5)	-2.7 (1.5)
		Quantile (0.85)	-	-	36.1 (-)	-2.5 (-)	40.2 (5.6)	-2.1 (1.5)	40.2 (5.5)	-2.1 (1.5)
		Quantile (0.95)	-	-	38.9 (-)	-5.1 (-)	45.2 (7.4)	-1.7 (1.9)	45.1 (7.3)	-1.7 (1.8)
	Total	Mean	68.9 (4.0)	8.3 (4.9)	58.5 (1.7)	-0.5 (1.8)	41.9 (1.8)	0.8 (1.3)	52.9 (3.4)	5.1 (3.1)
		Median	69.3 (4.7)	8.6 (5.1)	58.7 (2.1)	0.0 (2.4)	39.8 (1.7)	0.4 (1.5)	53.6 (5.0)	7.6 (4.4)
		Quantile (0.85)	76.9 (3.4)	6.6 (3.9)	65.7 (1.0)	-2.4 (3.6)	54.0 (3.2)	1.8 (2.3)	71.0 (6.0)	8.1 (6.1)
		Quantile (0.95)	80.3 (2.9)	4.7 (3.9)	70.8 (1.1)	-3.2 (3.6)	60.4 (2.4)	0.1 (2.0)	77.0 (5.1)	6.8 (5.0)

Table 22. Speed by Road Type, Horizontal Curvature Class, and Vertical Curvature Class (continued)

			FCC ROAD CLASS							
			1 Limited access		2 Major arterial		3 Minor art/collector		Total	
			Speed		Speed		Speed		Speed	
			2009	**Change**	**2009**	**Change**	**2009**	**Change**	**2009**	**Change**
HOR_CURVERDCLASS	**VER_CURVERDCLASS**		Est. (SE)	Est. (SE)	Est. (SE)	Est. (SE)	Est. (SE)	Est. (SE)	Est. (SE)	Est. (SE)
3 Sharp	1 Flat	Mean	70.2 (2.1)	2.4 (-)	58.2 (-)	-1.0 (-)	40.9 (2.0)	-1.5 (1.1)	52.4 (5.0)	4.2 (6.2)
		Median	70.2 (2.6)	1.9 (-)	58.2 (-)	-1.1 (-)	38.6 (1.4)	-1.3 (1.3)	52.1 (10.8)	7.4 (8.7)
		Quantile (0.85)	76.3 (1.0)	-0.4 (-)	65.1 (-)	-3.9 (-)	52.9 (5.7)	-3.0 (3.3)	72.0 (4.1)	6.0 (11.9)
		Quantile (0.95)	79.5 (0.3)	-4.0 (-)	69.8 (-)	-5.9 (-)	59.6 (5.8)	-2.4 (2.6)	77.0 (1.4)	2.4 (10.6)
	2 Moderate	Mean	66.7 (-)	3.7 (-)	-	-	41.9 (4.7)	0.8 (2.6)	59.1 (15.8)	1.8 (1.2)
		Median	65.7 (-)	3.0 (-)	-	-	39.9 (5.7)	0.6 (3.3)	63.9 (21.6)	4.2 (3.6)
		Quantile (0.85)	71.8 (-)	1.4 (-)	-	-	50.0 (9.5)	0.9 (2.0)	70.9 (17.5)	1.9 (1.5)
		Quantile (0.95)	75.7 (-)	0.6 (-)	-	-	58.8 (10.0)	1.0 (1.3)	75.0 (13.8)	1.4 (0.7)
	3 Steep	Mean	-	-	-	-	37.1 (0.9)	-6.1 (-)	37.1 (0.9)	-6.1 (-)
		Median	-	-	-	-	36.3 (1.2)	-6.5 (-)	36.3 (1.2)	-6.5 (-)
		Quantile (0.85)	-	-	-	-	44.2 (0.3)	-3.6 (-)	44.2 (0.3)	-3.6 (-)
		Quantile (0.95)	-	-	-	-	57.0 (6.8)	4.8 (-)	57.0 (6.8)	4.8 (-)
	Total	Mean	68.6 (1.8)	4.7 (2.1)	58.2 (-)	-1.0 (-)	41.1 (1.8)	-1.0 (1.2)	54.3 (5.0)	1.3 (3.7)
		Median	67.8 (2.6)	4.2 (2.1)	58.2 (-)	-1.1 (-)	39.0 (1.3)	-0.6 (1.9)	57.5 (11.9)	1.9 (7.8)
		Quantile (0.85)	74.9 (1.9)	2.9 (3.1)	65.1 (-)	-3.9 (-)	52.6 (5.2)	-1.8 (2.4)	72.0 (3.5)	3.8 (4.7)
		Quantile (0.95)	78.4 (1.3)	1.1 (4.8)	69.8 (-)	-5.9 (-)	59.5 (4.4)	-1.5 (1.7)	77.0 (2.9)	3.0 (3.0)
Total	1 Flat	Mean	70.6 (1.0)	5.8 (0.7)	53.3 (1.2)	-0.3 (0.5)	47.1 (1.2)	0.1 (0.4)	56.7 (1.5)	2.0 (0.8)
		Median	70.9 (1.2)	5.9 (1.2)	53.4 (1.3)	-0.7 (1.0)	46.4 (1.3)	0.4 (0.5)	56.4 (2.1)	1.2 (1.1)
		Quantile (0.85)	78.0 (2.1)	4.1 (2.0)	63.7 (1.6)	-0.7 (0.6)	57.8 (1.9)	-0.6 (0.8)	73.0 (1.8)	4.3 (1.5)
		Quantile (0.95)	81.9 (0.7)	2.5 (0.8)	70.1 (1.5)	-0.4 (1.2)	65.6 (1.7)	-0.4 (1.2)	79.0 (1.3)	3.8 (1.0)
	2 Moderate	Mean	66.7 (-)	3.7 (-)	52.6 (-)	-2.4 (-)	46.9 (4.1)	1.1 (1.5)	50.7 (3.4)	-0.9 (2.2)
		Median	65.7 (-)	3.0 (-)	52.2 (-)	-3.2 (-)	44.8 (4.5)	1.3 (1.9)	49.8 (5.9)	-3.0 (4.7)
		Quantile (0.85)	71.8 (-)	1.4 (-)	57.8 (-)	-2.0 (-)	59.5 (5.3)	0.2 (3.4)	65.0 (4.6)	0.0 (0.8)
		Quantile (0.95)	75.7 (-)	0.6 (-)	62.6 (-)	-0.1 (-)	66.5 (4.7)	1.3 (1.8)	70.9 (4.0)	0.4 (1.3)
	3 Steep	Mean	68.6 (-)	7.6 (-)	55.6 (10.9)	-0.6 (2.9)	39.7 (2.7)	-1.7 (0.9)	44.5 (4.4)	-1.6 (0.8)
		Median	68.5 (-)	7.6 (-)	57.0 (11.8)	-0.3 (3.5)	39.5 (3.7)	-2.1 (1.7)	42.6 (3.1)	-0.9 (1.2)
		Quantile (0.85)	74.5 (-)	6.9 (-)	67.4 (14.2)	-4.4 (7.1)	47.6 (3.3)	-0.5 (1.3)	58.4 (10.3)	-0.9 (2.7)
		Quantile (0.95)	78.0 (-)	5.4 (-)	73.3 (14.6)	-5.6 (6.1)	52.6 (3.8)	-0.3 (1.0)	67.1 (12.0)	-3.9 (3.4)
	Total	Mean	70.5 (1.0)	5.8 (0.7)	53.3 (1.2)	-0.3 (0.6)	47.0 (1.2)	0.2 (0.4)	56.4 (1.5)	1.9 (0.7)
		Median	70.8 (0.8)	6.0 (0.8)	53.4 (1.3)	-0.7 (1.0)	46.1 (1.4)	0.3 (0.6)	56.0 (2.0)	1.0 (0.9)
		Quantile (0.85)	78.0 (1.6)	4.2 (1.4)	63.7 (1.5)	-0.8 (0.7)	57.8 (2.0)	-0.5 (0.7)	73.0 (1.6)	4.5 (1.2)
		Quantile (0.95)	81.8 (0.7)	2.6 (0.7)	70.1 (1.5)	-0.5 (1.3)	65.6 (1.7)	-0.4 (1.0)	79.0 (1.4)	3.9 (1.1)

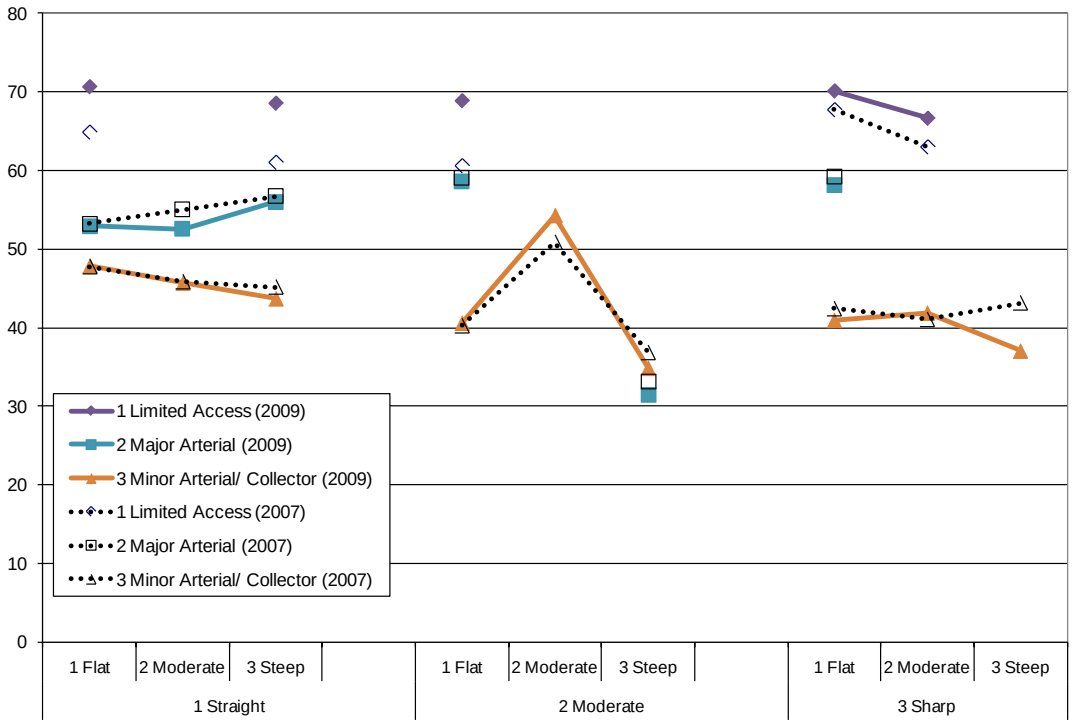

Figure 18. Speed by Road Type, Horizontal, and Vertical Curvature Class (Free-Flow)

Table 23. Standard Deviations for Values Reported in Table 22

		FCC ROAD CLASS							
		1 Limited access		2 Major arterial		3 Minor art/collector		Total	
		Speed Value Std Dev		Speed Value Std Dev		Speed Value Std Dev		Speed Value Std Dev	
HOR_CURVERD CLASS	**VER_CURVERD CLASS**	**2009**	**Change**	**2009**	**Change**	**2009**	**Change**	**2009**	**Change**
1 Straight	1 Flat	8.1	-1.0	10.4	-0.4	10.3	-0.5	14.0	1.3
	2 Moderate	-	-	5.8	0.7	11.0	-0.6	10.7	-0.7
	3 Steep	7.2	0.2	11.4	-2.3	6.6	0.9	11.0	-0.5
	Total	8.1	-1.0	10.4	-0.4	10.3	-0.5	14.0	1.2
2 Moderate	1 Flat	8.6	-0.9	7.6	-1.1	9.1	-0.7	15.6	2.0
	2 Moderate	-	-	-	-	8.8	0.4	8.8	0.4
	3 Steep	-	-	5.6	-0.4	5.3	-0.5	5.4	-0.5
	Total	8.6	-0.9	7.8	-1.1	10.1	0.1	15.4	2.1
3 Sharp	1 Flat	6.7	-5.0	7.2	-2.7	9.6	-1.1	16.2	1.2
	2 Moderate	5.5	-1.7	-	-	8.3	0.0	13.1	1.0
	3 Steep	-	-	-	-	9.5	4.2	9.5	4.2
	Total	6.4	-2.0	7.2	-2.7	9.4	-0.7	15.6	1.4
Total	1 Flat	8.1	-1.1	10.4	-0.4	10.4	-0.5	14.2	1.2
	2 Moderate	5.5	-1.7	5.8	0.7	11.0	0.0	12.3	-0.1
	3 Steep	7.2	0.2	11.8	-2.2	7.5	0.4	11.7	-0.2
	Total	8.1	-1.0	10.3	-0.4	10.5	-0.4	14.2	1.2

5.10 Horizontal Curvature and Vehicle Length

The influence of vehicle length and horizontal curvature is presented in Table 24 and Table 25 Generally, the year-to-year variations were minimal. We note that the estimated speeds for the longest trucks on sharply curved minor arterials are unreliable due to the small sample size. Speeds on limited access highway showed a general increase over values from 2007. Most of these differences were in the 3 to 5 mph range; the exception in this case was for the longest two vehicle length categories, which showed some convergence between 2007 and 2009. Figure 19 provides a graphic view of the statistics from Table 24.

Table 24. Speed by Road Type, Length Class, and Horizontal Curvature Class

			FCC ROAD CLASS							
			1 Limited access		2 Major arterial		3 Minor art/collector		Total	
			Speed		Speed		Speed		Speed	
			2009	**Change**	**2009**	**Change**	**2009**	**Change**	**2009**	**Change**
HOR_ CURVERD CLASS	**VEH_LENGTH**		Est. (SE)	Est. (SE)	Est. (SE)	Est. (SE)	Est. (SE)	Est. (SE)	Est. (SE)	Est. (SE)
1 Straight	1 (<20ft)	Mean	71.5 (1.3)	6.6 (1.0)	50.8 (0.9)	-1.4 (0.7)	45.8 (1.1)	-0.8 (0.4)	55.4 (1.7)	2.0 (1.1)
		Median	72.0 (1.3)	6.7 (1.4)	50.9 (0.9)	-1.4 (1.6)	45.1 (1.2)	-0.4 (0.6)	53.6 (2.0)	0.6 (1.2)
		Quantile (0.85)	78.9 (0.9)	4.8 (1.1)	60.5 (1.4)	-2.1 (0.6)	55.6 (1.5)	-1.4 (1.0)	73.0 (3.0)	5.3 (2.6)
		Quantile (0.95)	82.6 (1.1)	3.3 (1.0)	66.4 (1.3)	-2.6 (1.1)	62.6 (1.8)	-2.3 (1.1)	79.0 (1.8)	4.5 (1.7)
	2 (20-29 ft)	Mean	72.0 (1.0)	4.7 (0.7)	56.4 (1.5)	-1.8 (0.5)	51.2 (1.4)	-2.4 (0.5)	58.1 (1.2)	-2.4 (0.8)
		Median	72.7 (1.0)	5.2 (1.0)	56.5 (1.6)	-2.8 (0.7)	50.5 (1.6)	-3.9 (0.8)	57.6 (1.6)	-3.7 (1.1)
		Quantile (0.85)	79.0 (0.2)	2.3 (0.8)	67.0 (1.6)	-1.6 (1.5)	62.5 (1.9)	-2.6 (1.1)	73.5 (1.8)	0.6 (1.7)
		Quantile (0.95)	82.4 (0.5)	0.6 (0.6)	73.2 (1.3)	-1.7 (1.7)	69.9 (1.4)	-2.5 (1.5)	79.0 (0.3)	0.2 (0.9)
	3 (30-39 ft)	Mean	67.7 (1.1)	6.0 (0.9)	56.2 (1.2)	3.2 (0.9)	51.7 (1.2)	1.9 (0.5)	57.9 (1.1)	2.5 (0.5)
		Median	67.8 (0.9)	6.2 (1.0)	56.1 (1.3)	1.9 (1.7)	51.1 (1.8)	1.1 (1.2)	58.1 (1.3)	2.4 (0.8)
		Quantile (0.85)	76.0 (0.4)	5.4 (0.7)	67.7 (1.3)	4.3 (0.7)	63.2 (1.1)	1.5 (0.8)	71.6 (1.6)	4.6 (1.6)
		Quantile (0.95)	80.0 (0.7)	3.7 (1.1)	75.1 (1.0)	4.5 (1.0)	71.6 (1.1)	2.9 (1.9)	77.6 (1.5)	4.0 (1.6)
	4 (40-49 ft)	Mean	66.9 (1.0)	6.4 (0.7)	56.1 (1.0)	2.7 (0.9)	52.2 (1.6)	2.1 (0.3)	59.1 (1.1)	3.6 (0.7)
		Median	66.9 (1.3)	6.4 (1.0)	56.7 (1.2)	2.5 (0.8)	52.3 (1.9)	1.6 (1.1)	60.0 (1.1)	4.2 (1.0)
		Quantile (0.85)	74.6 (0.7)	5.6 (0.7)	66.3 (0.7)	3.0 (1.3)	62.6 (0.9)	2.0 (0.6)	71.6 (1.6)	5.6 (1.6)
		Quantile (0.95)	78.5 (0.6)	3.7 (0.7)	72.8 (1.1)	3.5 (2.0)	69.6 (0.9)	2.8 (2.0)	76.8 (1.5)	4.8 (1.5)
	5 (50-79 ft)	Mean	65.7 (1.3)	3.1 (0.3)	55.6 (1.3)	-0.4 (0.5)	53.3 (2.2)	-0.2 (0.8)	63.6 (1.4)	3.0 (0.4)
		Median	65.7 (1.5)	3.1 (0.9)	56.5 (1.3)	-0.3 (0.4)	54.6 (2.5)	0.1 (0.7)	65.0 (1.3)	3.7 (0.6)
		Quantile (0.85)	71.8 (1.2)	2.4 (0.7)	66.3 (0.8)	1.7 (1.6)	63.9 (0.7)	0.6 (1.1)	72.0 (1.3)	3.5 (0.8)
		Quantile (0.95)	75.4 (0.9)	1.3 (0.3)	72.2 (0.4)	2.3 (2.1)	69.6 (0.7)	1.4 (1.4)	75.8 (1.9)	2.5 (1.6)
	6 (80-100 ft)	Mean	66.6 (1.7)	-0.2 (0.9)	58.3 (3.1)	-3.0 (3.5)	54.9 (2.1)	-2.9 (1.3)	65.3 (1.6)	-0.4 (0.8)
		Median	66.4 (1.6)	-0.1 (0.9)	59.3 (2.3)	-3.3 (2.1)	56.3 (1.2)	-2.4 (3.6)	66.0 (1.7)	0.0 (1.3)
		Quantile (0.85)	73.1 (1.9)	-1.3 (0.4)	66.7 (2.3)	-2.8 (6.1)	63.8 (0.8)	-5.1 (3.7)	73.0 (1.9)	-0.8 (1.2)
		Quantile (0.95)	76.8 (1.4)	-3.4 (1.6)	71.6 (2.1)	-2.4 (6.5)	70.0 (0.5)	-2.9 (3.5)	76.5 (1.5)	-3.0 (1.2)
	Total	Mean	70.7 (1.0)	5.8 (0.7)	53.0 (1.2)	-0.3 (0.5)	47.7 (1.3)	0.1 (0.3)	56.7 (1.6)	1.7 (0.7)
		Median	70.9 (1.7)	5.8 (1.6)	53.0 (1.3)	-0.9 (1.3)	46.9 (1.4)	0.3 (0.6)	56.1 (2.2)	0.7 (1.1)
		Quantile (0.85)	78.7 (1.6)	4.7 (1.4)	63.5 (1.6)	-0.7 (0.8)	58.4 (2.1)	-0.6 (0.5)	73.0 (1.6)	4.2 (1.3)
		Quantile (0.95)	82.0 (0.7)	2.7 (0.8)	70.1 (1.6)	-0.3 (1.4)	66.1 (1.7)	-0.5 (1.0)	79.0 (1.3)	3.7 (1.1)

Table 24. Speed by Road Type, Length Class, and Horizontal Curvature Class (continued)

			FCC ROAD CLASS							
			1 Limited access		2 Major arterial		3 Minor art/collector		Total	
			Speed		Speed		Speed		Speed	
			2009	Change	2009	Change	2009	Change	2009	Change
HOR_ CURVERD CLASS	VEH_LENGTH		Est. (SE)	Est. (SE)	Est. (SE)	Est. (SE)	Est. (SE)	Est. (SE)	Est. (SE)	Est. (SE)
2 Moderate	1 (<20 ft)	Mean	69.5 (3.8)	8.9 (5.2)	56.7 (1.7)	-1.2 (1.6)	39.9 (1.6)	-0.4 (1.4)	49.4 (3.0)	3.5 (2.5)
		Median	69.6 (4.6)	9.3 (5.9)	57.1 (1.9)	-0.6 (2.2)	38.0 (1.4)	-0.9 (1.3)	46.5 (5.7)	3.4 (3.6)
		Quantile (0.85)	77.1 (3.7)	7.0 (4.4)	64.1 (1.7)	-2.6 (2.9)	50.8 (4.2)	0.5 (2.3)	69.0 (5.8)	8.1 (5.9)
		Quantile (0.95)	80.7 (3.3)	5.2 (3.9)	68.3 (1.2)	-3.8 (3.0)	57.8 (2.4)	-1.2 (2.7)	76.9 (5.7)	8.4 (5.6)
	2 (20-29 ft)	Mean	71.6 (3.7)	7.2 (3.9)	60.6 (1.5)	-2.5 (2.2)	46.3 (2.1)	1.1 (2.0)	58.1 (4.3)	3.9 (4.4)
		Median	72.2 (4.3)	7.7 (4.5)	60.8 (2.1)	-2.0 (2.1)	45.0 (2.6)	-0.5 (2.3)	59.5 (4.6)	3.2 (4.9)
		Quantile (0.85)	77.8 (2.2)	3.7 (2.9)	67.8 (1.4)	-4.6 (3.8)	57.7 (2.5)	-0.6 (1.8)	74.0 (6.8)	5.2 (6.9)
		Quantile (0.95)	80.8 (1.7)	1.4 (2.5)	73.1 (1.4)	-4.4 (3.0)	64.0 (2.4)	-0.4 (1.6)	79.0 (4.5)	3.5 (4.5)
	3 (30-39 ft)	Mean	65.8 (3.9)	8.9 (4.8)	58.6 (1.5)	0.5 (1.8)	47.8 (1.8)	3.5 (1.7)	56.2 (2.4)	6.2 (2.6)
		Median	65.4 (3.5)	8.9 (5.1)	58.3 (2.0)	1.3 (1.2)	48.0 (2.4)	5.2 (3.3)	57.1 (2.5)	5.6 (2.9)
		Quantile (0.85)	75.1 (4.4)	9.0 (4.5)	65.8 (1.6)	-1.3 (6.6)	58.5 (1.6)	1.7 (2.8)	69.0 (4.2)	6.1 (4.4)
		Quantile (0.95)	79.2 (4.0)	7.8 (4.4)	74.6 (1.4)	2.3 (4.3)	65.4 (2.1)	2.3 (2.5)	76.3 (3.6)	7.3 (3.7)
	4 (40-49 ft)	Mean	64.4 (3.0)	9.7 (4.7)	57.7 (2.6)	0.7 (1.1)	48.1 (2.0)	3.1 (2.1)	57.5 (2.3)	6.4 (3.3)
		Median	64.0 (2.3)	8.8 (4.7)	57.7 (3.3)	1.5 (1.6)	49.1 (2.0)	6.3 (4.2)	58.6 (2.9)	6.5 (4.3)
		Quantile (0.85)	72.3 (2.4)	7.3 (3.3)	64.5 (2.7)	0.0 (1.4)	58.2 (1.3)	0.7 (3.9)	68.0 (3.9)	4.9 (4.1)
		Quantile (0.95)	76.8 (3.0)	6.6 (3.4)	69.4 (1.8)	-3.0 (3.9)	63.5 (0.6)	-1.5 (3.4)	74.0 (3.8)	5.2 (4.0)
	5 (50-79 ft)	Mean	60.1 (3.2)	3.0 (3.9)	57.9 (3.1)	-0.2 (1.6)	48.4 (2.5)	1.3 (1.0)	58.7 (2.5)	2.9 (2.5)
		Median	61.0 (3.3)	2.8 (4.0)	58.1 (3.2)	0.7 (2.1)	50.3 (2.3)	3.1 (2.8)	60.0 (3.6)	3.1 (3.9)
		Quantile (0.85)	67.1 (2.6)	1.3 (1.7)	63.9 (1.6)	-2.8 (3.9)	58.1 (1.0)	0.2 (2.5)	66.9 (2.6)	1.8 (2.2)
		Quantile (0.95)	71.5 (2.3)	2.7 (1.1)	67.0 (0.6)	-5.3 (4.6)	62.7 (2.0)	0.5 (2.0)	71.0 (2.6)	1.7 (1.6)
	6 (80-100 ft)	Mean	60.5 (4.0)	-1.1 (4.4)	60.1 (4.0)	-5.0 (3.9)	56.9 (5.9)	3.8 (4.1)	60.3 (3.2)	-1.3 (3.1)
		Median	62.3 (4.4)	0.0 (5.2)	59.5 (4.8)	-4.2 (1.6)	60.9 (11.3)	6.6 (7.6)	61.8 (3.8)	-0.6 (4.0)
		Quantile (0.85)	67.7 (1.3)	-0.7 (1.6)	64.9 (4.9)	-7.7 (8.9)	65.6 (1.1)	2.8 (5.5)	67.6 (1.4)	-1.0 (1.7)
		Quantile (0.95)	71.0 (2.1)	-0.7 (3.2)	67.9 (5.3)	-12.3 (8.0)	70.6 (4.6)	5.4 (7.5)	70.6 (1.6)	-4.2 (5.5)
	Total	Mean	68.9 (4.0)	8.3 (4.9)	58.5 (1.7)	-0.5 (1.8)	41.9 (1.8)	0.8 (1.3)	52.9 (3.4)	5.1 (3.1)
		Median	69.3 (4.7)	8.6 (5.1)	58.7 (2.1)	0.0 (2.4)	39.8 (1.7)	0.4 (1.5)	53.6 (5.0)	7.6 (4.4)
		Quantile (0.85)	76.9 (3.4)	6.6 (3.9)	65.7 (1.0)	-2.4 (3.6)	54.0 (3.2)	1.8 (2.3)	71.0 (6.0)	8.1 (6.1)
		Quantile (0.95)	80.3 (2.9)	4.7 (3.9)	70.8 (1.1)	-3.2 (3.6)	60.4 (2.4)	0.1 (2.0)	77.0 (5.1)	6.8 (5.0)

Table 24. Speed by Road Type, Length Class, and Horizontal Curvature Class (continued)

			FCC ROAD CLASS							
			1 Limited access		2 Major arterial		3 Minor art/collector		Total	
			Speed		Speed		Speed		Speed	
			2009	Change	2009	Change	2009	Change	2009	Change
HOR_ CURVERD CLASS	VEH_LENGTH		Est. (SE)	Est. (SE)	Est. (SE)	Est. (SE)	Est. (SE)	Est. (SE)	Est. (SE)	Est. (SE)
3 Sharp	1 (<20 ft)	Mean	68.7 (1.6)	4.8 (2.7)	56.8 (-)	-2.7 (-)	39.6 (1.4)	-2.0 (1.6)	52.9 (5.6)	0.7 (3.9)
		Median	67.8 (2.3)	4.2 (2.8)	57.0 (-)	-2.2 (-)	38.0 (0.8)	-1.3 (2.3)	54.6 (15.7)	0.2 (9.8)
		Quantile (0.85)	74.9 (1.7)	3.0 (3.7)	63.3 (-)	-4.9 (-)	49.2 (5.6)	-4.8 (4.2)	71.0 (2.8)	3.0 (4.4)
		Quantile (0.95)	78.4 (1.1)	1.4 (5.8)	67.5 (-)	-7.7 (-)	57.1 (5.3)	-3.7 (2.3)	76.0 (2.5)	2.3 (2.8)
	2 (20-29 ft)	Mean	69.0 (2.3)	3.3 (1.5)	60.8 (-)	-1.6 (-)	45.0 (2.5)	-0.9 (2.1)	57.3 (4.2)	-1.0 (5.6)
		Median	68.5 (3.3)	3.0 (3.4)	60.5 (-)	-1.8 (-)	43.3 (2.9)	-1.9 (2.8)	60.5 (6.3)	-0.1 (6.2)
		Quantile (0.85)	75.3 (2.4)	2.3 (2.8)	66.9 (-)	-6.0 (-)	56.8 (4.5)	-0.8 (3.6)	72.4 (3.1)	1.8 (6.8)
		Quantile (0.95)	78.6 (1.9)	-0.5 (6.0)	71.9 (-)	-6.7 (-)	62.5 (3.9)	-0.8 (3.2)	76.9 (1.9)	-0.1 (4.5)
	3 (30-39 ft)	Mean	66.8 (1.4)	4.8 (0.6)	55.4 (-)	-0.8 (-)	46.7 (3.5)	0.3 (1.6)	56.8 (4.2)	2.3 (2.1)
		Median	65.8 (1.9)	4.4 (0.9)	55.2 (-)	-2.7 (-)	45.8 (6.2)	-3.1 (6.1)	59.6 (5.2)	2.6 (3.0)
		Quantile (0.85)	72.9 (1.6)	3.4 (1.3)	64.9 (-)	-4.1 (-)	58.8 (2.9)	0.8 (2.0)	70.0 (2.2)	3.9 (3.5)
		Quantile (0.95)	76.7 (1.3)	1.6 (2.8)	71.7 (-)	-1.4 (-)	64.5 (2.9)	2.6 (2.6)	75.0 (1.0)	3.0 (2.5)
	4 (40-49 ft)	Mean	66.6 (1.2)	6.2 (1.7)	54.8 (-)	1.4 (-)	48.0 (5.1)	4.2 (3.1)	59.1 (3.6)	4.1 (4.2)
		Median	66.0 (1.8)	6.0 (3.2)	55.2 (-)	4.4 (-)	48.9 (8.8)	7.8 (6.1)	61.7 (4.4)	4.7 (4.5)
		Quantile (0.85)	72.1 (1.1)	4.5 (0.9)	62.4 (-)	-0.8 (-)	59.9 (4.7)	4.4 (3.2)	70.0 (2.5)	4.7 (3.8)
		Quantile (0.95)	75.0 (1.1)	2.5 (0.8)	65.6 (-)	-13.2 (-)	65.1 (5.0)	2.1 (5.8)	73.9 (1.4)	2.6 (2.2)
	5 (50-79 ft)	Mean	64.3 (2.4)	5.2 (1.2)	52.6 (-)	-1.1 (-)	45.8 (2.6)	0.7 (0.7)	60.7 (2.4)	3.5 (2.0)
		Median	63.1 (2.4)	4.5 (1.6)	52.1 (-)	-2.4 (-)	45.0 (6.3)	0.4 (3.2)	62.0 (1.4)	4.2 (1.8)
		Quantile (0.85)	69.4 (3.9)	4.1 (3.2)	60.6 (-)	-5.4 (-)	60.9 (2.0)	4.0 (4.0)	68.5 (3.5)	3.5 (3.7)
		Quantile (0.95)	73.6 (3.2)	4.0 (2.2)	69.7 (-)	-0.7 (-)	65.1 (3.1)	3.2 (4.2)	73.7 (2.6)	4.2 (2.5)
	6 (80-100 ft)	Mean	65.4 (3.9)	4.1 (5.5)	60.5 (-)	1.0 (-)	46.8 (-)	10.6 (-)	65.1 (2.5)	5.5 (8.4)
		Median	64.3 (4.3)	3.3 (3.9)	60.5 (0.0)	1.0 (0.0)	43.3 (-)	7.8 (-)	64.0 (2.9)	3.8 (15.6)
		Quantile (0.85)	70.3 (4.6)	3.9 (2.4)	60.5 (0.0)	1.0 (0.0)	53.0 (-)	14.4 (-)	70.1 (4.2)	3.8 (3.7)
		Quantile (0.95)	73.8 (5.0)	1.8 (5.1)	60.5 (0.0)	1.0 (0.0)	53.5 (-)	13.3 (-)	73.4 (4.6)	1.9 (5.2)
	Total	Mean	68.6 (1.8)	4.7 (2.1)	58.2 (-)	-1.0 (-)	41.1 (1.8)	-1.0 (1.2)	54.3 (5.0)	1.3 (3.7)
		Median	67.8 (2.6)	4.2 (2.1)	58.2 (-)	-1.1 (-)	39.0 (1.3)	-0.6 (1.9)	57.5 (11.9)	1.9 (7.8)
		Quantile (0.85)	74.9 (1.9)	2.9 (3.1)	65.1 (-)	-3.9 (-)	52.6 (5.2)	-1.8 (2.4)	72.0 (3.5)	3.8 (4.7)
		Quantile (0.95)	78.4 (1.3)	1.1 (4.8)	69.8 (-)	-5.9 (-)	59.5 (4.4)	-1.5 (1.7)	77.0 (2.9)	3.0 (3.0)

Table 24. Speed by Road Type, Length Class, and Horizontal Curvature Class (continued)

			FCC ROAD CLASS							
			1 Limited access		2 Major arterial		3 Minor art/collector		Total	
			Speed		Speed		Speed		Speed	
			2009	**Change**	**2009**	**Change**	**2009**	**Change**	**2009**	**Change**
HOR_ CURVERD CLASS	**VEH_LENGTH**		Est. (SE)	Est. (SE)	Est. (SE)	Est. (SE)	Est. (SE)	Est. (SE)	Est. (SE)	Est. (SE)
Total	1 (<20 ft)	Mean	71.3 (1.3)	6.6 (1.0)	51.1 (0.9)	-1.4 (0.7)	45.0 (1.0)	-0.8 (0.5)	54.9 (1.6)	2.1 (1.0)
		Median	71.9 (1.4)	6.8 (1.3)	51.3 (1.0)	-1.4 (1.4)	44.2 (1.2)	-0.5 (0.7)	53.4 (2.0)	0.7 (1.2)
		Quantile (0.85)	78.8 (1.3)	5.0 (1.2)	60.8 (1.2)	-2.2 (0.6)	55.2 (1.5)	-1.3 (1.1)	73.0 (2.2)	5.6 (2.0)
		Quantile (0.95)	82.4 (1.1)	3.4 (1.0)	66.5 (1.3)	-2.7 (1.0)	62.1 (1.7)	-2.2 (1.1)	79.0 (1.3)	4.8 (1.1)
	2 (20-29 ft)	Mean	71.8 (1.0)	4.7 (0.7)	56.7 (1.4)	-1.9 (0.5)	50.7 (1.4)	-2.1 (0.5)	58.1 (1.2)	-2.0 (0.8)
		Median	72.6 (1.2)	5.3 (1.1)	57.0 (1.6)	-2.6 (0.5)	50.1 (1.6)	-3.8 (0.9)	57.7 (1.4)	-3.3 (0.9)
		Quantile (0.85)	78.9 (0.2)	2.5 (0.8)	67.1 (1.5)	-1.9 (1.2)	62.0 (1.9)	-2.5 (1.1)	73.7 (1.7)	1.1 (1.5)
		Quantile (0.95)	82.2 (0.5)	0.4 (0.8)	73.2 (1.3)	-2.1 (1.4)	69.4 (1.5)	-2.5 (1.3)	79.0 (0.4)	0.4 (0.6)
	3 (30-39 ft)	Mean	67.6 (1.0)	6.1 (0.9)	56.3 (1.2)	3.1 (0.9)	51.4 (1.2)	2.2 (0.5)	57.7 (1.0)	2.8 (0.5)
		Median	67.7 (0.8)	6.3 (1.0)	56.3 (1.4)	1.8 (1.5)	50.8 (1.7)	1.5 (1.3)	58.0 (1.3)	2.5 (0.8)
		Quantile (0.85)	75.9 (0.3)	5.6 (0.6)	67.6 (1.2)	3.9 (1.0)	62.9 (1.1)	1.8 (0.9)	71.2 (1.3)	4.4 (1.3)
		Quantile (0.95)	79.9 (0.6)	3.7 (0.8)	75.0 (0.8)	4.5 (0.8)	71.3 (1.0)	3.2 (1.8)	77.3 (1.5)	4.0 (1.6)
	4 (40-49 ft)	Mean	66.7 (0.9)	6.5 (0.7)	56.2 (1.0)	2.6 (0.9)	51.9 (1.6)	2.3 (0.3)	59.0 (1.0)	3.8 (0.8)
		Median	66.7 (0.9)	6.4 (0.8)	56.8 (1.2)	2.4 (0.8)	52.1 (1.8)	2.1 (1.3)	60.0 (1.1)	4.4 (1.1)
		Quantile (0.85)	74.5 (0.7)	5.6 (0.6)	66.1 (0.8)	2.5 (1.1)	62.2 (1.0)	1.8 (0.8)	71.0 (1.1)	5.0 (1.2)
		Quantile (0.95)	78.3 (0.6)	3.9 (0.7)	72.6 (1.0)	3.0 (2.0)	69.1 (0.8)	2.4 (1.6)	76.0 (1.5)	4.1 (1.5)
	5 (50-79 ft)	Mean	65.4 (1.4)	3.0 (0.4)	55.8 (1.4)	-0.3 (0.5)	52.9 (2.2)	-0.2 (0.7)	63.3 (1.4)	2.9 (0.4)
		Median	64.9 (1.9)	2.5 (1.3)	56.8 (1.4)	-0.1 (0.3)	54.3 (2.6)	0.1 (0.6)	64.0 (1.6)	3.0 (1.1)
		Quantile (0.85)	71.6 (1.3)	2.3 (0.6)	65.9 (0.6)	1.2 (1.4)	63.6 (1.1)	0.5 (1.1)	71.0 (2.4)	2.7 (2.0)
		Quantile (0.95)	75.3 (0.9)	1.1 (0.3)	72.1 (0.7)	2.1 (1.8)	69.3 (0.6)	1.2 (1.1)	75.0 (0.9)	1.8 (0.9)
	6 (80-100 ft)	Mean	66.2 (1.7)	-0.4 (0.8)	58.5 (3.2)	-3.2 (3.3)	55.0 (2.2)	-2.2 (1.4)	64.9 (1.6)	-0.5 (0.8)
		Median	66.1 (1.5)	-0.4 (0.8)	59.5 (2.3)	-3.4 (1.7)	56.4 (1.2)	-2.1 (4.2)	66.0 (1.3)	0.2 (0.7)
		Quantile (0.85)	72.8 (2.0)	-1.4 (0.4)	66.6 (2.4)	-3.6 (5.9)	63.8 (0.6)	-4.7 (3.5)	72.9 (2.5)	-0.7 (1.3)
		Quantile (0.95)	76.7 (1.6)	-3.4 (1.6)	71.5 (2.8)	-3.5 (6.7)	70.0 (0.3)	-2.8 (2.7)	76.3 (1.6)	-3.2 (1.0)
	Total	Mean	70.5 (1.0)	5.8 (0.7)	53.3 (1.2)	-0.3 (0.6)	47.0 (1.2)	0.2 (0.4)	56.4 (1.5)	1.9 (0.7)
		Median	70.8 (0.8)	6.0 (0.8)	53.4 (1.3)	-0.7 (1.0)	46.1 (1.4)	0.3 (0.6)	56.0 (2.0)	1.0 (0.9)
		Quantile (0.85)	78.0 (1.6)	4.2 (1.4)	63.7 (1.5)	-0.8 (0.7)	57.8 (2.0)	-0.5 (0.7)	73.0 (1.6)	4.5 (1.2)
		Quantile (0.95)	81.8 (0.7)	2.6 (0.7)	70.1 (1.5)	-0.5 (1.3)	65.6 (1.7)	-0.4 (1.0)	79.0 (1.4)	3.9 (1.1)

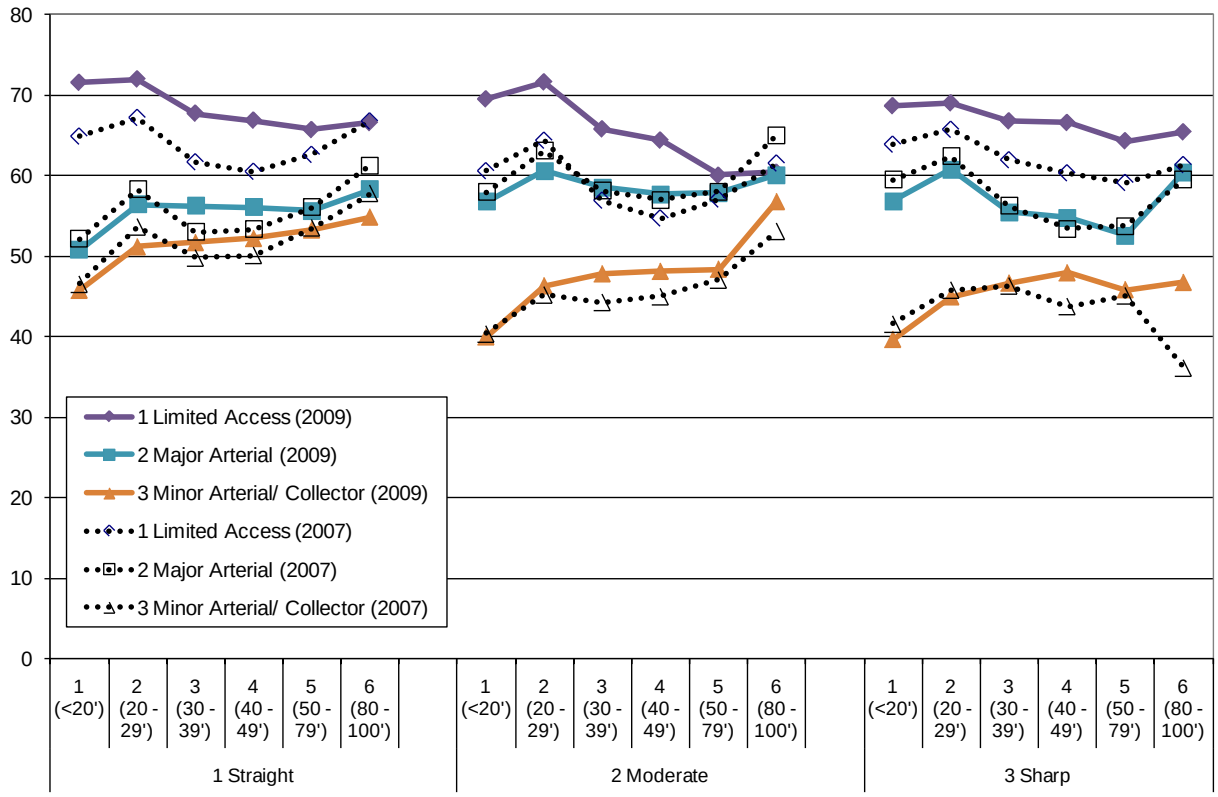

Figure 19. Speed by Road Type, Length Class, and Horizontal Curvature Class (Free-Flow)

Table 25. Standard Deviations for Values Reported in Table 24

		FCC ROAD CLASS							
		1 Limited access		2 Major arterial		3 Minor art/collector		Total	
		Speed Value Std Dev		Speed Value Std Dev		Speed Value Std Dev		Speed Value Std Dev	
HOR_CURVERD CLASS	**VEH_LENGTH**	**2009**	**Change**	**2009**	**Change**	**2009**	**Change**	**2009**	**Change**
1 Straight	1 (<20 ft)	7.856	-1.481	9.728	-0.713	9.598	-0.704	14.646	1.822
	2 (20-29 ft)	8.043	-1.150	10.306	-0.955	10.594	-1.179	13.098	0.857
	3 (30-39 ft)	9.047	0.157	11.128	0.128	11.080	-0.314	12.480	0.789
	4 (40-49 ft)	8.937	0.172	10.526	0.250	10.477	-0.001	11.844	1.076
	5 (50-79 ft)	6.819	-0.180	10.937	1.727	10.995	1.043	8.900	0.445
	6 (80-100 ft)	7.564	-0.119	9.324	-0.750	9.979	-0.397	8.551	0.000
	Total	8.117	-1.010	10.380	-0.393	10.328	-0.466	14.030	1.239
2 Moderate	1 (<20 ft)	8.081	-1.111	7.735	-1.076	9.352	-0.203	15.583	2.804
	2 (20-29 ft)	7.049	-2.450	7.460	-1.144	10.326	-1.719	14.278	0.080
	3 (30-39 ft)	9.276	0.002	8.453	0.065	10.870	-0.284	12.467	0.333
	4 (40-49 ft)	8.443	-1.613	7.267	-1.242	10.250	-0.762	11.056	-0.414
	5 (50-79 ft)	8.390	-0.328	6.912	-1.022	10.251	0.272	9.055	-0.438
	6 (80-100 ft)	8.784	1.028	5.008	-3.734	11.950	0.797	8.525	-0.495
	Total	8.589	-0.930	7.833	-1.121	10.136	0.075	15.374	2.087
3 Sharp	1 (<20 ft)	6.297	-2.183	6.647	-2.151	8.633	-1.304	16.128	1.702
	2 (20-29 ft)	6.583	-1.087	6.467	-3.967	10.057	-1.004	14.254	1.050
	3 (30-39 ft)	6.089	-1.407	9.276	-2.908	11.582	-0.350	13.215	0.614
	4 (40-49 ft)	5.909	-1.120	7.608	-4.449	11.000	-0.166	11.593	0.048
	5 (50-79 ft)	5.304	-0.792	9.269	-2.177	13.193	2.196	10.044	1.434
	6 (80-100 ft)	4.964	-0.524	0.000	0.000	8.723	5.445	4.990	-3.095
	Total	6.389	-1.967	7.225	-2.707	9.419	-0.730	15.638	1.366
Total	1 (<20 ft)	7.843	-1.480	9.722	-0.724	9.742	-0.665	14.835	1.825
	2 (20-29 ft)	7.915	-1.267	10.188	-0.988	10.678	-1.381	13.225	0.743
	3 (30-39 ft)	9.006	0.101	10.993	0.044	11.140	-0.374	12.501	0.682
	4 (40-49 ft)	8.860	-0.013	10.304	0.074	10.532	-0.124	11.795	0.914
	5 (50-79 ft)	7.044	-0.117	10.668	1.494	11.079	0.970	9.004	0.431
	6 (80-100 ft)	7.789	0.041	8.939	-1.031	10.082	-0.627	8.624	-0.014
	Total	8.113	-1.034	10.329	-0.434	10.464	-0.443	14.211	1.216

5.11 Vertical Curvature and Vehicle Length

Table 26 and Table 27 present the relationship among vehicle length and hilliness (steepness of gradient or vertical curvature) as a function of roadway class. This interaction was one of the most puzzling in terms of comparisons. To some extent, that could be a result of the sample levels that made standard errors impossible to calculate for all but the flat, limited access roadways and moderately hilly major arterials. In terms of year-to-year variations, speeds on limited access highways were very similar to those presented for the horizontal curvature cases in Section 5.10 of this report. In 2009, speeds on limited access highways showed a general increase (i.e., 5 to 6 mph) over values from 2007. However, speeds for heavy and combination trucks decreased by over 20 mph along the steepest roadways, and there was a convergence for the long vehicle speeds on the flat roads, much like that

noted with the straight segments of Section 5.10. For moderate hills, speeds on major arterials deceased slightly, while speeds on minor arterials and collectors showed somewhat more steady variation for the various vehicle lengths on a year-to-year basis. Variations in speed by vehicle lengths were much less variable among classes for the major arterials on steep grades in 2009 when compared to 2007. Figure 20 provides a graphic view of the statistics from Table 26.

Table 26. Speed by Road Type, Length Class, and Vertical Curvature Class

			FCC ROAD CLASS							
			1 Limited access		2 Major arterial		3 Minor art/collector		Total	
			Speed		Speed		Speed		Speed	
			2009	**Change**	**2009**	**Change**	**2009**	**Change**	**2009**	**Change**
VER_CURVERD CLASS	**VEH_LENGTH**		Est. (SE)	Est. (SE)	Est. (SE)	Est. (SE)	Est. (SE)	Est. (SE)	Est. (SE)	Est. (SE)
1 Flat	1 (<20ft)	Mean	71.4 (1.3)	6.6 (1.0)	51.0 (0.9)	-1.4 (0.7)	45.2 (1.0)	-0.8 (0.5)	55.3 (1.6)	2.2 (1.1)
		Median	71.9 (1.4)	6.8 (1.3)	51.3 (0.9)	-1.4 (1.4)	44.5 (1.1)	-0.5 (0.6)	53.9 (2.0)	1.1 (1.2)
		Quantile (0.85)	78.8 (1.2)	4.8 (1.2)	60.8 (1.3)	-2.2 (0.5)	55.3 (1.4)	-1.6 (1.1)	73.0 (3.1)	5.4 (2.8)
		Quantile (0.95)	82.5 (1.1)	3.2 (1.0)	66.5 (1.3)	-2.6 (0.9)	62.1 (1.7)	-2.3 (1.2)	79.0 (1.8)	4.6 (1.7)
	2 (20-29 ft)	Mean	71.9 (0.9)	4.8 (0.7)	56.7 (1.5)	-1.8 (0.5)	50.7 (1.3)	-2.1 (0.5)	58.3 (1.2)	-2.0 (0.8)
		Median	72.7 (1.0)	5.3 (1.0)	57.0 (1.6)	-2.5 (0.5)	50.1 (1.6)	-3.8 (0.9)	58.0 (1.5)	-3.1 (1.1)
		Quantile (0.85)	78.9 (0.2)	2.4 (0.7)	67.1 (1.5)	-1.8 (1.1)	62.0 (1.8)	-2.5 (1.3)	74.0 (1.8)	1.2 (1.6)
		Quantile (0.95)	82.2 (0.5)	0.4 (0.7)	73.2 (1.4)	-1.9 (1.5)	69.4 (1.5)	-2.6 (1.3)	79.0 (0.0)	0.3 (0.8)
	3 (30-39 ft)	Mean	67.6 (1.0)	6.1 (0.9)	56.3 (1.3)	3.0 (0.9)	51.4 (1.1)	2.0 (0.5)	57.9 (1.0)	2.8 (0.5)
		Median	67.8 (0.8)	6.4 (1.0)	56.3 (1.4)	1.7 (1.4)	50.8 (1.6)	1.2 (1.3)	58.1 (1.3)	2.6 (1.0)
		Quantile (0.85)	75.9 (0.4)	5.5 (0.6)	67.6 (1.2)	3.8 (1.0)	62.7 (1.0)	1.6 (0.8)	71.6 (1.6)	4.7 (1.5)
		Quantile (0.95)	79.9 (0.6)	3.7 (0.8)	75.1 (0.9)	4.5 (0.6)	71.2 (1.1)	3.1 (1.7)	77.6 (1.5)	4.1 (1.6)
	4 (40-49 ft)	Mean	66.7 (0.9)	6.5 (0.7)	56.2 (1.0)	2.6 (0.8)	51.9 (1.4)	2.2 (0.4)	59.1 (1.1)	3.8 (0.8)
		Median	66.8 (1.0)	6.4 (0.8)	56.8 (1.2)	2.4 (0.6)	52.1 (1.8)	2.0 (1.2)	60.0 (1.1)	4.4 (1.1)
		Quantile (0.85)	74.5 (0.7)	5.6 (0.7)	66.1 (0.8)	2.6 (1.1)	62.1 (0.8)	2.0 (0.6)	71.2 (1.7)	5.2 (1.7)
		Quantile (0.95)	78.3 (0.6)	3.8 (0.8)	72.6 (1.0)	3.3 (1.8)	68.9 (0.8)	2.2 (1.3)	76.5 (1.6)	4.5 (1.4)
	5 (50-79 ft)	Mean	65.4 (1.4)	3.0 (0.4)	55.8 (1.5)	-0.3 (0.5)	52.5 (1.8)	-0.3 (0.8)	63.4 (1.4)	2.9 (0.4)
		Median	65.0 (2.0)	2.4 (1.6)	56.7 (1.5)	0.0 (0.3)	54.0 (2.2)	0.0 (0.5)	64.0 (1.8)	2.9 (1.4)
		Quantile (0.85)	71.6 (1.3)	2.3 (0.6)	65.8 (0.6)	1.3 (1.2)	62.9 (1.0)	0.0 (1.1)	71.0 (3.0)	2.6 (2.7)
		Quantile (0.95)	75.3 (0.9)	1.1 (0.3)	72.1 (0.7)	2.3 (1.5)	69.0 (0.9)	0.8 (1.3)	75.0 (1.5)	1.8 (1.3)
	6 (80-100 ft)	Mean	66.2 (1.7)	-0.4 (0.8)	58.5 (3.3)	-3.1 (3.2)	54.9 (2.0)	-1.2 (1.5)	65.0 (1.6)	-0.5 (0.8)
		Median	66.1 (1.5)	-0.4 (0.8)	59.5 (2.3)	-3.3 (1.6)	56.3 (1.1)	-0.2 (3.2)	66.0 (1.3)	0.1 (0.7)
		Quantile (0.85)	72.8 (1.9)	-1.4 (0.4)	66.6 (2.5)	-3.0 (5.8)	63.3 (1.2)	-3.0 (4.3)	72.9 (2.1)	-0.8 (1.1)
		Quantile (0.95)	76.7 (1.5)	-3.4 (1.5)	71.5 (2.3)	-3.6 (6.3)	69.1 (1.5)	-3.7 (2.4)	76.4 (1.6)	-3.2 (1.2)
	Total	Mean	70.6 (1.0)	5.8 (0.7)	53.3 (1.2)	-0.3 (0.5)	47.1 (1.2)	0.1 (0.4)	56.7 (1.5)	2.0 (0.8)
		Median	70.9 (1.2)	5.9 (1.2)	53.4 (1.3)	-0.7 (1.0)	46.4 (1.3)	0.4 (0.5)	56.4 (2.1)	1.2 (1.1)
		Quantile (0.85)	78.0 (2.1)	4.1 (2.0)	63.7 (1.6)	-0.7 (0.6)	57.8 (1.9)	-0.6 (0.8)	73.0 (1.8)	4.3 (1.5)
		Quantile (0.95)	81.9 (0.7)	2.5 (0.8)	70.1 (1.5)	-0.4 (1.2)	65.6 (1.7)	-0.4 (1.2)	79.0 (1.3)	3.8 (1.0)

Table 26. Speed by Road Type, Length Class, and Vertical Curvature Class (continued)

			FCC ROAD CLASS							
			1 Limited access		2 Major arterial		3 Minor art/collector		Total	
			Speed		Speed		Speed		Speed	
			2009	**Change**	**2009**	**Change**	**2009**	**Change**	**2009**	**Change**
VER_CURVERD CLASS	**VEH_LENGTH**		Est. (SE)	Est. (SE)	Est. (SE)	Est. (SE)	Est. (SE)	Est. (SE)	Est. (SE)	Est. (SE)
2 Moderate	1 (<20 ft)	Mean	66.8 (-)	4.0 (-)	51.5 (-)	-3.0 (-)	44.4 (3.2)	0.5 (1.5)	48.7 (3.5)	-1.6 (2.3)
		Median	65.8 (-)	3.3 (-)	51.5 (-)	-3.5 (-)	42.5 (3.3)	0.8 (1.5)	46.3 (4.7)	-4.0 (5.7)
		Quantile (0.85)	72.0 (-)	2.1 (-)	56.3 (-)	-2.9 (-)	56.1 (5.2)	0.2 (3.6)	63.9 (6.6)	-0.2 (2.0)
		Quantile (0.95)	75.9 (-)	1.6 (-)	60.3 (-)	-1.5 (-)	62.5 (3.8)	-0.2 (3.5)	70.0 (6.5)	-0.1 (1.0)
	2 (20-29 ft)	Mean	67.0 (-)	1.3 (-)	54.5 (-)	-3.7 (-)	51.7 (4.6)	-1.8 (1.8)	54.5 (3.1)	-3.0 (1.3)
		Median	66.1 (-)	0.6 (-)	53.8 (-)	-5.1 (-)	51.1 (6.3)	-4.1 (2.3)	55.0 (4.9)	-4.4 (2.7)
		Quantile (0.85)	72.0 (-)	-0.8 (-)	59.8 (-)	-3.0 (-)	63.9 (5.2)	-1.3 (1.3)	67.0 (2.8)	-1.4 (0.9)
		Quantile (0.95)	75.7 (-)	-3.2 (-)	65.2 (-)	-0.3 (-)	70.5 (5.0)	0.6 (1.0)	72.5 (2.5)	-1.2 (2.4)
	3 (30-39 ft)	Mean	65.6 (-)	4.1 (-)	52.0 (-)	-4.8 (-)	53.0 (5.3)	4.6 (1.4)	54.8 (3.0)	1.8 (2.2)
		Median	64.6 (-)	3.8 (-)	50.7 (-)	-6.5 (-)	53.3 (6.5)	5.0 (2.1)	55.8 (4.0)	0.9 (2.8)
		Quantile (0.85)	70.5 (-)	1.5 (-)	58.0 (-)	-2.8 (-)	65.0 (6.2)	3.4 (1.1)	66.9 (2.2)	2.0 (1.1)
		Quantile (0.95)	74.8 (-)	-0.5 (-)	64.3 (-)	2.0 (-)	73.4 (6.1)	6.9 (1.4)	73.6 (1.7)	3.6 (3.4)
	4 (40-49 ft)	Mean	65.3 (-)	4.8 (-)	50.7 (-)	-5.1 (-)	54.0 (6.6)	3.8 (1.1)	55.6 (3.0)	1.7 (2.0)
		Median	64.4 (-)	4.3 (-)	49.9 (-)	-6.3 (-)	55.3 (8.4)	5.2 (2.4)	57.0 (2.9)	0.9 (2.7)
		Quantile (0.85)	70.0 (-)	2.6 (-)	54.0 (-)	-5.7 (-)	64.9 (5.9)	1.6 (2.2)	67.0 (2.6)	2.9 (2.0)
		Quantile (0.95)	73.9 (-)	1.8 (-)	58.1 (-)	-3.9 (-)	72.2 (7.8)	6.0 (5.6)	72.5 (1.6)	3.5 (2.9)
	5 (50-79 ft)	Mean	62.9 (-)	4.2 (-)	51.5 (-)	-2.0 (-)	57.9 (8.9)	1.7 (1.4)	59.5 (1.8)	2.3 (1.1)
		Median	62.2 (-)	4.2 (-)	51.5 (-)	-2.5 (-)	60.4 (10.3)	1.3 (2.5)	61.4 (1.7)	2.9 (2.4)
		Quantile (0.85)	66.2 (-)	1.5 (-)	54.4 (-)	-5.5 (-)	67.2 (6.4)	2.8 (2.2)	66.9 (1.1)	2.4 (0.4)
		Quantile (0.95)	69.3 (-)	0.3 (-)	59.0 (-)	-1.3 (-)	71.8 (3.5)	4.4 (2.9)	70.8 (1.3)	2.6 (2.1)
	6 (80-100 ft)	Mean	64.2 (-)	3.3 (-)	-	-	58.8 (2.0)	-6.8 (10.0)	61.6 (2.8)	-1.3 (5.9)
		Median	63.4 (-)	2.7 (-)	-	-	63.4 (10.0)	-1.3 (9.3)	63.6 (0.4)	0.7 (2.6)
		Quantile (0.85)	68.3 (-)	2.6 (-)	-	-	69.9 (1.4)	0.3 (11.2)	69.9 (0.9)	1.0 (2.2)
		Quantile (0.95)	70.7 (-)	1.3 (-)	-	-	70.0 (2.4)	-1.4 (14.6)	70.4 (0.8)	-1.8 (3.3)
	Total	Mean	66.7 (-)	3.7 (-)	52.6 (-)	-2.4 (-)	46.9 (4.1)	1.1 (1.5)	50.7 (3.4)	-0.9 (2.2)
		Median	65.7 (-)	3.0 (-)	52.2 (-)	-3.2 (-)	44.8 (4.5)	1.3 (1.9)	49.8 (5.9)	-3.0 (4.7)
		Quantile (0.85)	71.8 (-)	1.4 (-)	57.8 (-)	-2.0 (-)	59.5 (5.3)	0.2 (3.4)	65.0 (4.6)	0.0 (0.8)
		Quantile (0.95)	75.7 (-)	0.6 (-)	62.6 (-)	-0.1 (-)	66.5 (4.7)	1.3 (1.8)	70.9 (4.0)	0.4 (1.3)

Table 26. Speed by Road Type, Length Class, and Vertical Curvature Class (continued)

			FCC ROAD CLASS							
			1 Limited access		2 Major arterial		3 Minor art/collector		Total	
			Speed		Speed		Speed		Speed	
			2009	**Change**	**2009**	**Change**	**2009**	**Change**	**2009**	**Change**
VER_CURVERD CLASS	**VEH_LENGTH**		Est. (SE)	Est. (SE)	Est. (SE)	Est. (SE)	Est. (SE)	Est. (SE)	Est. (SE)	Est. (SE)
3 Steep	1 (<20 ft)	Mean	69.0 (-)	8.6 (-)	53.5 (11.4)	-1.9 (2.4)	38.7 (2.6)	-2.5 (0.7)	42.5 (3.8)	-2.7 (1.0)
		Median	68.6 (-)	8.3 (-)	54.8 (11.6)	-0.4 (3.4)	38.4 (3.8)	-3.1 (1.5)	41.0 (2.9)	-2.0 (1.2)
		Quantile (0.85)	74.5 (-)	7.8 (-)	65.3 (15.5)	-5.1 (5.4)	46.2 (2.7)	-1.6 (1.3)	53.4 (9.6)	-2.9 (3.7)
		Quantile (0.95)	77.7 (-)	6.6 (-)	71.6 (17.6)	-7.1 (5.1)	50.3 (3.4)	-1.4 (1.5)	64.4 (12.0)	-4.6 (3.3)
	2 (20-29 ft)	Mean	69.0 (-)	4.7 (-)	58.3 (9.9)	-4.1 (3.4)	42.8 (3.0)	-1.0 (4.0)	48.5 (4.6)	-1.5 (2.0)
		Median	69.0 (-)	5.4 (-)	59.0 (10.5)	-3.7 (4.5)	43.0 (3.2)	-1.4 (7.6)	46.8 (3.0)	-1.7 (3.2)
		Quantile (0.85)	75.2 (-)	3.8 (-)	69.7 (12.9)	-6.2 (0.8)	50.9 (4.1)	-3.9 (1.4)	62.2 (9.8)	-3.0 (4.2)
		Quantile (0.95)	79.4 (-)	2.6 (-)	75.0 (13.9)	-8.5 (1.6)	55.8 (4.1)	-4.7 (1.6)	70.1 (11.3)	-5.7 (1.7)
	3 (30-39 ft)	Mean	65.2 (-)	5.6 (-)	59.7 (7.8)	10.0 (9.1)	42.1 (2.0)	2.6 (5.5)	52.1 (7.6)	7.3 (3.6)
		Median	66.1 (-)	7.5 (-)	59.9 (7.5)	17.0 (14.7)	41.4 (2.1)	3.9 (5.9)	53.8 (10.1)	12.8 (8.8)
		Quantile (0.85)	73.1 (-)	6.4 (-)	68.9 (7.9)	4.9 (12.8)	52.7 (3.0)	4.2 (6.9)	65.3 (7.7)	4.7 (5.7)
		Quantile (0.95)	76.2 (-)	-0.3 (-)	75.6 (10.1)	2.3 (15.5)	60.2 (3.3)	-0.6 (13.4)	72.9 (9.0)	2.9 (3.2)
	4 (40-49 ft)	Mean	65.5 (-)	8.4 (-)	59.3 (15.5)	6.9 (8.5)	38.3 (4.9)	-2.2 (0.5)	52.8 (12.3)	3.6 (5.5)
		Median	65.5 (-)	8.3 (-)	59.5 (15.9)	7.8 (9.7)	37.5 (7.4)	-2.5 (3.6)	56.1 (15.1)	11.0 (13.3)
		Quantile (0.85)	73.3 (-)	9.8 (-)	68.2 (19.6)	1.1 (3.4)	45.6 (4.9)	-1.8 (3.1)	65.7 (17.1)	0.6 (2.3)
		Quantile (0.95)	77.5 (-)	10.1 (-)	75.3 (24.4)	1.4 (1.0)	54.6 (10.9)	0.5 (7.6)	72.7 (9.7)	0.1 (8.4)
	5 (50-79 ft)	Mean	61.4 (-)	3.1 (-)	59.9 (14.1)	-0.8 (3.1)	36.0 (1.7)	-3.8 (1.7)	55.2 (13.8)	-2.7 (2.4)
		Median	62.8 (-)	4.4 (-)	60.7 (16.5)	0.8 (2.4)	32.8 (2.1)	-6.4 (1.3)	58.4 (16.8)	-0.4 (1.2)
		Quantile (0.85)	70.5 (-)	5.4 (-)	68.1 (15.7)	-5.1 (10.3)	46.2 (11.3)	-2.4 (8.8)	67.5 (14.8)	-5.5 (7.2)
		Quantile (0.95)	75.3 (-)	5.8 (-)	73.0 (17.7)	-4.2 (7.2)	53.0 (9.2)	0.1 (12.4)	72.3 (9.4)	-4.3 (6.9)
	6 (80-100 ft)	Mean	53.3 (-)	-9.8 (-)	58.1 (-)	-15.9 (-)	38.9 (6.4)	-1.6 (-)	49.8 (10.0)	-17.4 (10.6)
		Median	58.0 (-)	-7.1 (-)	50.1 (-)	-23.9 (-)	33.6 (4.5)	-6.8 (4.5)	45.5 (11.3)	-25.6 (23.8)
		Quantile (0.85)	67.2 (-)	-0.2 (-)	61.4 (-)	-12.6 (-)	41.0 (6.5)	0.5 (6.5)	65.0 (21.9)	-8.1 (7.8)
		Quantile (0.95)	72.8 (-)	4.0 (-)	64.6 (-)	-9.4 (-)	43.0 (8.2)	2.6 (8.2)	65.8 (19.9)	-7.9 (13.5)
	Total	Mean	68.6 (-)	7.6 (-)	55.6 (10.9)	-0.6 (2.9)	39.7 (2.7)	-1.7 (0.9)	44.5 (4.4)	-1.6 (0.8)
		Median	68.5 (-)	7.6 (-)	57.0 (11.8)	-0.3 (3.5)	39.5 (3.7)	-2.1 (1.7)	42.6 (3.1)	-0.9 (1.2)
		Quantile (0.85)	74.5 (-)	6.9 (-)	67.4 (14.2)	-4.4 (7.1)	47.6 (3.3)	-0.5 (1.3)	58.4 (10.3)	-0.9 (2.7)
		Quantile (0.95)	78.0 (-)	5.4 (-)	73.3 (14.6)	-5.6 (6.1)	52.6 (3.8)	-0.3 (1.0)	67.1 (12.0)	-3.9 (3.4)

Table 26. Speed by Road Type, Length Class, and Vertical Curvature Class (continued)

			FCC ROAD CLASS							
			1 Limited access		2 Major arterial		3 Minor art/collector		Total	
			Speed		Speed		Speed		Speed	
			2009	Change	2009	Change	2009	Change	2009	Change
VER_CURVERD CLASS	VEH_LENGTH		Est. (SE)	Est. (SE)	Est. (SE)	Est. (SE)	Est. (SE)	Est. (SE)	Est. (SE)	Est. (SE)
Total	1 (<20 ft)	Mean	71.3 (1.3)	6.6 (1.0)	51.1 (0.9)	-1.4 (0.7)	45.0 (1.0)	-0.8 (0.5)	54.9 (1.6)	2.1 (1.0)
		Median	71.9 (1.4)	6.8 (1.3)	51.3 (1.0)	-1.4 (1.4)	44.2 (1.2)	-0.5 (0.7)	53.4 (2.0)	0.7 (1.2)
		Quantile (0.85)	78.8 (1.3)	5.0 (1.2)	60.8 (1.2)	-2.2 (0.6)	55.2 (1.5)	-1.3 (1.1)	73.0 (2.2)	5.6 (2.0)
		Quantile (0.95)	82.4 (1.1)	3.4 (1.0)	66.5 (1.3)	-2.7 (1.0)	62.1 (1.7)	-2.2 (1.1)	79.0 (1.3)	4.8 (1.1)
	2 (20-29 ft)	Mean	71.8 (1.0)	4.7 (0.7)	56.7 (1.4)	-1.9 (0.5)	50.7 (1.4)	-2.1 (0.5)	58.1 (1.2)	-2.0 (0.8)
		Median	72.6 (1.2)	5.3 (1.1)	57.0 (1.6)	-2.6 (0.5)	50.1 (1.6)	-3.8 (0.9)	57.7 (1.4)	-3.3 (0.9)
		Quantile (0.85)	78.9 (0.2)	2.5 (0.8)	67.1 (1.5)	-1.9 (1.2)	62.0 (1.9)	-2.5 (1.1)	73.7 (1.7)	1.1 (1.5)
		Quantile (0.95)	82.2 (0.5)	0.4 (0.8)	73.2 (1.3)	-2.1 (1.4)	69.4 (1.5)	-2.5 (1.3)	79.0 (0.4)	0.4 (0.6)
	3 (30-39 ft)	Mean	67.6 (1.0)	6.1 (0.9)	56.3 (1.2)	3.1 (0.9)	51.4 (1.2)	2.2 (0.5)	57.7 (1.0)	2.8 (0.5)
		Median	67.7 (0.8)	6.3 (1.0)	56.3 (1.4)	1.8 (1.5)	50.8 (1.7)	1.5 (1.3)	58.0 (1.3)	2.5 (0.8)
		Quantile (0.85)	75.9 (0.3)	5.6 (0.6)	67.6 (1.2)	3.9 (1.0)	62.9 (1.1)	1.8 (0.9)	71.2 (1.3)	4.4 (1.3)
		Quantile (0.95)	79.9 (0.6)	3.7 (0.8)	75.0 (0.8)	4.5 (0.8)	71.3 (1.0)	3.2 (1.8)	77.3 (1.5)	4.0 (1.6)
	4 (40-49 ft)	Mean	66.7 (0.9)	6.5 (0.7)	56.2 (1.0)	2.6 (0.9)	51.9 (1.6)	2.3 (0.3)	59.0 (1.0)	3.8 (0.8)
		Median	66.7 (0.9)	6.4 (0.8)	56.8 (1.2)	2.4 (0.8)	52.1 (1.8)	2.1 (1.3)	60.0 (1.1)	4.4 (1.1)
		Quantile (0.85)	74.5 (0.7)	5.6 (0.6)	66.1 (0.8)	2.5 (1.1)	62.2 (1.0)	1.8 (0.8)	71.0 (1.1)	5.0 (1.2)
		Quantile (0.95)	78.3 (0.6)	3.9 (0.7)	72.6 (1.0)	3.0 (2.0)	69.1 (0.8)	2.4 (1.6)	76.0 (1.5)	4.1 (1.5)
	5 (50-79 ft)	Mean	65.4 (1.4)	3.0 (0.4)	55.8 (1.4)	-0.3 (0.5)	52.9 (2.2)	-0.2 (0.7)	63.3 (1.4)	2.9 (0.4)
		Median	64.9 (1.9)	2.5 (1.3)	56.8 (1.4)	-0.1 (0.3)	54.3 (2.6)	0.1 (0.6)	64.0 (1.6)	3.0 (1.1)
		Quantile (0.85)	71.6 (1.3)	2.3 (0.6)	65.9 (0.6)	1.2 (1.4)	63.6 (1.1)	0.5 (1.1)	71.0 (2.4)	2.7 (2.0)
		Quantile (0.95)	75.3 (0.9)	1.1 (0.3)	72.1 (0.7)	2.1 (1.8)	69.3 (0.6)	1.2 (1.1)	75.0 (0.9)	1.8 (0.9)
	6 (80-100 ft)	Mean	66.2 (1.7)	-0.4 (0.8)	58.5 (3.2)	-3.2 (3.3)	55.0 (2.2)	-2.2 (1.4)	64.9 (1.6)	-0.5 (0.8)
		Median	66.1 (1.5)	-0.4 (0.8)	59.5 (2.3)	-3.4 (1.7)	56.4 (1.2)	-2.1 (4.2)	66.0 (1.3)	0.2 (0.7)
		Quantile (0.85)	72.8 (2.0)	-1.4 (0.4)	66.6 (2.4)	-3.6 (5.9)	63.8 (0.6)	-4.7 (3.5)	72.9 (2.5)	-0.7 (1.3)
		Quantile (0.95)	76.7 (1.6)	-3.4 (1.6)	71.5 (2.8)	-3.5 (6.7)	70.0 (0.3)	-2.8 (2.7)	76.3 (1.6)	-3.2 (1.0)
	Total	Mean	70.5 (1.0)	5.8 (0.7)	53.3 (1.2)	-0.3 (0.6)	47.0 (1.2)	0.2 (0.4)	56.4 (1.5)	1.9 (0.7)
		Median	70.8 (0.8)	6.0 (0.8)	53.4 (1.3)	-0.7 (1.0)	46.1 (1.4)	0.3 (0.6)	56.0 (2.0)	1.0 (0.9)
		Quantile (0.85)	78.0 (1.6)	4.2 (1.4)	63.7 (1.5)	-0.8 (0.7)	57.8 (2.0)	-0.5 (0.7)	73.0 (1.6)	4.5 (1.2)
		Quantile (0.95)	81.8 (0.7)	2.6 (0.7)	70.1 (1.5)	-0.5 (1.3)	65.6 (1.7)	-0.4 (1.0)	79.0 (1.4)	3.9 (1.1)

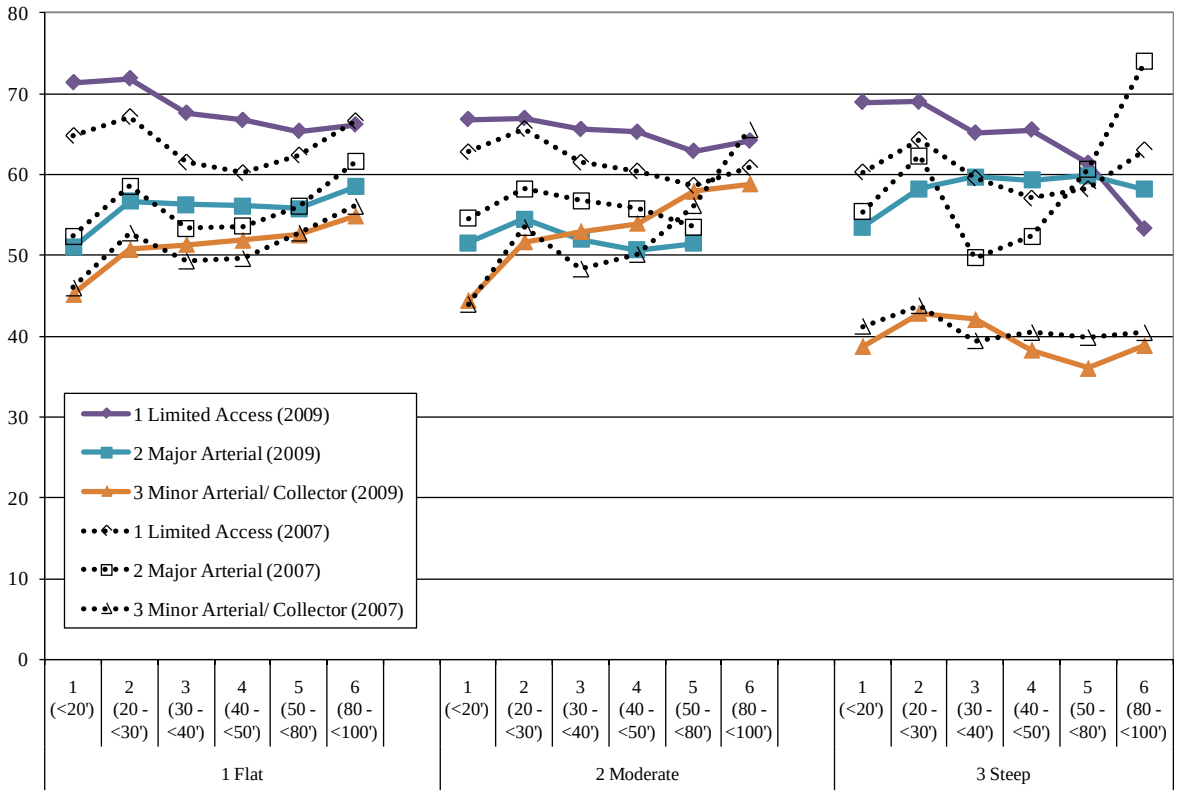

Figure 20. Speed by Road Type, Length Class, and Vertical Curvature Class (Free-Flow)

Table 27. Standard Deviations for Values Reported in Table 26

		FCC ROAD CLASS							
		1 Limited access		2 Major arterial		3 Minor art/collector		Total	
		Speed Value Std Dev		Speed Value Std Dev		Speed Value Std Dev		Speed Value Std Dev	
VER_CURVERD CLASS	**VEH_LENGTH**	**2009**	**Change**	**2009**	**Change**	**2009**	**Change**	**2009**	**Change**
1 Flat	1 (<20 ft)	7.856	-1.548	9.733	-0.705	9.735	-0.718	14.852	1.833
	2 (20-29 ft)	7.928	-1.297	10.226	-0.958	10.636	-1.425	13.245	0.789
	3 (30-39 ft)	9.045	0.101	11.016	0.087	11.046	-0.421	12.489	0.726
	4 (40-49 ft)	8.891	-0.037	10.314	0.163	10.416	-0.167	11.774	0.941
	5 (50-79 ft)	7.053	-0.109	10.686	1.585	10.953	0.860	8.978	0.432
	6 (80-100 ft)	7.803	0.054	8.947	-1.006	9.711	-1.051	8.588	-0.087
	Total	8.134	-1.070	10.355	-0.404	10.428	-0.497	14.205	1.219
2 Moderate	1 (<20 ft)	5.475	-1.488	5.349	0.398	9.897	-0.113	12.234	-0.141
	2 (20-29 ft)	5.375	-2.053	5.959	0.955	11.263	-0.445	11.471	-0.220
	3 (30-39 ft)	5.431	-1.982	7.149	2.737	12.176	0.361	11.955	-0.093
	4 (40-49 ft)	5.178	-1.404	4.151	-0.089	11.365	-0.073	11.134	0.134
	5 (50-79 ft)	4.101	-1.942	4.517	-0.899	10.821	1.356	9.268	0.970
	6 (80-100 ft)	3.889	-1.223	-	-	11.706	6.955	9.017	3.523
	Total	5.455	-1.680	5.794	0.690	11.022	0.008	12.325	-0.124
3 Steep	1 (<20 ft)	6.121	-0.460	12.033	-1.835	7.059	0.491	10.831	-0.341
	2 (20-29 ft)	7.861	0.785	10.837	-3.256	7.888	-2.421	11.781	-2.712
	3 (30-39 ft)	10.518	2.609	10.187	-2.501	9.874	0.179	13.367	0.880
	4 (40-49 ft)	9.318	2.156	10.472	-2.457	9.102	0.643	14.048	1.066
	5 (50-79 ft)	12.787	5.770	9.240	-2.540	9.800	1.823	13.414	0.068
	6 (80-100 ft)	19.511	12.174	8.061	8.061	5.225	5.225	11.977	-1.234
	Total	7.163	0.242	11.761	-2.218	7.541	0.406	11.666	-0.223
Total	1 (<20 ft)	7.843	-1.480	9.722	-0.724	9.742	-0.665	14.835	1.825
	2 (20-29 ft)	7.915	-1.267	10.188	-0.988	10.678	-1.381	13.225	0.743
	3 (30-39 ft)	9.006	0.101	10.993	0.044	11.140	-0.374	12.501	0.682
	4 (40-49 ft)	8.860	-0.013	10.304	0.074	10.532	-0.124	11.795	0.914
	5 (50-79 ft)	7.044	-0.117	10.668	1.494	11.079	0.970	9.004	0.431
	6 (80-100 ft)	7.789	0.041	8.939	-1.031	10.082	-0.627	8.624	-0.014
	Total	8.113	-1.034	10.329	-0.434	10.464	-0.443	14.211	1.216

5.12 Horizontal Curvature and Light Condition

Table 28 and Table 29 present the relationship between roadway curviness and light condition as a function of FCC roadway class. Here, as in 2007, the results show little impact from the light condition and relatively similar patterns based on horizontal curvature within each roadway class. The daylight means are slightly higher than nighttime means, but the difference is not statistically significant. Again, the year-to-year shift for limited access roadways of 5 to 6 mph indicated in the overall mean speed values can be seen here as well. Figure 21 provides a graphic view of the statistics from Table 28.

Table 28. Speed by Road Type, Horizontal Curvature Class, and Light Condition

			FCC ROAD CLASS							
			1 Limited access		2 Major arterial		3 Minor art/collector		Total	
			Speed		Speed		Speed		Speed	
			2009	**Change**	**2009**	**Change**	**2009**	**Change**	**2009**	**Change**
LIGHTCONDITION	**HOR_CURVERDCLASS**		Est. (SE)	Est. (SE)	Est. (SE)	Est. (SE)	Est. (SE)	Est. (SE)	Est. (SE)	Est. (SE)
1 Day (0600-2059)	1 Straight	Mean	71.2 (1.0)	6.0 (0.7)	53.1 (1.2)	-0.3 (0.6)	47.7 (1.3)	0.1 (0.3)	56.4 (1.6)	1.6 (0.8)
		Median	71.9 (1.3)	6.6 (1.4)	53.2 (1.3)	-0.8 (1.0)	46.9 (1.4)	0.3 (0.6)	55.5 (2.1)	0.5 (0.9)
		Quantile (0.85)	78.8 (0.8)	4.6 (1.0)	63.6 (1.5)	-0.7 (0.8)	58.4 (2.1)	-0.6 (0.5)	73.0 (1.6)	4.3 (1.4)
		Quantile (0.95)	82.4 (0.8)	2.7 (0.9)	70.2 (1.6)	-0.3 (1.6)	66.1 (1.8)	-0.5 (1.0)	79.0 (1.3)	3.7 (1.2)
	2 Moderate	Mean	69.3 (3.8)	8.4 (4.8)	58.7 (1.8)	-0.5 (1.8)	41.9 (1.8)	0.8 (1.4)	52.6 (3.2)	4.9 (3.0)
		Median	69.7 (4.5)	8.8 (5.1)	58.9 (2.1)	0.0 (2.1)	39.8 (1.8)	0.6 (1.6)	53.0 (4.9)	7.1 (4.3)
		Quantile (0.85)	77.0 (3.2)	6.7 (4.0)	65.9 (1.1)	-2.3 (3.6)	54.0 (3.2)	1.7 (2.3)	71.0 (5.9)	8.0 (5.9)
		Quantile (0.95)	80.5 (2.7)	4.3 (3.4)	71.2 (1.4)	-3.0 (3.4)	60.4 (2.4)	-0.1 (2.0)	77.0 (4.8)	6.7 (4.8)
	3 Sharp	Mean	69.0 (1.8)	4.7 (2.0)	58.5 (-)	-0.9 (-)	41.1 (1.9)	-1.0 (1.1)	53.3 (4.9)	0.8 (3.1)
		Median	68.4 (2.6)	4.3 (2.0)	58.3 (-)	-1.0 (-)	39.0 (1.3)	-0.7 (2.0)	55.0 (12.5)	0.3 (7.6)
		Quantile (0.85)	75.3 (1.8)	3.2 (3.6)	65.3 (-)	-3.7 (-)	52.6 (5.5)	-2.2 (2.2)	71.0 (3.7)	2.8 (4.9)
		Quantile (0.95)	78.6 (1.3)	0.6 (4.7)	70.0 (-)	-5.8 (-)	59.6 (4.5)	-1.4 (1.1)	76.8 (3.0)	2.8 (2.8)
	Total	Mean	71.0 (1.0)	6.0 (0.7)	53.4 (1.2)	-0.3 (0.6)	47.0 (1.3)	0.1 (0.4)	56.1 (1.5)	1.8 (0.8)
		Median	71.9 (2.0)	6.8 (1.9)	53.5 (1.3)	-0.8 (1.1)	46.1 (1.4)	0.3 (0.6)	55.4 (2.1)	0.7 (1.0)
		Quantile (0.85)	78.8 (1.2)	4.6 (1.0)	63.9 (1.4)	-0.7 (0.6)	57.8 (2.0)	-0.5 (0.7)	73.0 (1.6)	4.6 (1.3)
		Quantile (0.95)	82.1 (0.8)	2.7 (0.8)	70.3 (1.5)	-0.5 (1.3)	65.6 (1.7)	-0.4 (1.0)	79.0 (1.3)	3.9 (1.1)
2 Night (2100-0559)	1 Straight	Mean	69.1 (1.0)	5.1 (0.7)	52.4 (1.2)	-0.4 (0.6)	47.8 (1.1)	0.2 (0.3)	58.2 (1.5)	2.1 (0.7)
		Median	68.9 (1.1)	4.7 (0.8)	52.0 (1.4)	-0.7 (1.4)	47.0 (1.4)	0.4 (0.5)	59.0 (2.1)	2.0 (1.4)
		Quantile (0.85)	76.6 (0.8)	3.7 (0.6)	62.9 (1.9)	-0.6 (0.6)	58.3 (1.7)	-0.6 (0.6)	73.0 (1.4)	4.0 (1.2)
		Quantile (0.95)	80.6 (0.8)	2.4 (0.8)	69.8 (1.8)	-0.2 (1.4)	65.7 (1.4)	-0.7 (0.8)	78.0 (2.0)	2.8 (2.0)
	2 Moderate	Mean	67.6 (4.7)	8.0 (5.5)	57.0 (1.2)	-0.7 (2.1)	42.0 (1.8)	0.8 (1.0)	54.4 (4.2)	6.2 (3.9)
		Median	67.6 (5.5)	7.9 (5.8)	57.0 (1.7)	-0.1 (2.4)	40.4 (1.7)	0.8 (1.3)	55.3 (5.3)	8.2 (5.3)
		Quantile (0.85)	76.2 (4.7)	7.3 (4.8)	64.2 (1.3)	-1.8 (3.1)	53.4 (3.0)	1.7 (1.8)	72.0 (7.2)	9.5 (7.3)
		Quantile (0.95)	79.7 (3.9)	5.1 (4.0)	70.1 (1.4)	-1.8 (2.8)	59.5 (2.2)	0.3 (2.0)	78.0 (6.2)	8.4 (6.1)
	3 Sharp	Mean	67.4 (1.7)	4.9 (1.0)	55.9 (-)	-2.2 (-)	41.3 (1.4)	-0.6 (2.0)	57.9 (5.2)	2.9 (6.3)
		Median	66.3 (2.3)	4.1 (1.2)	56.3 (-)	-1.5 (-)	39.2 (1.5)	-0.3 (2.2)	62.0 (6.6)	4.3 (9.9)
		Quantile (0.85)	73.7 (2.0)	3.6 (2.0)	62.1 (-)	-8.0 (-)	52.6 (4.1)	-1.4 (3.4)	71.8 (1.9)	3.7 (7.6)
		Quantile (0.95)	77.6 (1.6)	2.5 (3.3)	67.1 (-)	-8.3 (-)	58.2 (2.9)	-1.8 (2.7)	76.8 (2.2)	3.8 (4.0)

Table 28. Speed by Road Type, Horizontal Curvature Class, and Light Condition (continued)

			FCC ROAD CLASS							
			1 Limited access		2 Major arterial		3 Minor art/collector		Total	
			Speed		Speed		Speed		Speed	
			2009	Change	2009	Change	2009	Change	2009	Change
LIGHTCONDITION	HOR_CURVERDCLASS		Est. (SE)	Est. (SE)	Est. (SE)	Est. (SE)	Est. (SE)	Est. (SE)	Est. (SE)	Est. (SE)
	Total	Mean	68.9 (1.0)	5.1 (0.7)	52.6 (1.2)	-0.4 (0.6)	47.1 (1.1)	0.3 (0.4)	58.0 (1.4)	2.3 (0.7)
		Median	68.9 (1.1)	5.0 (0.9)	52.3 (1.5)	-0.7 (1.3)	46.2 (1.3)	0.5 (0.6)	59.0 (2.0)	2.5 (1.2)
		Quantile (0.85)	76.5 (0.9)	3.8 (0.6)	63.0 (1.8)	-0.7 (0.6)	57.7 (1.7)	-0.5 (0.7)	73.0 (1.3)	4.2 (0.9)
		Quantile (0.95)	80.5 (0.8)	2.5 (0.7)	69.8 (1.7)	-0.3 (1.4)	65.2 (1.4)	-0.6 (0.5)	78.0 (1.1)	3.0 (1.2)
Total	1 Straight	Mean	70.7 (1.0)	5.8 (0.7)	53.0 (1.2)	-0.3 (0.5)	47.7 (1.3)	0.1 (0.3)	56.7 (1.6)	1.7 (0.7)
		Median	70.9 (1.7)	5.8 (1.6)	53.0 (1.3)	-0.9 (1.3)	46.9 (1.4)	0.3 (0.6)	56.1 (2.2)	0.7 (1.1)
		Quantile (0.85)	78.7 (1.6)	4.7 (1.4)	63.5 (1.6)	-0.7 (0.8)	58.4 (2.1)	-0.6 (0.5)	73.0 (1.6)	4.2 (1.3)
		Quantile (0.95)	82.0 (0.7)	2.7 (0.8)	70.1 (1.6)	-0.3 (1.4)	66.1 (1.7)	-0.5 (1.0)	79.0 (1.3)	3.7 (1.1)
	2 Moderate	Mean	68.9 (4.0)	8.3 (4.9)	58.5 (1.7)	-0.5 (1.8)	41.9 (1.8)	0.8 (1.3)	52.9 (3.4)	5.1 (3.1)
		Median	69.3 (4.7)	8.6 (5.1)	58.7 (2.1)	0.0 (2.4)	39.8 (1.7)	0.4 (1.5)	53.6 (5.0)	7.6 (4.4)
		Quantile (0.85)	76.9 (3.4)	6.6 (3.9)	65.7 (1.0)	-2.4 (3.6)	54.0 (3.2)	1.8 (2.3)	71.0 (6.0)	8.1 (6.1)
		Quantile (0.95)	80.3 (2.9)	4.7 (3.9)	70.8 (1.1)	-3.2 (3.6)	60.4 (2.4)	0.1 (2.0)	77.0 (5.1)	6.8 (5.0)
	3 Sharp	Mean	68.6 (1.8)	4.7 (2.1)	58.2 (-)	-1.0 (-)	41.1 (1.8)	-1.0 (1.2)	54.3 (5.0)	1.3 (3.7)
		Median	67.8 (2.6)	4.2 (2.1)	58.2 (-)	-1.1 (-)	39.0 (1.3)	-0.6 (1.9)	57.5 (11.9)	1.9 (7.8)
		Quantile (0.85)	74.9 (1.9)	2.9 (3.1)	65.1 (-)	-3.9 (-)	52.6 (5.2)	-1.8 (2.4)	72.0 (3.5)	3.8 (4.7)
		Quantile (0.95)	78.4 (1.3)	1.1 (4.8)	69.8 (-)	-5.9 (-)	59.5 (4.4)	-1.5 (1.7)	77.0 (2.9)	3.0 (3.0)
	Total	Mean	70.5 (1.0)	5.8 (0.7)	53.3 (1.2)	-0.3 (0.6)	47.0 (1.2)	0.2 (0.4)	56.4 (1.5)	1.9 (0.7)
		Median	70.8 (0.8)	6.0 (0.8)	53.4 (1.3)	-0.7 (1.0)	46.1 (1.4)	0.3 (0.6)	56.0 (2.0)	1.0 (0.9)
		Quantile (0.85)	78.0 (1.6)	4.2 (1.4)	63.7 (1.5)	-0.8 (0.7)	57.8 (2.0)	-0.5 (0.7)	73.0 (1.6)	4.5 (1.2)
		Quantile (0.95)	81.8 (0.7)	2.6 (0.7)	70.1 (1.5)	-0.5 (1.3)	65.6 (1.7)	-0.4 (1.0)	79.0 (1.4)	3.9 (1.1)

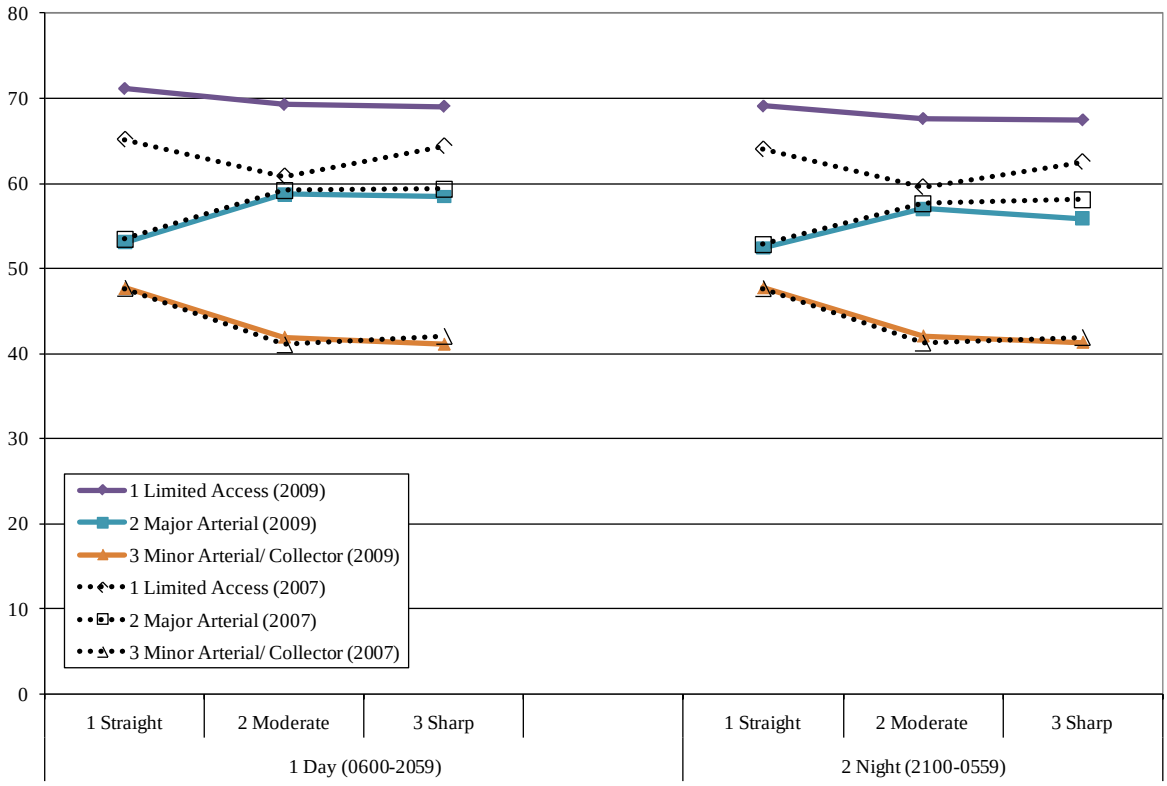

Figure 21. Speed by Road Type, Horizontal Curvature Class, and Light Condition (Free-Flow)

Table 29. Standard Deviations for Values Reported in Table 28

		FCC ROAD CLASS							
		1 Limited access		2 Major arterial		3 Minor art/collector		Total	
		Speed Value Std Dev		Speed Value Std Dev		Speed Value Std Dev		Speed Value Std Dev	
LIGHT CONDITION	**HOR_CURVERD CLASS**	**2009**	**Change**	**2009**	**Change**	**2009**	**Change**	**2009**	**Change**
1 Day (0600-2059)	1 Straight	8.181	-1.015	10.427	-0.433	10.348	-0.476	14.134	1.251
	2 Moderate	8.469	-1.014	7.809	-1.260	10.207	0.035	15.431	2.030
	3 Sharp	6.347	-2.173	7.179	-2.548	9.461	-0.719	15.797	1.275
	Total	8.168	-1.049	10.376	-0.477	10.489	-0.455	14.314	1.226
2 Night (2100-0559)	1 Straight	7.679	-1.168	10.103	-0.211	10.201	-0.421	13.429	1.106
	2 Moderate	8.898	-0.688	7.811	-0.334	9.697	0.246	14.986	2.292
	3 Sharp	6.343	-1.427	7.179	-4.349	9.175	-0.812	14.479	1.319
	Total	7.714	-1.145	10.048	-0.234	10.309	-0.388	13.604	1.093
Total	1 Straight	8.117	-1.010	10.380	-0.393	10.328	-0.466	14.030	1.239
	2 Moderate	8.589	-0.930	7.833	-1.121	10.136	0.075	15.374	2.087
	3 Sharp	6.389	-1.967	7.225	-2.707	9.419	-0.730	15.638	1.366
	Total	8.113	-1.034	10.329	-0.434	10.464	-0.443	14.211	1.216

5.13 Vertical Curvature and Light Condition

The impact of vertical curvature and light condition within roadway classes is shown in Table 30 and Table 31. Here, as in 2007, the results show little impact from the light condition and relatively similar patterns based on horizontal curvature within each roadway class. The light condition influences on mean speeds were extremely subtle. Patterns of variation in speeds by light and vertical curvature were relatively consistent across road types, with only minimal changes across light conditions for similar road type/vertical curvature pairings. While speeds on limited access highways were higher in 2009 for all vertical curvatures under both day and night conditions compared to 2007, it is notable that speeds associated with steep grades under night conditions for the limited access highway class were slightly slower compared to day conditions in 2009, while in 2007 speeds on steep grades for night and day conditions did not differ. Figure 22 provides a graphic view of the statistics from Table 30.

Table 30. Speed by Road Type, Vertical Curvature Class, and Light Condition

			FCC ROAD CLASS							
			1 Limited access		2 Major arterial		3 Minor art/collector		Total	
			Speed		Speed		Speed		Speed	
			2009	**Change**	**2009**	**Change**	**2009**	**Change**	**2009**	**Change**
LIGHTCONDITION	**VER_CURVERDCLASS**		Est. (SE)	Est. (SE)	Est. (SE)	Est. (SE)	Est. (SE)	Est. (SE)	Est. (SE)	Est. (SE)
1 Day (0600-2059)	1 Flat	Mean	71.0 (1.0)	6.0 (0.7)	53.4 (1.2)	-0.3 (0.6)	47.1 (1.2)	0.1 (0.4)	56.4 (1.5)	1.9 (0.8)
		Median	71.9 (1.6)	6.7 (1.5)	53.5 (1.3)	-0.7 (1.0)	46.4 (1.3)	0.4 (0.6)	55.8 (2.0)	0.9 (0.9)
		Quantile (0.85)	78.8 (1.1)	4.6 (1.0)	63.9 (1.5)	-0.7 (0.6)	57.8 (1.9)	-0.5 (0.8)	73.0 (1.9)	4.4 (1.5)
		Quantile (0.95)	82.2 (0.8)	2.6 (0.8)	70.3 (1.6)	-0.4 (1.2)	65.6 (1.7)	-0.5 (1.2)	79.0 (1.3)	3.7 (1.1)
	2 Moderate	Mean	67.1 (-)	3.8 (-)	52.7 (-)	-2.3 (-)	46.9 (4.1)	1.0 (1.4)	50.2 (3.4)	-0.9 (2.1)
		Median	66.2 (-)	3.2 (-)	52.2 (-)	-3.1 (-)	44.7 (4.5)	1.2 (1.9)	49.1 (5.8)	-2.7 (4.5)
		Quantile (0.85)	72.3 (-)	1.8 (-)	57.7 (-)	-2.0 (-)	59.5 (5.4)	0.2 (3.3)	64.5 (4.3)	0.0 (1.2)
		Quantile (0.95)	76.1 (-)	0.9 (-)	62.6 (-)	-0.1 (-)	66.5 (4.8)	1.3 (1.6)	70.9 (3.9)	0.5 (1.1)
	3 Steep	Mean	69.3 (-)	8.2 (-)	55.9 (10.8)	-0.5 (2.6)	39.5 (2.5)	-1.7 (1.1)	44.4 (4.6)	-1.5 (0.7)
		Median	69.1 (-)	8.2 (-)	57.5 (11.9)	-0.2 (3.0)	39.3 (3.4)	-2.2 (1.7)	42.3 (3.4)	-1.1 (1.4)
		Quantile (0.85)	74.9 (-)	7.3 (-)	67.6 (13.8)	-3.5 (6.2)	47.1 (2.9)	-0.8 (0.8)	58.4 (10.3)	-0.8 (2.5)
		Quantile (0.95)	78.3 (-)	6.2 (-)	73.3 (14.2)	-4.6 (4.6)	52.1 (3.4)	-0.7 (0.9)	67.4 (12.3)	-2.7 (2.8)
	Total	Mean	71.0 (1.0)	6.0 (0.7)	53.4 (1.2)	-0.3 (0.6)	47.0 (1.3)	0.1 (0.4)	56.1 (1.5)	1.8 (0.8)
		Median	71.9 (2.0)	6.8 (1.9)	53.5 (1.3)	-0.8 (1.1)	46.1 (1.4)	0.3 (0.6)	55.4 (2.1)	0.7 (1.0)
		Quantile (0.85)	78.8 (1.2)	4.6 (1.0)	63.9 (1.4)	-0.7 (0.6)	57.8 (2.0)	-0.5 (0.7)	73.0 (1.6)	4.6 (1.3)
		Quantile (0.95)	82.1 (0.8)	2.7 (0.8)	70.3 (1.5)	-0.5 (1.3)	65.6 (1.7)	-0.4 (1.0)	79.0 (1.3)	3.9 (1.1)
2 Night (2100-0559)	1 Flat	Mean	69.0 (1.0)	5.1 (0.7)	52.6 (1.2)	-0.4 (0.5)	47.2 (1.0)	0.2 (0.4)	58.2 (1.4)	2.4 (0.7)
		Median	68.9 (1.1)	4.9 (0.8)	52.3 (1.5)	-0.7 (1.2)	46.4 (1.2)	0.4 (0.6)	59.5 (2.2)	2.9 (1.2)
		Quantile (0.85)	76.5 (0.8)	3.8 (0.6)	63.0 (1.8)	-0.5 (0.6)	57.7 (1.6)	-0.5 (0.6)	73.0 (1.5)	4.1 (1.4)
		Quantile (0.95)	80.5 (0.7)	2.5 (0.9)	69.8 (1.8)	-0.1 (1.3)	65.2 (1.3)	-0.7 (0.7)	78.0 (2.5)	2.9 (2.2)
	2 Moderate	Mean	65.7 (-)	3.4 (-)	51.7 (-)	-3.4 (-)	47.1 (3.9)	1.4 (2.1)	53.1 (4.9)	-0.7 (2.4)
		Median	64.7 (-)	2.8 (-)	51.0 (-)	-4.9 (-)	45.4 (4.3)	2.1 (2.7)	53.7 (6.8)	-2.3 (4.5)
		Quantile (0.85)	70.6 (-)	0.9 (-)	58.0 (-)	-2.2 (-)	59.3 (5.4)	0.0 (4.4)	67.0 (7.0)	0.6 (2.3)
		Quantile (0.95)	74.6 (-)	0.2 (-)	62.6 (-)	-0.9 (-)	65.8 (5.2)	0.3 (3.3)	71.7 (4.8)	0.3 (1.1)
	3 Steep	Mean	65.0 (-)	4.3 (-)	54.5 (11.2)	-1.3 (4.4)	41.0 (4.0)	-1.8 (0.5)	45.3 (3.8)	-1.9 (1.7)
		Median	64.4 (-)	4.1 (-)	54.8 (11.5)	-0.3 (4.4)	40.5 (4.5)	-2.1 (1.5)	43.5 (2.4)	-0.5 (1.3)
		Quantile (0.85)	71.5 (-)	3.4 (-)	66.8 (15.2)	-6.2 (9.4)	48.6 (5.1)	-0.7 (1.6)	57.7 (9.3)	-1.8 (3.9)
		Quantile (0.95)	75.0 (-)	1.7 (-)	72.8 (15.6)	-6.7 (10.9)	54.0 (6.1)	-0.3 (2.4)	67.0 (11.4)	-5.0 (4.0)

Table 30. Speed by Road Type, Vertical Curvature Class, and Light Condition (continued)

			FCC ROAD CLASS							
			1 Limited access		2 Major arterial		3 Minor art/collector		Total	
			Speed		Speed		Speed		Speed	
			2009	**Change**	**2009**	**Change**	**2009**	**Change**	**2009**	**Change**
LIGHTCONDITION	**VER_CURVERDCLASS**		Est. (SE)	Est. (SE)	Est. (SE)	Est. (SE)	Est. (SE)	Est. (SE)	Est. (SE)	Est. (SE)
	Total	Mean	68.9 (1.0)	5.1 (0.7)	52.6 (1.2)	-0.4 (0.6)	47.1 (1.1)	0.3 (0.4)	58.0 (1.4)	2.3 (0.7)
		Median	68.9 (1.1)	5.0 (0.9)	52.3 (1.5)	-0.7 (1.3)	46.2 (1.3)	0.5 (0.6)	59.0 (2.0)	2.5 (1.2)
		Quantile (0.85)	76.5 (0.9)	3.8 (0.6)	63.0 (1.8)	-0.7 (0.6)	57.7 (1.7)	-0.5 (0.7)	73.0 (1.3)	4.2 (0.9)
		Quantile (0.95)	80.5 (0.8)	2.5 (0.7)	69.8 (1.7)	-0.3 (1.4)	65.2 (1.4)	-0.6 (0.5)	78.0 (1.1)	3.0 (1.2)
Total	1 Flat	Mean	70.6 (1.0)	5.8 (0.7)	53.3 (1.2)	-0.3 (0.5)	47.1 (1.2)	0.1 (0.4)	56.7 (1.5)	2.0 (0.8)
		Median	70.9 (1.2)	5.9 (1.2)	53.4 (1.3)	-0.7 (1.0)	46.4 (1.3)	0.4 (0.5)	56.4 (2.1)	1.2 (1.1)
		Quantile (0.85)	78.0 (2.1)	4.1 (2.0)	63.7 (1.6)	-0.7 (0.6)	57.8 (1.9)	-0.6 (0.8)	73.0 (1.8)	4.3 (1.5)
		Quantile (0.95)	81.9 (0.7)	2.5 (0.8)	70.1 (1.5)	-0.4 (1.2)	65.6 (1.7)	-0.4 (1.2)	79.0 (1.3)	3.8 (1.0)
	2 Moderate	Mean	66.7 (-)	3.7 (-)	52.6 (-)	-2.4 (-)	46.9 (4.1)	1.1 (1.5)	50.7 (3.4)	-0.9 (2.2)
		Median	65.7 (-)	3.0 (-)	52.2 (-)	-3.2 (-)	44.8 (4.5)	1.3 (1.9)	49.8 (5.9)	-3.0 (4.7)
		Quantile (0.85)	71.8 (-)	1.4 (-)	57.8 (-)	-2.0 (-)	59.5 (5.3)	0.2 (3.4)	65.0 (4.6)	0.0 (0.8)
		Quantile (0.95)	75.7 (-)	0.6 (-)	62.6 (-)	-0.1 (-)	66.5 (4.7)	1.3 (1.8)	70.9 (4.0)	0.4 (1.3)
	3 Steep	Mean	68.6 (-)	7.6 (-)	55.6 (10.9)	-0.6 (2.9)	39.7 (2.7)	-1.7 (0.9)	44.5 (4.4)	-1.6 (0.8)
		Median	68.5 (-)	7.6 (-)	57.0 (11.8)	-0.3 (3.5)	39.5 (3.7)	-2.1 (1.7)	42.6 (3.1)	-0.9 (1.2)
		Quantile (0.85)	74.5 (-)	6.9 (-)	67.4 (14.2)	-4.4 (7.1)	47.6 (3.3)	-0.5 (1.3)	58.4 (10.3)	-0.9 (2.7)
		Quantile (0.95)	78.0 (-)	5.4 (-)	73.3 (14.6)	-5.6 (6.1)	52.6 (3.8)	-0.3 (1.0)	67.1 (12.0)	-3.9 (3.4)
	Total	Mean	70.5 (1.0)	5.8 (0.7)	53.3 (1.2)	-0.3 (0.6)	47.0 (1.2)	0.2 (0.4)	56.4 (1.5)	1.9 (0.7)
		Median	70.8 (0.8)	6.0 (0.8)	53.4 (1.3)	-0.7 (1.0)	46.1 (1.4)	0.3 (0.6)	56.0 (2.0)	1.0 (0.9)
		Quantile (0.85)	78.0 (1.6)	4.2 (1.4)	63.7 (1.5)	-0.8 (0.7)	57.8 (2.0)	-0.5 (0.7)	73.0 (1.6)	4.5 (1.2)
		Quantile (0.95)	81.8 (0.7)	2.6 (0.7)	70.1 (1.5)	-0.5 (1.3)	65.6 (1.7)	-0.4 (1.0)	79.0 (1.4)	3.9 (1.1)

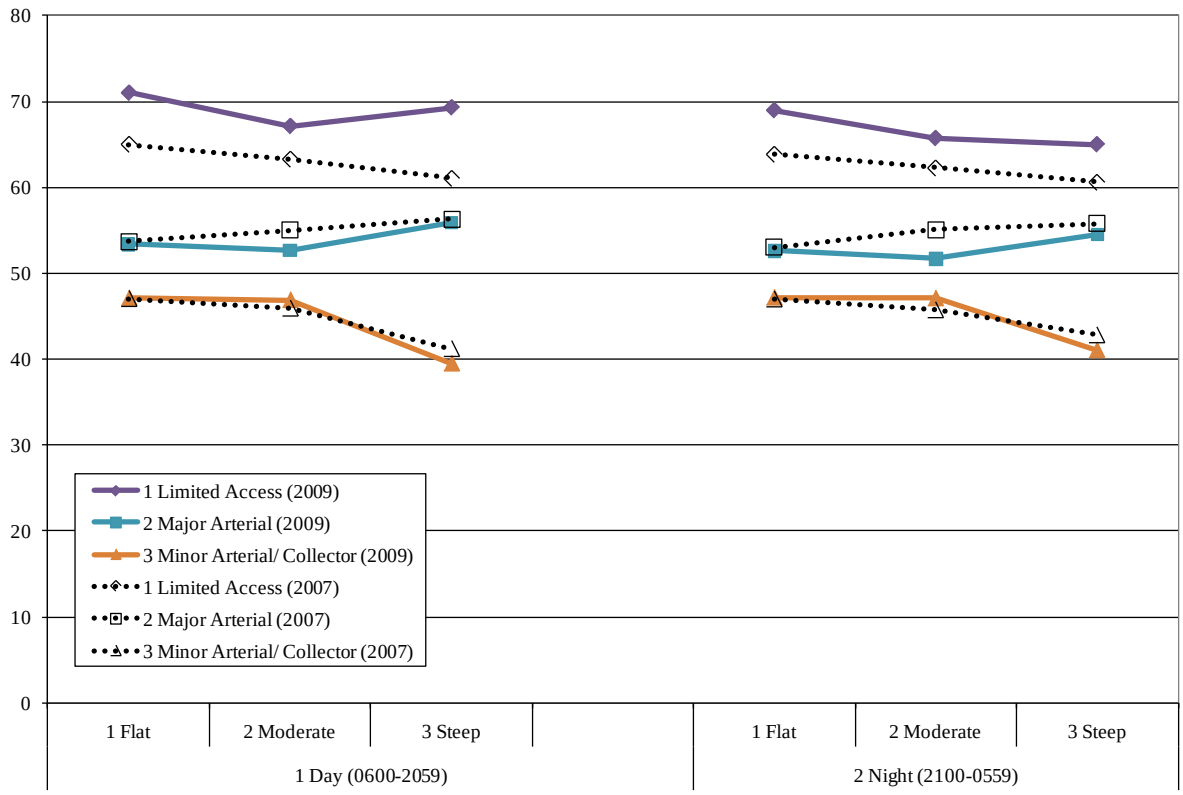

Figure 22. Speed by Road Type, Vertical Curvature Class, and Light Condition (Free-Flow)

Table 31. Standard Deviations for Values Reported in Table 30

		FCC ROAD CLASS							
		1 Limited access		2 Major arterial		3 Minor art/collector		Total	
		Speed Value Std Dev		Speed Value Std Dev		Speed Value Std Dev		Speed Value Std Dev	
LIGHT CONDITION	**VER_CURVERD CLASS**	**2009**	**Change**	**2009**	**Change**	**2009**	**Change**	**2009**	**Change**
1 Day (0600-2059)	1 Flat	8.188	-1.085	10.406	-0.455	10.449	-0.512	14.314	1.231
	2 Moderate	5.419	-1.636	5.724	0.687	11.081	0.056	12.230	-0.189
	3 Steep	7.030	0.293	11.828	-1.948	7.488	0.352	11.790	-0.092
	Total	8.168	-1.049	10.376	-0.477	10.489	-0.455	14.314	1.226
2 Night (2100-0559)	1 Flat	7.744	-1.178	10.053	-0.164	10.294	-0.423	13.577	1.086
	2 Moderate	5.408	-1.850	6.328	0.700	10.664	-0.285	12.501	0.170
	3 Steep	6.716	-0.863	11.373	-3.446	7.672	0.691	10.990	-0.875
	Total	7.714	-1.145	10.048	-0.234	10.309	-0.388	13.604	1.093
Total	1 Flat	8.134	-1.070	10.355	-0.404	10.428	-0.497	14.205	1.219
	2 Moderate	5.455	-1.680	5.794	0.690	11.022	0.008	12.325	-0.124
	3 Steep	7.163	0.242	11.761	-2.218	7.541	0.406	11.666	-0.223
	Total	8.113	-1.034	10.329	-0.434	10.464	-0.443	14.211	1.216

5.14 Vehicle Length and Light Condition

The influence of vehicle length and light condition on speed for a given roadway class is shown in Table 32 and Table 33. Year-to-year differences were again relatively minimal with the exception of slight speed increases of mid-length trucks and slight decreases for the shortest and longest vehicles. The year-to-year shift for speeds on the limited access roadways is evident here again, with the convergence of speeds for the longest vehicles. In 2007, the greatest difference between night and day speeds was associated with the longest vehicle class on major arterial roadways, where speeds at night are approximately 1 to 2 mph higher than daytime speeds. That effect disappeared in 2009 and actually moved in the opposite direction by about the same amount (i.e., 1 to 2 mph). Figure 23 provides a graphic view of the statistics from Table 32.

Table 32. Speed by Road Type, Length Class, and Light Condition

			FCC ROAD CLASS							
			1 Limited access		2 Major arterial		3 Minor art/collector		Total	
			Speed		Speed		Speed		Speed	
			2009	**Change**	**2009**	**Change**	**2009**	**Change**	**2009**	**Change**
LIGHTCONDITION	**VEH_LENGTH**		Est. (SE)	Est. (SE)	Est. (SE)	Est. (SE)	Est. (SE)	Est. (SE)	Est. (SE)	Est. (SE)
1 Day (0600-2059)	1 (<20 ft)	Mean	71.8 (1.3)	6.8 (1.0)	51.2 (0.9)	-1.4 (0.7)	45.0 (1.1)	-0.8 (0.5)	54.6 (1.6)	1.9 (1.1)
		Median	72.5 (1.8)	7.1 (1.6)	51.5 (0.8)	-1.5 (1.5)	44.2 (1.2)	-0.5 (0.7)	52.8 (1.9)	0.5 (1.2)
		Quantile (0.85)	78.9 (0.4)	4.8 (0.8)	61.0 (1.3)	-2.2 (0.6)	55.2 (1.5)	-1.5 (1.0)	73.0 (2.2)	5.6 (2.1)
		Quantile (0.95)	82.7 (1.1)	3.4 (1.0)	66.6 (1.3)	-2.7 (0.9)	62.1 (1.7)	-2.3 (1.1)	79.0 (1.5)	4.8 (1.4)
	2 (20-29 ft)	Mean	72.1 (1.0)	4.9 (0.7)	56.8 (1.4)	-1.7 (0.6)	50.6 (1.4)	-1.9 (0.6)	57.9 (1.2)	-1.8 (0.8)
		Median	72.8 (0.5)	5.3 (0.6)	57.1 (1.5)	-2.5 (0.5)	50.0 (1.7)	-3.6 (1.0)	57.5 (1.6)	-3.2 (1.0)
		Quantile (0.85)	78.9 (0.2)	2.3 (0.7)	67.1 (1.5)	-1.8 (1.2)	62.0 (1.9)	-2.4 (1.1)	73.4 (1.9)	0.9 (1.7)
		Quantile (0.95)	82.4 (0.5)	0.4 (0.6)	73.2 (1.3)	-2.0 (1.3)	69.5 (1.5)	-2.2 (1.4)	79.0 (0.4)	0.4 (0.5)
	3 (30-39 ft)	Mean	67.7 (1.1)	6.1 (0.9)	56.3 (1.3)	3.1 (0.9)	51.1 (1.3)	2.3 (0.5)	57.5 (1.1)	3.0 (0.5)
		Median	67.8 (1.0)	6.4 (1.2)	56.3 (1.4)	1.7 (1.4)	50.5 (1.8)	1.6 (1.2)	57.7 (1.2)	2.3 (0.9)
		Quantile (0.85)	76.1 (0.6)	5.5 (0.6)	67.6 (1.2)	3.9 (0.8)	62.7 (1.2)	1.9 (0.8)	71.2 (1.3)	4.8 (1.2)
		Quantile (0.95)	80.1 (0.7)	3.7 (1.0)	75.1 (0.9)	4.5 (0.8)	71.1 (1.3)	3.6 (1.7)	77.6 (1.5)	4.4 (1.5)
	4 (40-49 ft)	Mean	66.8 (1.0)	6.5 (0.9)	56.0 (1.0)	2.3 (0.9)	51.7 (1.6)	2.2 (0.4)	58.5 (1.1)	3.7 (0.9)
		Median	66.9 (1.2)	6.4 (1.1)	56.5 (1.2)	2.1 (0.7)	51.8 (1.9)	1.9 (1.1)	59.3 (1.2)	3.9 (1.2)
		Quantile (0.85)	74.7 (0.7)	5.7 (0.8)	65.9 (0.8)	2.2 (1.1)	62.1 (1.0)	1.9 (0.8)	71.0 (0.9)	5.3 (1.0)
		Quantile (0.95)	78.6 (0.5)	4.0 (0.8)	72.4 (0.9)	3.0 (2.0)	68.9 (0.9)	2.4 (1.6)	76.1 (1.7)	4.4 (1.6)
	5 (50-79 ft)	Mean	65.5 (1.5)	3.1 (0.5)	55.8 (1.4)	-0.2 (0.5)	52.7 (2.3)	-0.1 (0.7)	63.0 (1.5)	2.8 (0.4)
		Median	65.7 (2.0)	3.2 (1.1)	56.8 (1.4)	0.2 (0.4)	54.2 (2.6)	0.2 (0.7)	64.0 (1.6)	3.2 (1.1)
		Quantile (0.85)	71.8 (1.2)	2.5 (0.7)	66.0 (0.8)	1.4 (1.5)	63.5 (1.0)	0.4 (0.9)	71.9 (2.6)	3.7 (2.4)
		Quantile (0.95)	75.5 (0.8)	1.4 (0.3)	72.2 (0.6)	2.2 (1.4)	69.1 (0.7)	1.0 (1.2)	75.6 (1.8)	2.4 (1.5)
	6 (80-100 ft)	Mean	66.1 (1.9)	-0.7 (0.9)	59.1 (3.3)	-2.0 (3.2)	54.9 (2.7)	-2.1 (1.4)	64.7 (1.8)	-0.7 (0.9)
		Median	66.2 (1.6)	-0.2 (0.8)	59.6 (3.1)	-2.7 (2.0)	56.4 (2.2)	-2.2 (5.2)	66.0 (1.4)	0.1 (0.6)
		Quantile (0.85)	73.0 (1.9)	-1.3 (0.4)	66.8 (2.8)	-3.7 (5.6)	63.6 (1.9)	-5.1 (3.3)	72.9 (2.1)	-0.8 (1.2)
		Quantile (0.95)	77.0 (1.7)	-3.5 (1.6)	71.6 (3.3)	-3.2 (10.3)	69.9 (1.7)	-3.5 (4.8)	76.5 (1.8)	-3.6 (1.4)
	Total	Mean	71.0 (1.0)	6.0 (0.7)	53.4 (1.2)	-0.3 (0.6)	47.0 (1.3)	0.1 (0.4)	56.1 (1.5)	1.8 (0.8)
		Median	71.9 (2.0)	6.8 (1.9)	53.5 (1.3)	-0.8 (1.1)	46.1 (1.4)	0.3 (0.6)	55.4 (2.1)	0.7 (1.0)
		Quantile (0.85)	78.8 (1.2)	4.6 (1.0)	63.9 (1.4)	-0.7 (0.6)	57.8 (2.0)	-0.5 (0.7)	73.0 (1.6)	4.6 (1.3)
		Quantile (0.95)	82.1 (0.8)	2.7 (0.8)	70.3 (1.5)	-0.5 (1.3)	65.6 (1.7)	-0.4 (1.0)	79.0 (1.3)	3.9 (1.1)

Table 32. Speed by Road Type, Length Class, and Light Condition (continued)

			FCC ROAD CLASS							
			1 Limited access		2 Major arterial		3 Minor art/collector		Total	
			Speed		Speed		Speed		Speed	
			2009	**Change**	**2009**	**Change**	**2009**	**Change**	**2009**	**Change**
LIGHTCONDITION	**VEH_LENGTH**		Est. (SE)	Est. (SE)	Est. (SE)	Est. (SE)	Est. (SE)	Est. (SE)	Est. (SE)	Est. (SE)
2 Night (2100-0559)	1 (<20 ft)	Mean	69.6 (1.2)	6.0 (1.0)	50.4 (0.9)	-1.3 (0.8)	45.0 (0.9)	-0.6 (0.5)	56.5 (1.4)	2.8 (0.9)
		Median	69.6 (1.6)	5.7 (1.3)	50.3 (1.0)	-1.2 (1.6)	44.2 (1.0)	-0.4 (0.7)	56.3 (2.1)	2.5 (1.4)
		Quantile (0.85)	76.9 (1.2)	4.2 (0.9)	59.8 (1.6)	-2.2 (0.6)	55.0 (1.3)	-1.1 (1.0)	73.0 (1.5)	5.4 (1.4)
		Quantile (0.95)	81.0 (1.1)	3.2 (0.9)	65.8 (1.6)	-2.6 (1.0)	61.4 (1.4)	-2.5 (0.9)	78.0 (3.2)	4.0 (3.1)
	2 (20-29 ft)	Mean	70.7 (1.0)	4.1 (0.9)	56.1 (1.5)	-3.1 (0.5)	51.0 (1.2)	-3.4 (0.5)	59.2 (1.2)	-2.8 (1.0)
		Median	71.0 (2.5)	4.4 (2.3)	56.1 (1.7)	-3.5 (0.8)	50.5 (1.5)	-4.3 (0.7)	59.5 (1.5)	-3.1 (1.3)
		Quantile (0.85)	77.9 (0.4)	2.3 (0.8)	66.7 (1.7)	-2.3 (1.5)	62.1 (1.5)	-3.4 (1.0)	74.0 (1.4)	0.9 (1.4)
		Quantile (0.95)	81.4 (0.6)	0.5 (0.8)	73.0 (1.3)	-2.4 (2.0)	69.2 (1.1)	-3.2 (1.0)	79.0 (1.0)	0.1 (1.3)
	3 (30-39 ft)	Mean	67.0 (0.8)	5.6 (0.7)	56.5 (1.0)	3.0 (1.6)	53.1 (1.0)	1.4 (0.9)	59.2 (0.9)	1.8 (0.7)
		Median	67.0 (1.2)	5.6 (1.2)	56.1 (1.2)	2.1 (2.4)	52.6 (1.4)	-0.1 (1.8)	60.0 (0.3)	2.0 (0.9)
		Quantile (0.85)	74.4 (0.7)	4.6 (0.9)	67.8 (1.0)	4.0 (1.4)	64.7 (1.2)	0.7 (1.7)	71.3 (1.5)	3.2 (1.6)
		Quantile (0.95)	78.5 (0.5)	2.8 (1.1)	74.9 (0.6)	4.4 (1.5)	73.1 (1.6)	2.8 (2.4)	77.0 (0.0)	3.2 (1.2)
	4 (40-49 ft)	Mean	66.4 (0.7)	6.4 (0.5)	57.4 (0.8)	4.2 (0.9)	54.1 (1.4)	3.6 (0.8)	61.5 (0.8)	4.8 (0.6)
		Median	66.3 (1.5)	6.2 (1.0)	57.8 (1.0)	4.3 (1.5)	54.9 (1.8)	3.7 (1.7)	62.9 (1.2)	5.9 (0.9)
		Quantile (0.85)	73.4 (0.9)	4.9 (0.5)	67.2 (0.8)	3.9 (1.2)	65.1 (0.6)	3.2 (1.2)	71.9 (0.4)	5.1 (0.5)
		Quantile (0.95)	77.1 (0.6)	3.1 (0.6)	73.5 (1.4)	3.4 (1.8)	71.1 (0.9)	3.4 (2.3)	76.0 (1.0)	3.2 (1.1)
	5 (50-79 ft)	Mean	65.1 (1.3)	2.9 (0.4)	55.8 (1.4)	-1.0 (0.8)	53.8 (1.8)	-0.5 (0.7)	64.1 (1.3)	3.0 (0.4)
		Median	64.5 (0.9)	2.1 (0.6)	56.5 (1.3)	-1.0 (0.7)	54.8 (1.7)	-0.4 (0.8)	64.8 (2.0)	3.2 (1.6)
		Quantile (0.85)	71.0 (1.5)	2.0 (0.4)	65.2 (0.6)	0.3 (1.1)	64.2 (0.9)	0.2 (1.4)	71.0 (1.5)	2.5 (0.8)
		Quantile (0.95)	74.7 (1.1)	1.0 (0.5)	71.2 (0.7)	0.9 (2.8)	69.9 (0.4)	0.9 (1.1)	75.0 (1.2)	1.8 (0.6)
	6 (80-100 ft)	Mean	66.3 (1.4)	0.1 (0.8)	56.3 (3.0)	-7.0 (4.3)	55.5 (1.2)	-2.5 (2.8)	65.4 (1.3)	-0.1 (0.8)
		Median	65.8 (1.5)	-0.5 (0.9)	58.8 (1.1)	-4.2 (1.4)	55.3 (2.7)	-3.0 (3.3)	65.8 (1.2)	0.1 (0.6)
		Quantile (0.85)	72.2 (1.8)	-1.5 (1.3)	65.7 (2.3)	-1.9 (8.9)	64.9 (4.3)	1.0 (1.7)	71.9 (1.4)	-1.3 (1.4)
		Quantile (0.95)	76.2 (1.5)	-2.8 (1.5)	70.0 (3.4)	-5.2 (8.2)	73.6 (7.4)	3.9 (4.3)	76.0 (1.5)	-2.4 (1.3)
	Total	Mean	68.9 (1.0)	5.1 (0.7)	52.6 (1.2)	-0.4 (0.6)	47.1 (1.1)	0.3 (0.4)	58.0 (1.4)	2.3 (0.7)
		Median	68.9 (1.1)	5.0 (0.9)	52.3 (1.5)	-0.7 (1.3)	46.2 (1.3)	0.5 (0.6)	59.0 (2.0)	2.5 (1.2)
		Quantile (0.85)	76.5 (0.9)	3.8 (0.6)	63.0 (1.8)	-0.7 (0.6)	57.7 (1.7)	-0.5 (0.7)	73.0 (1.3)	4.2 (0.9)
		Quantile (0.95)	80.5 (0.8)	2.5 (0.7)	69.8 (1.7)	-0.3 (1.4)	65.2 (1.4)	-0.6 (0.5)	78.0 (1.1)	3.0 (1.2)

Table 32. Speed by Road Type, Length Class, and Light Condition (continued)

			FCC ROAD CLASS							
			1 Limited access		2 Major arterial		3 Minor art/collector		Total	
			Speed		Speed		Speed		Speed	
			2009	**Change**	**2009**	**Change**	**2009**	**Change**	**2009**	**Change**
LIGHTCONDITION	**VEH_LENGTH**		Est. (SE)	Est. (SE)	Est. (SE)	Est. (SE)	Est. (SE)	Est. (SE)	Est. (SE)	Est. (SE)
Total	1 (<20 ft)	Mean	71.3 (1.3)	6.6 (1.0)	51.1 (0.9)	-1.4 (0.7)	45.0 (1.0)	-0.8 (0.5)	54.9 (1.6)	2.1 (1.0)
		Median	71.9 (1.4)	6.8 (1.3)	51.3 (1.0)	-1.4 (1.4)	44.2 (1.2)	-0.5 (0.7)	53.4 (2.0)	0.7 (1.2)
		Quantile (0.85)	78.8 (1.3)	5.0 (1.2)	60.8 (1.2)	-2.2 (0.6)	55.2 (1.5)	-1.3 (1.1)	73.0 (2.2)	5.6 (2.0)
		Quantile (0.95)	82.4 (1.1)	3.4 (1.0)	66.5 (1.3)	-2.7 (1.0)	62.1 (1.7)	-2.2 (1.1)	79.0 (1.3)	4.8 (1.1)
	2 (20-29 ft)	Mean	71.8 (1.0)	4.7 (0.7)	56.7 (1.4)	-1.9 (0.5)	50.7 (1.4)	-2.1 (0.5)	58.1 (1.2)	-2.0 (0.8)
		Median	72.6 (1.2)	5.3 (1.1)	57.0 (1.6)	-2.6 (0.5)	50.1 (1.6)	-3.8 (0.9)	57.7 (1.4)	-3.3 (0.9)
		Quantile (0.85)	78.9 (0.2)	2.5 (0.8)	67.1 (1.5)	-1.9 (1.2)	62.0 (1.9)	-2.5 (1.1)	73.7 (1.7)	1.1 (1.5)
		Quantile (0.95)	82.2 (0.5)	0.4 (0.8)	73.2 (1.3)	-2.1 (1.4)	69.4 (1.5)	-2.5 (1.3)	79.0 (0.4)	0.4 (0.6)
	3 (30-39 ft)	Mean	67.6 (1.0)	6.1 (0.9)	56.3 (1.2)	3.1 (0.9)	51.4 (1.2)	2.2 (0.5)	57.7 (1.0)	2.8 (0.5)
		Median	67.7 (0.8)	6.3 (1.0)	56.3 (1.4)	1.8 (1.5)	50.8 (1.7)	1.5 (1.3)	58.0 (1.3)	2.5 (0.8)
		Quantile (0.85)	75.9 (0.3)	5.6 (0.6)	67.6 (1.2)	3.9 (1.0)	62.9 (1.1)	1.8 (0.9)	71.2 (1.3)	4.4 (1.3)
		Quantile (0.95)	79.9 (0.6)	3.7 (0.8)	75.0 (0.8)	4.5 (0.8)	71.3 (1.0)	3.2 (1.8)	77.3 (1.5)	4.0 (1.6)
	4 (40-49 ft)	Mean	66.7 (0.9)	6.5 (0.7)	56.2 (1.0)	2.6 (0.9)	51.9 (1.6)	2.3 (0.3)	59.0 (1.0)	3.8 (0.8)
		Median	66.7 (0.9)	6.4 (0.8)	56.8 (1.2)	2.4 (0.8)	52.1 (1.8)	2.1 (1.3)	60.0 (1.1)	4.4 (1.1)
		Quantile (0.85)	74.5 (0.7)	5.6 (0.6)	66.1 (0.8)	2.5 (1.1)	62.2 (1.0)	1.8 (0.8)	71.0 (1.1)	5.0 (1.2)
		Quantile (0.95)	78.3 (0.6)	3.9 (0.7)	72.6 (1.0)	3.0 (2.0)	69.1 (0.8)	2.4 (1.6)	76.0 (1.5)	4.1 (1.5)
	5 (50-79 ft)	Mean	65.4 (1.4)	3.0 (0.4)	55.8 (1.4)	-0.3 (0.5)	52.9 (2.2)	-0.2 (0.7)	63.3 (1.4)	2.9 (0.4)
		Median	64.9 (1.9)	2.5 (1.3)	56.8 (1.4)	-0.1 (0.3)	54.3 (2.6)	0.1 (0.6)	64.0 (1.6)	3.0 (1.1)
		Quantile (0.85)	71.6 (1.3)	2.3 (0.6)	65.9 (0.6)	1.2 (1.4)	63.6 (1.1)	0.5 (1.1)	71.0 (2.4)	2.7 (2.0)
		Quantile (0.95)	75.3 (0.9)	1.1 (0.3)	72.1 (0.7)	2.1 (1.8)	69.3 (0.6)	1.2 (1.1)	75.0 (0.9)	1.8 (0.9)
	6 (80-100 ft)	Mean	66.2 (1.7)	-0.4 (0.8)	58.5 (3.2)	-3.2 (3.3)	55.0 (2.2)	-2.2 (1.4)	64.9 (1.6)	-0.5 (0.8)
		Median	66.1 (1.5)	-0.4 (0.8)	59.5 (2.3)	-3.4 (1.7)	56.4 (1.2)	-2.1 (4.2)	66.0 (1.3)	0.2 (0.7)
		Quantile (0.85)	72.8 (2.0)	-1.4 (0.4)	66.6 (2.4)	-3.6 (5.9)	63.8 (0.6)	-4.7 (3.5)	72.9 (2.5)	-0.7 (1.3)
		Quantile (0.95)	76.7 (1.6)	-3.4 (1.6)	71.5 (2.8)	-3.5 (6.7)	70.0 (0.3)	-2.8 (2.7)	76.3 (1.6)	-3.2 (1.0)
	Total	Mean	70.5 (1.0)	5.8 (0.7)	53.3 (1.2)	-0.3 (0.6)	47.0 (1.2)	0.2 (0.4)	56.4 (1.5)	1.9 (0.7)
		Median	70.8 (0.8)	6.0 (0.8)	53.4 (1.3)	-0.7 (1.0)	46.1 (1.4)	0.3 (0.6)	56.0 (2.0)	1.0 (0.9)
		Quantile (0.85)	78.0 (1.6)	4.2 (1.4)	63.7 (1.5)	-0.8 (0.7)	57.8 (2.0)	-0.5 (0.7)	73.0 (1.6)	4.5 (1.2)
		Quantile (0.95)	81.8 (0.7)	2.6 (0.7)	70.1 (1.5)	-0.5 (1.3)	65.6 (1.7)	-0.4 (1.0)	79.0 (1.4)	3.9 (1.1)

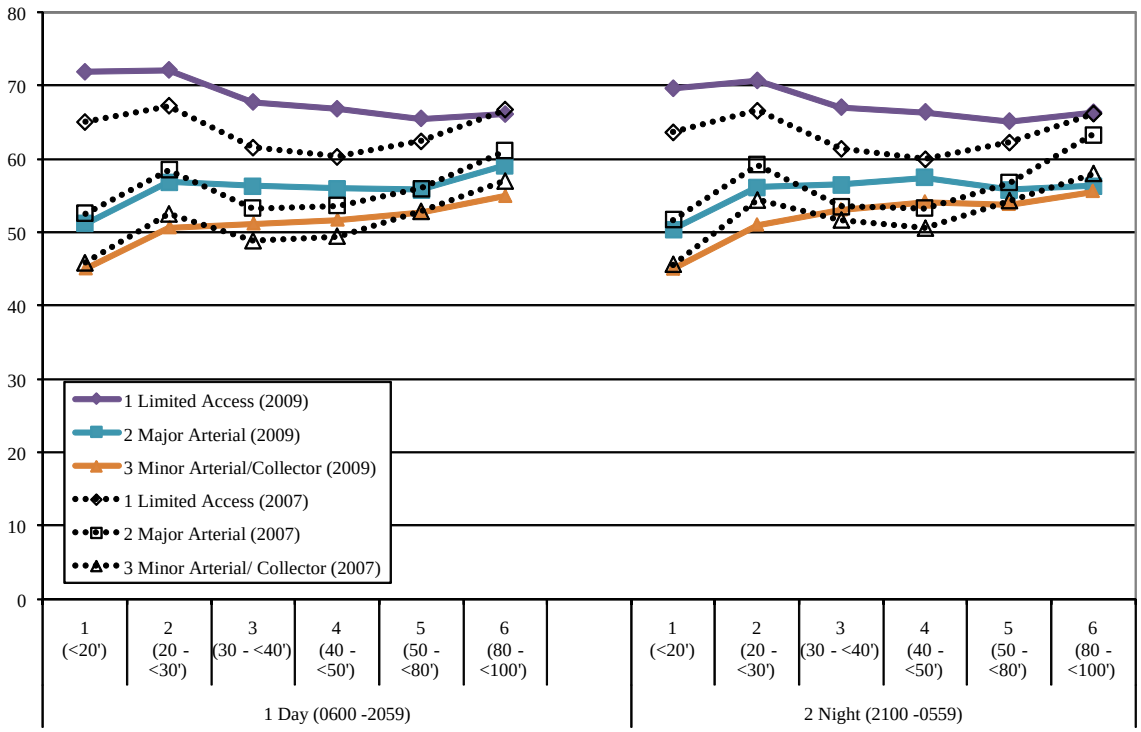

Figure 23. Speed by Road Type, Length Class, and Light Condition (Free-Flow)

Table 33. Standard Deviations for Values Reported in Table 32

		FCC ROAD CLASS							
		1 Limited access		2 Major arterial		3 Minor art/collector		Total	
		Speed Value Std Dev		Speed Value Std Dev		Speed Value Std Dev		Speed Value Std Dev	
LIGHT CONDITION	**VEH_LENGTH**	**2009**	**Change**	**2009**	**Change**	**2009**	**Change**	**2009**	**Change**
1 Day (0600-2059)	1 (<20 ft)	7.804	-1.542	9.796	-0.746	9.787	-0.666	14.915	1.841
	2 (20-29 ft)	7.946	-1.351	10.204	-1.114	10.701	-1.460	13.278	0.561
	3 (30-39 ft)	9.272	0.242	11.046	0.045	11.099	-0.347	12.631	0.685
	4 (40-49 ft)	9.165	0.265	10.336	0.107	10.484	-0.148	11.965	1.007
	5 (50-79 ft)	7.390	0.168	10.776	1.492	11.110	0.985	9.566	0.743
	6 (80-100 ft)	8.441	0.606	8.539	-2.560	9.885	-1.342	9.157	0.109
	Total	8.168	-1.049	10.376	-0.477	10.489	-0.455	14.314	1.226
2 Night (2100-0559)	1 (<20 ft)	7.729	-1.437	9.296	-0.629	9.470	-0.680	14.357	1.665
	2 (20-29 ft)	7.689	-1.080	10.079	-0.178	10.526	-0.711	12.882	1.747
	3 (30-39 ft)	7.639	-0.833	10.703	0.094	11.286	-0.436	11.625	0.797
	4 (40-49 ft)	7.552	-1.230	10.014	-0.219	10.704	-0.089	10.435	0.058
	5 (50-79 ft)	6.261	-0.761	10.110	1.381	10.825	0.889	7.404	-0.437
	6 (80-100 ft)	6.422	-1.130	9.939	4.266	10.839	2.504	7.421	-0.238
	Total	7.714	-1.145	10.048	-0.234	10.309	-0.388	13.604	1.093
Total	1 (<20 ft)	7.843	-1.480	9.722	-0.724	9.742	-0.665	14.835	1.825
	2 (20-29 ft)	7.915	-1.267	10.188	-0.988	10.678	-1.381	13.225	0.743
	3 (30-39 ft)	9.006	0.101	10.993	0.044	11.140	-0.374	12.501	0.682
	4 (40-49 ft)	8.860	-0.013	10.304	0.074	10.532	-0.124	11.795	0.914
	5 (50-79 ft)	7.044	-0.117	10.668	1.494	11.079	0.970	9.004	0.431
	6 (80-100 ft)	7.789	0.041	8.939	-1.031	10.082	-0.627	8.624	-0.014
	Total	8.113	-1.034	10.329	-0.434	10.464	-0.443	14.211	1.216

6. Conclusions

The following are the principal findings and conclusions from the 2009 wave of the National Travel Speed Survey and comparisons between the 2007 and 2009 data collections.

1. A total of 10,721,095 vehicle speeds were recorded in the 2009 survey wave. There were 5,705,044 constrained vehicles (within 5 seconds of the preceding vehicle), while 5,016,051 were free-flow vehicles. These numbers were similar to the 2007 survey, when a total of 10,062,747 vehicle speeds were recorded. 5,301,789 of the vehicles were recorded as free flow, and 4,760,958 were constrained.

2. For all flow conditions and vehicle types combined (free flow and constrained), there was little difference between 2007 and 2009 speeds measured on arterial roads and collector roads (less than 1 mph difference). However, mean and 85th-percentile speeds on limited access roads were approximately 4.5 mph higher in 2009 than 2007, and 95th percentile speeds on those roads in 2009 were approximately 2.4 mph higher.

3. The change was greater for free-flow vehicles. Mean speeds on limited access roads were approximately 5.8 mph higher in 2009 (70.5 mph) than 2007 (64.7 mph), but 85th-percentile speeds were just 4.2 mph higher; and 95th percentile speeds on those roads in 2009 were approximately 2.6 mph higher.

4. Standard deviation of free-flow traffic speed, a measure of the spread in the distribution of speeds, ranged from about 8 to 9 mph on freeways (14% of the mean) to 11 mph on minor arterials/collectors (23% of the mean). Compared to 2007, the standard deviations in 2009 are tighter, with the greatest reductions occurring on limited access roadways.

5. The increase in speeds for all traffic on freeways represents a 14-percentage-point increase in the proportion of vehicles on those roads exceeding the speed limit by more than 5 mph (now 44%) and a 4-percentage-point increase for vehicles exceeding the speed limit by more than 10 mph over the speed limit (now 19%). For free-flow vehicles, the proportion of vehicles traveling more than 5 mph over the speed limit was up 17 points (now 46%) and up 6 points (now 20%) for vehicles more than 10 mph over the limit.

6. Time of day had little influence on traffic speeds. The greatest variations in speeds appear to be on the smallest roads (minor arterial/collectors), though the means were not significantly different across time periods.

7. Period of light had little effect on travel speeds within each road condition. The differences are extremely small (i.e., 1 to 2 mph) between period of light conditions within each road type in 2009. This pattern is identical to that observed in 2007 where the changes were between 1 to 2 mph.

8. Unlike the 2007 data, 2009 speeds on major arterials were not nearly as disparate by day of week. In 2009, mean speeds differed by only 3 to 5 mph across day of week on arterials, collectors, and limited access roads. In 2007, mean speeds on major arterials had a much broader range, differing by 3 to 10 mph.

9. In 2007, speeds on moderately curved segments of all road segments were 4 to 6 mph slower than on straight segments, while speeds on sharply curved freeways, arterials, and collectors were higher than on moderately curved segments. In the 2009 data, limited access and minor arterial roadways speeds were 1 to 7 mph higher on straight roads when compared to moderate or sharp counterparts. On the other hand, speeds on major arterials were 5 to 6 mph lower for straight sections than for their curvier counterparts.

10. In 2009, speeds on urban roads were lower than on roads in more suburban or rural locations for all road types. Vehicles on limited access roads, major arterials and minor arterials/collectors in rural areas were 8 to 12 mph faster than on their counterparts in urban areas. This is slightly less pronounced than in 2007, where there was a 12 to 14 mph difference between speeds on urban and suburban and rural roads.

11. The greatest increases in speeds from 2007-2009 on freeways were for passenger cars/light trucks and medium-size trucks (up to 49 ft), where they increased by 5 to 7 mph. The 50- to

80-ft size class of big trucks also increased in speeds, but only around 3 mph. The biggest big trucks had little change in mean speed.

12. In 2009, there was an interaction among curvature (both horizontal and vertical), road class, and vehicle size. This interaction was not much different from that of 2007. In general, speeds decrease as curvature and gradient increase. While this is especially true for the largest trucks on minor arterials/collectors, the small sample size makes the speed estimates unreliable.

13. There was little influence of light condition on speed across combinations of vehicle size and road type. In 2007, the greatest difference between night and day speeds was associated with the largest trucks on major arterials, where speeds at night were about 1 to 2 mph higher than during daytime. This effect reversed in 2009, with daytime speeds about 1 to 2 mph higher than nighttime speeds.

14. The increase in speeds between 2007 & 2009 measurement waves may be due to some differences in traffic and timing of the study. In 2007, the field period extended from May through the first week or two in July due to long periods of bad weather. Many States have speed enforcement campaigns that commence with the *Click-It-or-Ticket* campaign that begins at the end of May each year. In 2009, data collection started in April and was completed by the end of May to meet the very tight project milestone schedule. Thus, special speed enforcement campaigns were probably not nearly as prevalent during 2009. Also, the economic conditions in 2008 and 2009 have been associated with much lower VMT in 2009 than in 2007 (as measured by various sources including FHWA's Highway Performance Monitoring System and the 2008-2009 National Household Travel Survey (USDOT, 2009)). Cumulative travel for 2009 changed by -.8% (FHWA, 2009). Thus, there may have been less congestion, resulting in higher speeds.

15. It is important to note that the sample design used in 2007 for selecting sites was less than optimal for estimating speeds. Because the design was a compromise to support both speed estimation and crash risk analysis, PSUs or sites within PSUs, were not selected in a way that minimized error variance. In this 2009 follow-on survey, the same 2007 sites were used to provide a direct longitudinal comparison to the 2007 data; however, a sample redesign should be considered for future waves to improve the speed estimates. The optimal design for general speed analysis is to have equal sampling rates and equal weights for every site. The over-sampling of crash sites resulted in a smaller sample of non-crash sites (assuming a fixed overall sample size) and differential weights between crash and non-crash sites, thereby increasing the variance for estimates that are not specific to crash sites.

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Appendices

Appendix A. Details of Sample Design Logic

The original purpose of the 2007 National Travel Speed Survey (NTSS) was two-fold. The first objective was to conduct a field survey to measure driving speeds for all types of motor vehicles on freeways, arterial highways, and collector roads across the United States and produce nationally representative estimates of traffic speeds. The second objective was to evaluate the statistical association between travel speeds and crash risk. These required a study design that supported access to detailed crash data, including pre-crash speeds, from a nationally representative sample of crashes with a well-defined sampling plan. The National Motor Vehicle Crash Causation Survey (NMVCCS) was conducted from January 1, 2005, to December 31, 2007. The data collected in NMVCCS survey was compiled into the NMVCCS database, which contains detailed information on 6,949 crashes. This survey provided a nationally representative sample of crashes and was therefore used as the basis for PSU selection. Unfortunately, the NMVCCS data set was not finalized and was unavailable in 2007 or 2009, and thus, analysis relating speed to crash incidence was impossible. Both the 2007 and the 2009 reports focus on the first objective. The following pages outline the logic behind the sampling design developed and used for the 2007 data collection and, in order to allow comparison between the two waves of data collection (2007 and 2009), were used in the 2009 NTSS.

The original 2007 sample design needed to accommodate and support a dual analytical requirement—to provide reliable national estimates of speeds and to determine the relationship between speeds and crashes. Considerable work was required to determine the analytical methodology. Basically, it involved a regression analysis to generate speed distributions for a set of roadway sites. The intent was to match crashes that were associated with a combination of variables with estimated speed distributions for roads having a similar combination of variables. If speed causes crashes, then the speed when crashes occur should be greater than the normal speed for matched roads. The logic behind the analytical approach is:

> *Let F_r and F_c represent the estimated speed distributions for the matched set of road segments from the regression model and from crashes, respectively. We wish to calculate the excess (or reduced) risk of driving above some speed value, V, by comparing the odds of a crash being above V to the odds of traffic being above V:*
>
> $$OR(V) = [1 - F_c(V)/F_c(V)]/[1 - F_r(V)/F_r(V)]$$
>
> *OR(V) will be greater than 1.0 or lower than 1.0 according to whether speeds above V increase or reduce the risk of crashes relative to speeds below V.*

One major problem with this approach is that crash and roadway data may not include all of the most important characteristics that affect speed and crashes. This analytical approach requires that "rare" road situations, such as roads with high horizontal and vertical curvature, have adequate representation in the sample.

At the most basic level, the national survey of speeds needs to support estimates of speeds for all characteristics of roads, road users, and geographic locations where speed differences would be of interest. The following characteristics are therefore of interest:

- **Region of the country:** The United States may be divided into geographic regions where geography, weather, and terrain may have a role in road speeds. Four regional classifications come to mind quickly.

1. There are currently 10 NHTSA regions that are useful for administering NHTSA programs and that also represent some differences in geography and weather. The NOPUS provides estimates of occupant restraint use for each of these regions.
2. The United States could be divided into six regions that represent a combination of geography, terrain, and weather patterns. They are: North East, South East, North Central, South Central, North West, and South West.
3. A more compact but somewhat less meaningful four-way regional division of the United States by geography would be North East, South East, North West and Middle/Central.
4. A simple three-way geographic division could be East, Central, and West. The four-way regional classification was selected for sample design.

- **Roadway type:** Several road taxonomies use engineering design features and the character of service they provide to classify roads. The two most applicable are:

1. FHWA Functional Classification System: Roads are divided into ***urban***, ***small urban,*** and ***rural*** areas and ***Arterial, Collector*** and ***Local*** road types. The classifications are:

    - Rural
        - Principal Arterial
            - Interstate
            - Other Principal Arterials
        - Collectors
            - Major Collector Roads
            - Minor Collector Roads
        - Local Roads
    - Urban and Small Urban
        - Principal Arterials
            - Interstate
            - Other Freeways and Expressways
            - Other Principal Arterials (no access control)
        - Minor Arterials
        - Collectors
        - Local streets

2. GIS Feature Class Code system: Various geographic information system (GIS) databases (e.g., TANA/GDT[3]) provide detailed roadway network data organized by feature class codes (FCC). The FCCs of interest for a national speed study include:

   - A10-Primary interstate highway, major category
   - A20-Primary U.S. and State highways, major category
   - A30-Secondary State and county highways, major category
   - A40-Local, neighborhood, rural road, city street, major category

   The GIS FCC classification was chosen for the sample design.

Crash characteristics were also a necessary component of the sample design to support association between speeds and crashes. Crash characteristics were to be obtained from NMVCCS cases that had occurred in each PSU because that crash sample included estimates of pre-crash speeds as part of its data collection procedures. The annual documentation of crashes that National Automotive Sampling System (NASS) teams conduct in each PSU was to have been obtained from participating jurisdictions, as well. Sample selection would therefore have needed to account for the following crash characteristics:

- Speed related or not speed related
- Horizontal and vertical curvature
- Intersection or non-intersection
- Road design features (presence of shoulders, clear roadside area, ditches, and obstacles, such as poles, trees, culvert, etc.)
- Lighted or unlighted
- Others

Ultimately, this effort featured a three-stage sample design. In the first stage of sampling, primary sampling units were selected. Next, sites for documentation in Phase I of the field work were sampled. Finally, a subsample of eligible sites was selected for speed data collection in Phase II of the field work.

Population: The population consisted of all motor vehicles on all minor and major arterial road segments and collectors, including limited access roads, but excluding local residential streets.

[3] 2005 Tele Atlas North America, Inc. /Geographic Data Technology Inc.

Sample PSUs: The set of sample PSUs for this survey was nearly all of those selected for the NMVCCS by NHTSA. A PSU is defined as a central city, the part of a county surrounding a central city, an entire county, or a group of contiguous counties. The NMVCCS sample was selected as a subsample of the NASS General Estimates System (GES). The GES sample selection is documented in NHTSA (1991). There are 60 sample PSUs in GES and 24 sample PSUs in NMVCCS. NMVCCS PSUs were used because there is detailed information on crash cause in NMVCCS sample PSUs. A second advantage in using NMVCCS PSUs was a substantial savings in time and cost over a completely independent sample of PSUs, for which analyzing road segment characteristics and obtaining data on crashes would be extremely difficult.

Unfortunately, the NMVCCS data set was not finalized and available before this project concluded. Thus, analysis relating speed to crash incidence was impossible.

The probability of selection for a NMVCCS PSU is roughly proportional to the estimated number of highway crashes with injuries as reported to police in 1983. We concluded that an ideal measure of size for a PSU for this effort was a function of several variables: number of crashes, population of the PSU, and, most important, the number of arterial and limited access highway miles. Miles were most important because the second stage of sampling involved selection of sites along the PSU roads (excluding local roads). Crashes were also important because the survey was particularly interested in the relationship between crashes and speed. A PSU with a relatively high ratio of population to road miles would be likely to have a higher rate of crashes because of more congested roads, which would make population/miles another indicator of crashes.

The correlation between the NMVCCS PSU probabilities of selection, based on a measure of size of 1983 crashes, and the ideal probability of selection, based on a measure of size using miles, population, and current crashes, is only moderate. A PSU with a relatively high number of miles of non-local roads but relatively low 1983 fatal and injury crashes would have large weights for collected data so long as the number of sample sites was the same in each sample PSU, causing some extreme variations in weights across PSUs. Westat alleviated this problem in two ways: sub-sampling of a few PSUs and varying the number of sites per PSU. We determined the ideal number of sample sites per PSU such that this number would be proportional to the ratio of a measure of size using miles, population, and crashes to the NMVCCS PSU measure of size. In doing this, we obtained a highly variable number of desired sites for different PSUs (in terms of the target sample size for Phase I). The PSU with the smallest number of desired sample sites was not included in TSS, resulting in a negligible amount of undercoverage. We selected two of the five PSUs with the next smallest desired number of sample sites with probability proportional to the desired sample size. The three non-selected PSUs were excluded from the sample, with the sample size in the two selected PSUs increased to account for the full set of five PSUs. Thus, this effort was conducted in 20 of the 24 NMVCCS sample PSUs.

Selection of sites for Phase I: Variables related to crashes include road curvature, gradient, super elevation, traffic volume, at or not at intersection, type of road, and weather conditions. The analytical procedure used for this effort required oversampling to ensure that an adequate number of “rare” situations, e.g., highly curved roads, would be represented in the final dataset.

The sample design was conducted in two stages. In this inaugural wave of the survey, it was unknown which segments were gradient/curves in each PSU, consequently more segments than needed were sampled during the Phase I site documentation. In that phase, senior field staff visited each sampled segment, determined whether a Hi-Star could be placed at a site, classified it in terms of gradient and horizontal curvature, and marked the beginning of the segment so that it could be easily located in Phase II data collection if the site was drawn for speed data collection. At the same time, the staff member's GPS-equipped computer precisely tracked and recorded the person's geographic position and elevation as he/she drove through each segment.

Roadways were put into one of three classifications. An "intersection site" consisted of the part of each road that was within 150 feet of an intersection. If there were two or more intersections that were within 150 feet of each other, they constituted a single intersection site. Each "mid-block" length of road outside of intersections was divided into one or more segments such that no segment was more than 500 feet long. A "crash site" consisted of a portion of a road or roads where there was an NMVCCS-reported crash that did not occur within an intersection site. All other "mid-block" sites were classified as "non-crash site."

Intersection speeds and crashes are problematic, in that speed is likely to be buried among many other causal factors in intersection crashes, and the problem of where to measure speed is greater than for non-intersections. Thus, only a small pilot study of intersections was conducted for the present survey. Two intersection sites were selected in each sample PSU for experimental purposes. The plan was to have approximately one-third of the remaining sample sites in a PSU be crash sites and two-thirds non-crash sites. The sample size for non-intersections was set according to what would yield approximately equal weights across PSUs. However, a somewhat smaller target sample size was used for PSUs with very large desired sample sizes, and somewhat larger target sample sizes were used for PSUs with very small desired sample sizes. This was done to avoid field staff being in a sample PSU for an inordinately long period of time or an extremely short period of time. In general, all crash sites where there was information from the police report that speed or aggressive driving was a factor in the reported crash(es) were included in the sample. A sample of other crash sites was selected to obtain the pre-determined number of sample crash sites in each PSU. For every PSU, at least one crash site that was not related to speed/aggressive driver crashes was selected. Crash sites within a PSU were each selected with equal probability, while non-crash sites were selected with probability proportional to length.

Selection of sites for Phase II: The curvature/gradient data collected in Phase I were used to classify a non-crash site as curvy/high gradient (CG) site, or non-curvy/low gradient (non-CG) site. CG sites were those that were at or above a certain threshold for curvature or/and were at or above a certain threshold for gradient. Non-CG sites were those that did not meet the threshold level for curvature or gradient.

CG threshold levels were defined based on ITE's Traffic Engineering Handbook (1992). Although the handbook includes a variety of factors such as urbanicity, functional classification code (FCC) and speed in its curvature thresholds, those levels of stratification were simplified for this definition. Instead an approximation that fit the typical posted speeds of the sample, FCC's, and middle ground between rural and urban situations was chosen for the CG levels. In this case, horizontal curvature was termed as "straight" for tangent heading changes of less than 5% and "sharp" for those exceeding 10%. Sites with levels falling between these values were termed "moderate". Likewise, gradients of less than 5% were defined as "flat" and more than 8% were deemed "steep" with "moderate" used to classify the

rest of the sites. These measures were based on a measure of heading or altitude changes within a quarter mile of the site along the sample road.

Sites for which field staff concluded a Hi-Star could not be placed were considered non-responding sites. All other crash sites and CG sites were included in the Phase II sample. Non-CG sites were subsampled to obtain the pre-determined total sample size for a given PSU.

The Site Selection and Documentation Process

There were two defined phases of the field data collection process for the 2007 effort. Phase I involved identifying and documenting sites that were adequate for inclusion in the speed data collection conducted in Phase II of the 2007 effort. Since the same sites were reused in 2009, only the data collection phase at those previously selected sites was performed in 2009. Since this selection and documentation phase may be of interest to some readers, this description of that process is provided here. The site documentation visits were used to evaluate each site's suitability in terms of traffic volume, surface type, location, road curvature, gradient, super elevation, drainage, and ability to safely deploy and retrieve data collection equipment. The second phase (in 2007) involved actually measuring the speeds along the selected roadways. Readers are invited to read that earlier report for specifics on that part of the process or refer to Section 3.1 of this report for the description of the 2009 data collection effort along with any contrasts made between the two efforts.

Phase I—Site Documentation

A substantial oversample of sites was selected in each PSU, with the intent of obtaining data at all high curvature and high gradient sites but obtaining data only from a subsample of other sites. Data also could not be collected from sites where it was technically infeasible to place Hi-Stars at the site. Data collection is described in Section 3.1.

Recruitment and Training

Recruiting site documenters was completed by drawing from a pool of field data collectors with proven skills necessary for completing the effort. Site documenters needed to show proficiency in computer skills, reliability, and some potential for or past experience in management of data collection exercises in the field. This was important since they would ultimately serve as field supervisors for the speed data collection phase of the 2007 effort.

Training took place in two parts; the first involved a 2-day classroom tutorial, and the second took place on location at one of two PSUs assigned to each site documenter. The classroom training included training on navigating to and surveying the sites, using the site documentation software to accurately record pertinent information regarding each site, proper field techniques, data transmission, and proper safety procedures for working on the side of the road. Trainers were TSS staff members with experience in conducting transportation field studies and using the site documentation equipment and software.

Project trainers then traveled with site documenters to one of their assigned PSUs to complete the field training. Trainers and site documenters visited several of the proposed data collection sites in the PSU and worked together to document the sites and confirm the ability of the site documenter to work independently to gather information from the remaining sites. Once the trainers consistently observed

that the site documenter's work was proficient, site documenters were given full responsibility to complete the documentation effort for the remaining sites in their remaining PSUs on their own and transmit the information electronically to Westat's home office.

Instrumentation

Each site documenter was assigned a laptop with a connected GPS, a digital camera, a safety vest, and a hard hat. A custom software application supported course navigation to each candidate site and then prompted documenters through each site to collect each of the needed data items for determining the site's feasibility (see Figure A-1). The GPS program provided directions to each of the sites and collected horizontal and vertical roadway curvature data when driving through the site. A second program enabled site documenters to record information regarding roadway design and geometry for each site. The digital camera was used to snap several photos of each site. Photos provided first-hand views of the roadway and assisted in determining whether the site was appropriate for inclusion in the study. These photos also afforded the site documenters the opportunity to clearly identify any roadway characteristics that might lead to rejecting the site for speed data collection later in Phase II of the 2007 effort or for gaining insight into data collection issues during the 2009 data collection exercise.

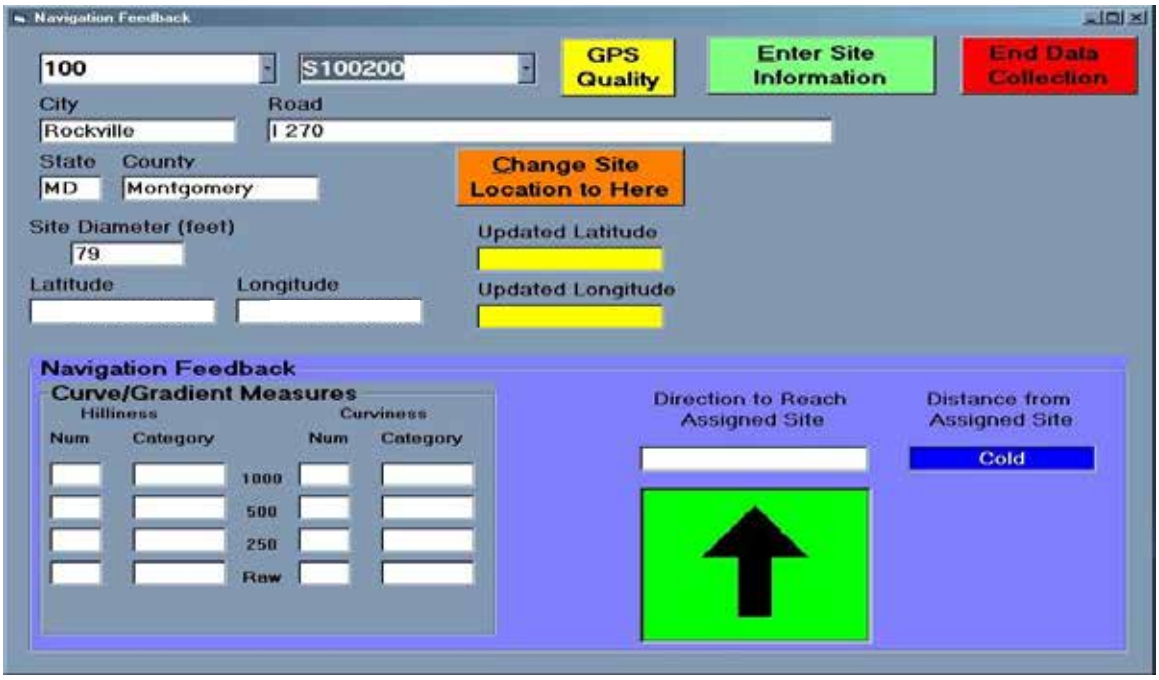


Figure A-1. Non-Intersection Site Navigation Interface

Site Characterization

Documenters were instructed to enter the candidate road segment at least ¼-mile in advance of the site. As they drove to within that ¼-mile radius, the PC with its GPS receiver collected curvature/elevation gradient data approximately every 100 feet, providing latitude and longitude as well as altitude data, while the documenter drove past the site. Audible feedback was provided by the PC each time one of the samples was collected, when the site's ¼-mile radius had been reached on the approach and retreat, and when the site center was reached.

After this "drive-by" step, the documenter returned to the center of the site and further documented the site during a "walk-through." This step included taking several digital photos of the site, marking the road with paint to allow the speed data collectors to locate the precise location at which the documenters would expect the data collection devices to be deployed, and providing written descriptions of the key aspects of the site for use in final selection of site. Figure A-2 shows the road marking at a site, and Figure A-3 shows the screen for documenting the "walk-through" information at a site.

Figure A-2. Marking Documented Sites

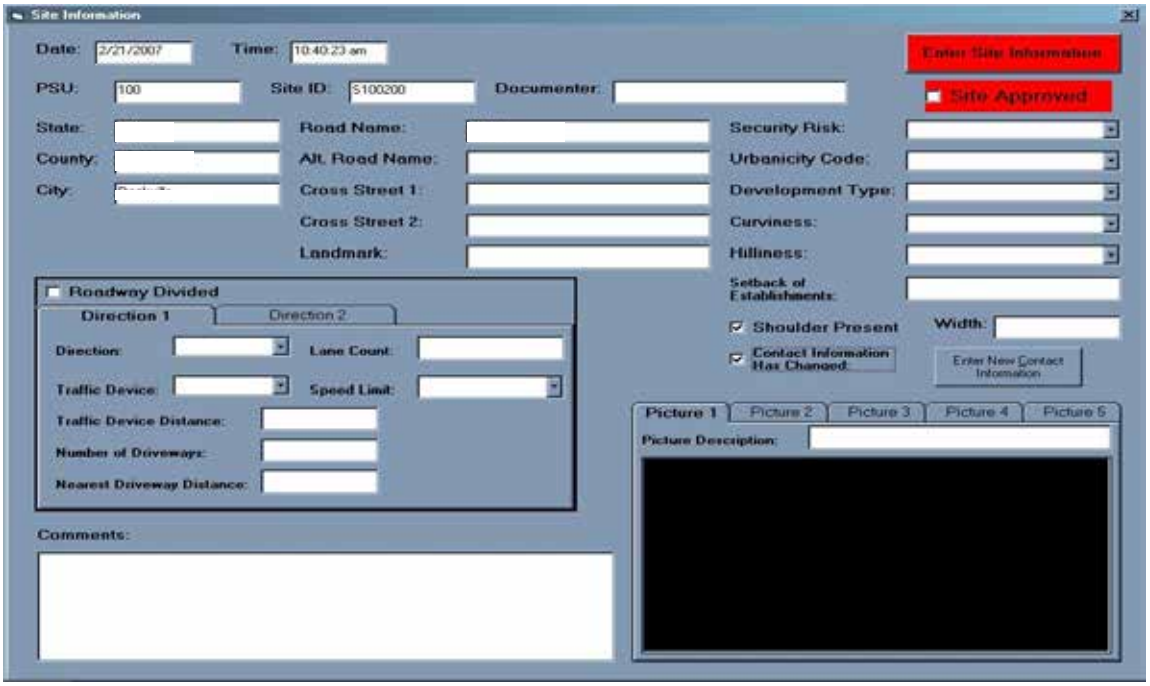


Figure A-3. Site Documentation Interface

Site documenters paid particular attention to a number of roadway characteristics:

- Adequate separation from the site location to adjacent sources of traffic "friction" (i.e., traffic controls, intersections, driveways, uncharacteristic curves, congestion, etc.);
- Paved roadway surfaces that would accommodate Hi-Star traffic classifiers with minimal chance of interference from overhead or underground sources of magnetic field disturbances;
- Roadway delineation that would channel most vehicles directly over the Hi-Stars;
- Surroundings that would promote safe installation and removal and likelihood that the Hi-Stars would survive a 24-hour installation (i.e., avoiding theft or destruction); and
- Landmarks that would help an unaccompanied speed data collector find the site several weeks later.

At the end of each day, documenters uploaded data files with their observations from each site as well as digital photos taken at the site. The photos were electronically linked to the descriptive data files so that all of the information would be available for the final review and site selection at the home office.

For cases where the site was an intersection, a slightly different user interface was used to navigate and document the site. The intersection site interface included different color coding and fields for documentation of traffic control and driveway presence for both the cross road as well as the primary road. Once they completed documentation of an intersection site, documenters were required to mark each of the lanes leading into the intersection. These locations were used for Hi-Star deployment during Phase II of the 2007 effort. However, no intersection sites were included in the 2009 data collection effort.

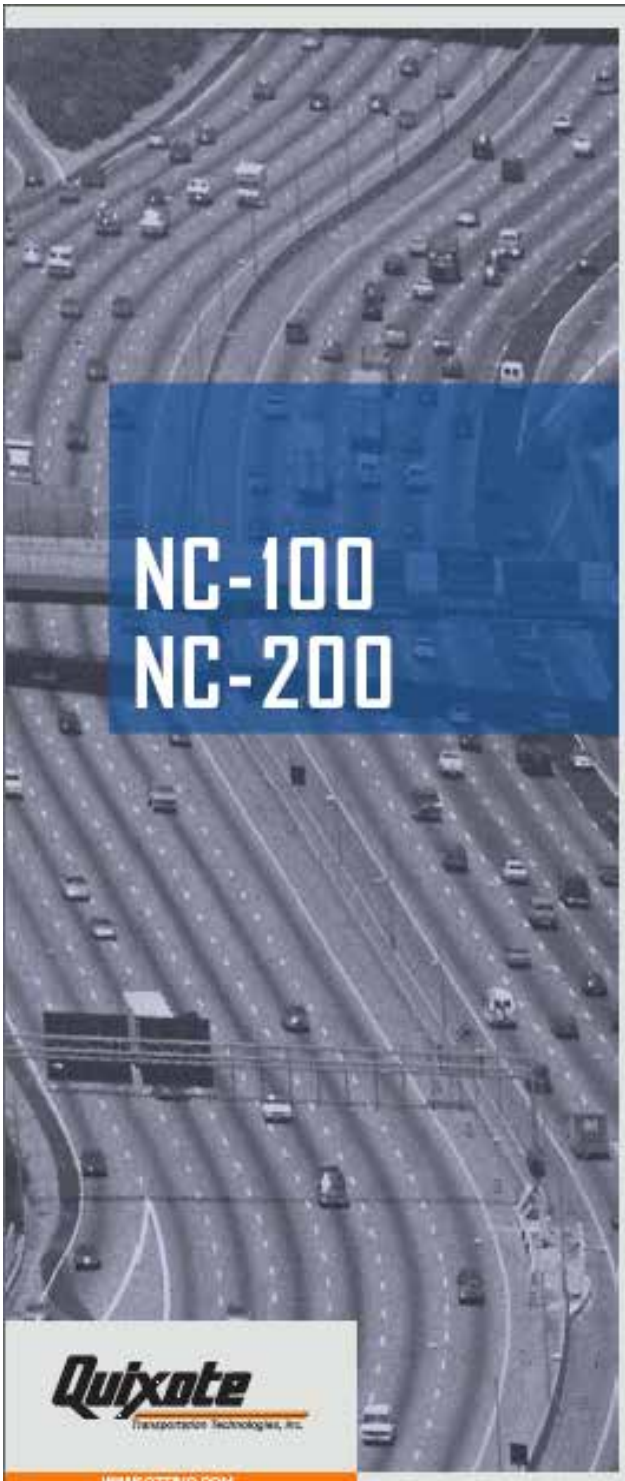
Final Site Selection

As documentation data were received from the field, the documenters' assessments of the feasibility of those sites were reviewed and given a final viability rating. This review included an appraisal of the completeness and consistency for a given site documentation exercise (e.g., was the "drive-by" documentation performed properly, were the street names and other requested characteristics provided, did the description match the photos, did the curvature data match the photos, etc.). It also included a rating of the site in terms of its feasibility with respect to the other candidates for that PSU. Sites that had some degree of curvature were intentionally selected for Phase II in 2007, since sites with curvature or gradient were rarer than those with simple, straight trajectories. Those sites were, of course, visited again during the 2009 exercise.

Reference

Neuamn, T. R. (1992). Roadway Geometric Design. In J. L. Pline (Ed.), *Traffic Engineering Handbook* (4nd ed., pp. 154-203). Washington, DC: Institute of Transportation Engineers.

Appendix B. Hi-Star Specifications & Manufacturer Validation



NC-100™ (Count Only)
NC-200™ (Count, Speed & Classification)

PORTABLE TRAFFIC ANALYZER

OVERVIEW

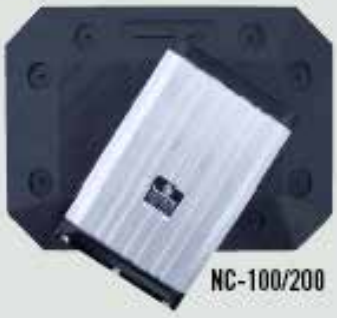
The NC-100/200 Portable Traffic Analyzer is a self-contained unit that monitors traffic flow conditions around the clock, providing the data you need for accurate traffic analysis. Utilizing Vehicle Magnetic Imaging technology, the NC-100/200 records traffic conditions and exports them to Highway Data Management Software (HDM) for fast generation of charts, reports, histograms and graphs.

FEATURES AND BENEFITS

- Easy and fast installation in roadway
- Durable extruded aluminum housing
- Long life, rechargeable, Lithium-ion battery
- 13 length classification bins
- No tubes, loops and chains

APPLICATIONS

- Multi-Lane Highways
- City Streets
- Intersections & Turn Lanes
- Unimproved Road
- Construction Zones
- State & Recreational Parks
- Casinos & Sports Arenas
- Airports
- Military Bases
- Parking Lots & Garages



NC-100/200

QTT NC-100 AND NC-200 SPECIFICATIONS

Housing Material:	Extruded / anodized aluminum
Ultimate Bearing Strength:	88,000 psi (607 MPa)
Dimensions:	7.125 in. x 4.625 in. x 0.5 in. (181 mm x 118 mm x 12.7 mm)
Weight:	1.3 lbs (0.59 kgs)
Electronic PCB:	Conformal coated and water resistant
Operating Temperature:	-4°F to +140°F (-20°C to +60°C)
Sensor:	GMR magnetic chip for Vehicle Magnetic Imaging
Memory:	Micro Serial Flash: 3MB
Battery/Power:	Lithium Ion Rechargeable 3.0 - 4.20 Vdc, 3000 mAH at 23°C Nominal voltage 3.70 vdc Up to 21 days before recharge Automatic overcharge protection Field replaceable by customer
Computed Values:	Imperial or Metric

Roadway Occupancy:	Percent occupancy over report interval
Count Period Frame Mode:	1 to 120 min
*** Capacity:**	Up to 300,000 vehicles or 21 days per study, whichever occurs first
Data Program/ Read Rate:	115K–9600 baud RS-232 user selectable
Communication Link:	Standard RS-232 USB adapter optional
Real-Time-Clock:	Yr, Mo, Day, Hr, Min, Sec
*** Length Classification (% of Volume):**	13 bins (user selectable length range)
*** Speed Class (% of Volume):**	15 bins (user selectable speed range)
Vehicle Count Determination:	Automatic headway adjustment 8 - 120 mph (12.8 - 193 kph) <8 mph (12.8 kph) recorded as stopped vehicle

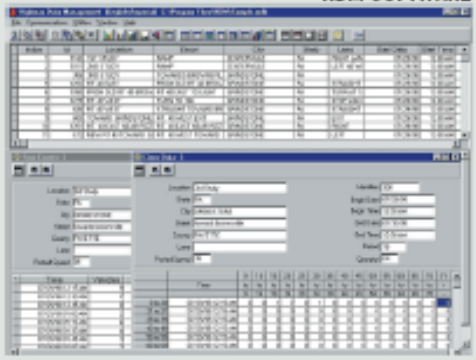
* APPLIES TO MODEL NC-200
Specifications subject to change without notice

11 in. x 8 in. x 0.7 in.
(279 mm x 203 mm x 17.8 mm)

THE NC-100/200 PROTECTIVE COVER

The protective cover, specifically molded for the NC-100 and NC-200 series, is constructed to withstand the impact of heavy vehicles and damage from most chemicals such as oil and fuel. Placed over the NC-100/200, the cover is easily installed using a screw drill. After the traffic study is complete, remove the cover and it is ready for use on another installation.

HDM SOFTWARE



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1007

FAYETTE ENGINEERING COMPANY INC.
Established 1902
CONSULTING ENGINEERS
R.B. Mechling, Jr., P.E.
Edward L. Myers, P.E.

March 1, 2006

Mr. Harry Godlewski
Nu-Metrics
University Drive
P.O. Box 518
Uniontown, PA 15401

REFERENCE: Traffic Counter Verification

Dear Mr. Godlewski:

During the months of January and February, Fayette Engineering Company had the opportunity to field test four NC-200 traffic counters. Our findings are presented in the attached report.

The NC-200s performed at or above the level of accuracy that we expected. We have found few performance issues, and none that would prevent the counters from being a useful and valuable tool to any firm or agency that studies traffic.

Sincerely,

FAYETTE ENGINEERING COMPANY, INC.

Jeremy M. Hughes, P.E.

COMMONWEALTH OF PENNSYLVANIA
REGISTERED PROFESSIONAL
JEREMY M. HUGHES
ENGINEER
PE069043

2200 UNIVERSITY DRIVE, P.O. BOX 1030 ■ UNIONTOWN, PA 15401-1030 ■ 724/438-5573 FAX: 724-438-6990

Introduction

During the months of January and February, 2006, Fayette Engineering Company had the opportunity to field test four NC-200 traffic counters. The following is a description of our findings.

Free Flow Test

On January 19, 2006, from 12:30 to 1:30 pm. we conducted a traffic count with the four NC200s on SR 119 Northbound, right lane, approximately 150 yards south of the intersection of SR 119 and Mt. Braddock Road. We simultaneously conducted a count with a permanent loop style counter in the same location, and made a video of the study. The counters were placed in the center of the lane, and within the loop. After correcting the clocks on the NC200s and the loop to the time on the camera, and truncating the count to only the time when all six devices were running, the extent of the study was from 12:29:43 to 1:29:22. During this time, 486 vehicles were observed by the camera to have passed over the counters and loop. The loop reported 487 vehicles (plus 2 "errors" corresponding to trucks passing by in the adjacent lane). The one vehicle discrepancy was due to two vehicles in the adjacent lane being counted and one vehicle in the study lane being missed. The first through fourth counters reported 488, 489, 489, and 490 vehicles, respectively. The error of the first counter was due to 4 tractor-trailers and 1 light truck / boat having the tractor and the trailer counted as separate vehicles, and 3 empty flatbed trucks being missed entirely. The errors on the second and third counters were due to 5 tractor trailers and 1 light truck / boat being counted as separate vehicles, and the same 3 flatbeds being missed. The error on the forth counter was due to the same 6 vehicles being counted separately, and 2 of the previously mentioned flatbeds being missed. All three of the missed flatbed trucks had timber beds. In this study, the NC-200 counters had an average vehicle counting accuracy of 99.4%.

The nature of errors for the loop and NC200s differed. False positives for the loop were due to vehicles in adjacent lanes being counted, whereas false positives for the NC200s were all due to double counting of long vehicles. The reason for the missed vehicle on the loop is not known, although it can be noted that a vehicle 4 seconds behind an "error" reading was the one that was missed. The three misses for the NC200s were all tractor trailers with empty timber trailers.

Other Field Testing

The four counters were used to conduct a one day test on a rural road in German Township, Fayette County. Three counters were placed in one direction and one was placed in the other direction. The paved width of the road is about 14' to 18' and cars tend to drive in the center of the road unless another vehicle is coming the other way. The weather was clear, and the temperature was below freezing for the

entire test. The traffic was manually counted for two hours for comparison purposes. We found that the counters performed well during this study despite the low temperatures and traffic traveling in both directions over the counter. The only counting errors were a series of false positives due to a light truck briefly parking over the counters. We also found that the counters picked up all vehicles traveling in the reverse direction, although the speed and length reported were always both greater than 100 for this case. However, this does mean that with minimal analysis of the raw data, a single counter could be used to study a bi-directional single traffic lane.

Speed Test

A speed test was conducted by repeatedly passing three passenger vehicles of known length and speed over the four NC200s. The three vehicles used were a 15.4' long BMW sedan, an 18.0' long Chevy truck, and a 14.0' long 2-door Civic. Speeds were determined by mounting a GPS rover unit to the vehicle and setting it to record a point at 1 second intervals and calculate a velocity for that intervening second. The GPS is accurate to a centimeter when used in this manner, which would correspond to a speed accuracy of about +/- 1% at 25 mph.
Speeds tested ranged from 10 mph to 60 mph. A total of 39 runs were made. On average, the counters recorded the speed and length accurately, with an average error for the study of -0.1 mph and +0.5 feet, respectively. This would indicate that speed errors are not biased in either direction, and length errors are only slightly biased to the high side. Thus, in real world use, any error would tend to balance out. At speeds above 10 mph the length accuracy was better than at speeds 10 mph and below. For instance, at one run at 8.4 mph, the counters had a uniform length error of -16'. The average absolute errors—i.e. the average error either plus or minus—for speed and length were 1.5 mph and 2.0 feet.

Speed Tests versus Loop

An additional speed test was conducted in a similar manner on SR 119 northbound under free flow conditions. The loop counter was tested simultaneously and the camera was used to record the test. A total of 30 runs were made with 3 vehicles (10 runs per vehicle) over a range of 12 to 55 mph. The three vehicles used were the 2001 BMW 530i sedan from the first speed test, a 2004 Hyundai Elantra sedan, and a 1998 Mercedes ML 320 SUV. Unfortunately, the loop counter functioned erratically, and only recorded 17 of the 30 runs. For the 17 runs that were recorded, the loop was accurate, with no error being greater than 3 mph. All loop errors were to the negative, and the average error was -1 mph. Three of the four NC200s performed well, all having average absolute errors of less than 2 mph. In addition these three counters were within 5 mph on 98% of the readings. The other counter consistently read high, with an average error of about +6 mph. This counter performed well in the earlier speed test, so the source of this error is not known. It is

possible that the counter was not oriented exactly with the flow of traffic, but this possibility can not be verified.

Conclusion

The NC200s performed at or above the level of accuracy that we expected. We have found few performance issues, and none that would prevent the counters from being a useful and valuable tool to any firm or agency that studies traffic.

Appendix C. Comparisons Tables for the 2007 and 2009 Data

Table C-1a. Overall Speeds by Road Class (All Traffic)

	FCC ROAD CLASS											
	1 Limited access			2 Major arterial			3 Minor arterial			Total		
	Speed Estimate			Speed Estimate			Speed Estimate			Speed Estimate		
	2007	2009	Change	2007	2009	Change	2007	2009	Change	2007	2009	Change
Mean	64.45	69.05	4.60	52.39	51.87	-0.52	46.43	46.44	0.01	54.93	57.26	2.33
Median	64.58	69.96	5.38	52.75	52.03	-0.72	45.21	45.56	0.35	55.56	57.99	2.43
Quantile (0.85)	73.14	77.50	4.36	63.24	62.48	-0.75	57.69	57.05	-0.63	68.78	73.48	4.69
Quantile (0.95)	78.52	80.97	2.44	69.40	68.90	-0.50	65.26	64.67	-0.59	75.00	78.99	3.99

Table C-1b. Standard Error of Speed by Road Class (All Traffic)

	FCC ROAD CLASS											
	1 Limited access			2 Major arterial			3 Minor arterial			Total		
	Standard Error			Standard Error			Standard Error			Standard Error		
	2007	2009	Change	2007	2009	Change	2007	2009	Change	2007	2009	Change
Mean	0.67	1.24	0.96	1.59	1.24	0.51	1.27	1.14	0.40	1.04	1.31	0.86
Median	0.69	2.08	2.05	2.26	1.33	1.06	1.32	1.30	0.58	1.36	1.92	1.40
Quantile (0.85)	0.85	1.14	1.16	1.47	1.61	0.91	1.93	1.81	0.67	0.75	2.00	1.85
Quantile (0.95)	0.88	0.80	0.85	1.23	1.67	1.28	1.82	1.59	1.09	0.66	1.52	1.26

Table C-1c. Standard Deviations for Speed by Road Class (All Traffic)

	FCC ROAD CLASS											
	1 Limited access			2 Major arterial			3 Minor arterial			Total		
	2007	2009	Change	2007	2009	Change	2007	2009	Change	2007	2009	Change
Std Dev	8.94	9.07	0.13	10.67	10.52	-0.15	10.64	10.30	-0.34	12.92	14.33	1.41

Table C-2a. Speed Estimate of Overall Speeds by Road Class (Free-Flow)

	FCC ROAD CLASS											
	1 Limited access			2 Major arterial			3 Minor arterial			Total		
	Speed Estimate			Speed Estimate			Speed Estimate			Speed Estimate		
	2007	2009	Change	2007	2009	Change	2007	2009	Change	2007	2009	Change
Mean	64.69	70.50	5.80	53.62	53.28	-0.34	46.85	47.01	0.17	54.51	56.39	1.88
Median	64.86	70.84	5.98	54.10	53.37	-0.73	45.85	46.15	0.29	55.02	56.00	0.98
Quantile (0.85)	73.77	77.96	4.18	64.46	63.68	-0.78	58.30	57.82	-0.48	68.48	72.99	4.51
Quantile (0.95)	79.20	81.83	2.63	70.64	70.14	-0.50	65.95	65.56	-0.39	75.06	78.99	3.93

Table C-2b. Standard Error of Overall Speeds by Road Class (Free-Flow)

	FCC ROAD CLASS											
	1 Limited access			2 Major arterial			3 Minor arterial			Total		
	Standard Error			Standard Error			Standard Error			Standard Error		
	2007	2009	Change	2007	2009	Change	2007	2009	Change	2007	2009	Change
Mean	0.76	1.02	0.71	1.71	1.22	0.56	1.43	1.23	0.39	1.23	1.47	0.74
Median	0.79	0.84	0.78	2.22	1.30	1.02	1.62	1.37	0.64	1.66	2.03	0.93
Quantile (0.85)	0.73	1.63	1.40	1.38	1.49	0.71	2.09	1.97	0.69	0.92	1.55	1.15
Quantile (0.95)	0.80	0.74	0.70	1.28	1.46	1.27	1.69	1.66	0.95	0.77	1.38	1.14

Table C-2c. Standard Deviations of Overall Speeds by Road Class (Free-Flow)

	FCC ROAD CLASS											
	1 Limited access			2 Major arterial			3 Minor arterial			Total		
	2007	2009	Change	2007	2009	Change	2007	2009	Change	2007	2009	Change
Std Dev	9.15	8.11	-1.03	10.76	10.33	-0.43	10.91	10.46	-0.44	12.99	14.21	1.22

Table C-3a. Proportion of Traffic Exceeding Speed Limit by Road Class (All Traffic)

	FCC ROAD CLASS											
	1 Limited access			2 Major arterial			3 Minor arterial			Total		
	2007	2009	Change	2007	2009	Change	2007	2009	Change	2007	2009	Change
% Exceeding Speed Limit by Any Amount	51.1%	70.6%	19.5%	58.3%	54.7%	-3.6%	59.2%	57.4%	-1.8%	55.7%	62.5%	6.8%
% Exceeding Speed Limit by > 5 mph	30.5%	44.5%	14.0%	32.0%	29.7%	-2.3%	33.3%	31.4%	-1.9%	31.9%	36.7%	4.8%
% Exceeding Speed Limit by > 10 mph	15.5%	19.3%	3.7%	13.6%	12.1%	-1.5%	14.8%	13.8%	-1.0%	14.9%	15.8%	0.9%

Table C-4a. Proportion of Traffic Exceeding Speed Limit by Road Class (Free-Flow)

	FCC ROAD CLASS											
	1 Limited access			2 Major arterial			3 Minor arterial			Total		
	2007	2009	Change	2007	2009	Change	2007	2009	Change	2007	2009	Change
% Exceeding Speed Limit by Any Amount	48.3%	71.7%	23.4%	59.8%	55.9%	-3.9%	60.8%	59.1%	-1.7%	56.2%	62.6%	6.5%
% Exceeding Speed Limit by > 5 mph	28.4%	45.5%	17.1%	34.0%	31.0%	-3.0%	35.2%	33.2%	-2.0%	32.6%	36.9%	4.3%
% Exceeding Speed Limit by > 10 mph	14.4%	20.1%	5.7%	15.3%	13.3%	-2.0%	16.2%	15.0%	-1.2%	15.4%	16.3%	1.0%

Table C-5a. Speed Estimate of Speed by Road Type and Time of Day (Free-Flow)

		FCC ROAD CLASS											
		1 Limited access			2 Major arterial			3 Minor arterial/collector			Total		
		Speed Estimate			Speed Estimate			Speed Estimate			Speed Estimate		
		2007	2009	Change	2007	2009	Change	2007	2009	Change	2007	2009	Change
TIMEDAY		Speed Estimate			Speed Estimate			Speed Estimate			Speed Estimate		
1 Late nite (0000-0559)	Mean	63.81	68.62	4.81	54.07	53.38	-0.70	48.38	48.67	0.28	57.03	59.41	2.37
	Median	63.87	67.98	4.11	54.06	53.13	-0.93	47.62	48.07	0.45	58.00	61.00	3.00
	Quantile (0.85)	72.64	76.24	3.59	64.55	63.87	-0.68	60.00	59.62	-0.38	69.37	73.00	3.63
	Quantile (0.95)	77.97	80.40	2.43	71.33	70.74	-0.58	67.29	66.87	-0.42	75.42	78.00	2.58
2 Morning peak 3 hrs. (0600-0859)	Mean	65.15	70.88	5.73	54.45	54.37	-0.08	48.06	48.27	0.21	55.11	56.99	1.88
	Median	65.32	70.98	5.67	55.22	54.60	-0.62	47.08	47.45	0.37	55.37	56.69	1.32
	Quantile (0.85)	74.23	78.31	4.07	65.15	64.88	-0.27	59.38	59.18	-0.21	68.82	73.00	4.17
	Quantile (0.95)	79.61	82.33	2.72	71.15	71.43	0.28	67.00	66.94	-0.06	75.29	78.99	3.71
3 Mid-day 7 hrs. (0900-1559)	Mean	64.85	70.98	6.13	53.53	53.14	-0.39	46.60	46.82	0.23	54.09	56.00	1.91
	Median	65.00	71.88	6.89	54.00	53.37	-0.63	45.49	45.98	0.49	54.60	55.31	0.71
	Quantile (0.85)	74.00	78.72	4.73	64.38	63.52	-0.86	58.16	57.69	-0.48	68.18	72.99	4.81
	Quantile (0.95)	79.33	81.99	2.66	70.61	69.90	-0.71	65.73	65.17	-0.55	75.00	78.99	3.99
4 Evening peak 3 hrs. (1600-1859)	Mean	65.07	71.16	6.09	54.02	53.64	-0.38	46.89	46.96	0.07	54.03	55.55	1.53
	Median	65.24	71.97	6.73	54.63	53.93	-0.70	45.94	46.00	0.06	54.38	54.60	0.23
	Quantile (0.85)	74.38	78.91	4.54	65.09	64.08	-1.01	58.58	57.88	-0.71	68.27	72.99	4.72
	Quantile (0.95)	80.00	82.54	2.55	71.10	70.51	-0.58	66.31	65.62	-0.69	75.10	78.99	3.90
5 Early night 5 hrs. (1900-2359)	Mean	64.37	69.94	5.58	52.49	52.27	-0.21	45.89	45.97	0.08	54.24	56.25	2.01
	Median	64.54	69.88	5.35	52.75	52.14	-0.61	44.74	44.99	0.25	54.64	56.00	1.36
	Quantile (0.85)	73.40	77.60	4.20	63.19	62.56	-0.63	57.00	56.37	-0.63	68.34	72.99	4.65
	Quantile (0.95)	78.65	81.16	2.51	69.52	69.08	-0.44	64.56	63.89	-0.67	74.98	78.00	3.02
Total	Mean	64.69	70.50	5.80	53.62	53.28	-0.34	46.85	47.01	0.17	54.51	56.39	1.88
	Median	64.86	70.84	5.98	54.10	53.37	-0.73	45.85	46.15	0.29	55.02	56.00	0.98
	Quantile (0.85)	73.77	77.96	4.18	64.46	63.68	-0.78	58.30	57.82	-0.48	68.48	72.99	4.51
	Quantile (0.95)	79.20	81.83	2.63	70.64	70.14	-0.50	65.95	65.56	-0.39	75.06	78.99	3.93

Table C-5b. Standard Error of Speed by Road Type and Time of Day (Free-Flow)

		FCC ROAD CLASS											
		1 Limited access			2 Major arterial			3 Minor arterial/collector			Total		
		Speed Estimate			Speed Estimate			Speed Estimate			Speed Estimate		
		2007	2009	Change	2007	2009	Change	2007	2009	Change	2007	2009	Change
TIMEDAY		Standard Error			Standard Error			Standard Error			Standard Error		
1 Late nite (0000-0559)	Mean	0.73	0.94	0.63	1.74	1.29	0.57	1.45	1.23	0.41	1.12	1.31	0.67
	Median	0.68	1.04	0.81	2.47	1.66	1.10	1.87	1.53	0.66	1.29	1.53	1.14
	Quantile (0.85)	0.70	1.10	0.70	1.68	1.81	0.79	1.62	1.68	0.63	0.66	1.50	1.50
	Quantile (0.95)	0.76	0.83	0.76	2.27	1.41	1.94	1.38	1.19	0.66	0.68	2.72	2.50
2 Morning peak 3 hrs. (0600-0859)	Mean	0.79	1.03	0.80	1.83	1.38	0.71	1.50	1.20	0.47	1.16	1.53	0.81
	Median	0.89	2.58	2.15	2.06	1.44	0.86	1.84	1.46	0.69	1.40	2.11	1.17
	Quantile (0.85)	0.67	0.72	0.56	0.90	1.72	1.26	2.00	1.89	0.84	0.80	1.57	1.45
	Quantile (0.95)	0.90	0.82	0.76	1.10	1.61	2.00	1.83	1.47	1.33	0.80	1.26	1.29
3 Mid-day 7 hrs. (0900-1559)	Mean	0.77	0.98	0.66	1.60	1.14	0.52	1.49	1.29	0.41	1.27	1.50	0.78
	Median	0.87	2.10	1.95	2.01	1.25	0.93	1.50	1.44	0.47	1.81	2.01	1.05
	Quantile (0.85)	0.80	1.37	1.17	1.38	1.42	0.73	2.20	1.92	0.69	0.95	1.71	1.37
	Quantile (0.95)	0.87	0.78	0.76	1.30	1.50	1.22	1.87	1.79	0.93	0.92	1.51	1.21
4 Evening peak 3 hrs. (1600-1859)	Mean	0.84	1.23	0.96	1.91	1.32	0.61	1.52	1.38	0.40	1.35	1.61	0.79
	Median	0.89	1.26	1.07	2.37	1.41	1.11	1.64	1.46	0.76	2.03	2.11	0.85
	Quantile (0.85)	0.69	0.30	0.61	1.41	1.61	0.72	2.23	2.25	0.81	1.00	1.74	1.44
	Quantile (0.95)	1.07	0.83	1.14	1.10	1.67	1.12	2.04	1.95	1.09	0.87	1.26	1.07
5 Early night 5 hrs. (1900-2359)	Mean	0.75	0.99	0.73	1.66	1.13	0.63	1.17	0.99	0.41	1.19	1.40	0.75
	Median	0.73	1.84	1.50	2.35	1.17	1.35	1.22	1.12	0.54	1.70	2.02	1.12
	Quantile (0.85)	0.82	0.86	0.76	1.63	1.70	0.66	1.87	1.60	0.69	0.88	1.72	1.46
	Quantile (0.95)	0.77	0.66	0.65	1.34	1.67	0.96	1.62	1.64	0.66	0.92	3.07	3.19
Total	Mean	0.76	1.02	0.71	1.71	1.22	0.56	1.43	1.23	0.39	1.23	1.47	0.74
	Median	0.79	0.84	0.78	2.22	1.30	1.02	1.62	1.37	0.64	1.66	2.03	0.93
	Quantile (0.85)	0.73	1.63	1.40	1.38	1.49	0.71	2.09	1.97	0.69	0.92	1.55	1.15
	Quantile (0.95)	0.80	0.74	0.70	1.28	1.46	1.27	1.69	1.66	0.95	0.77	1.38	1.14

Table C-5c. Standard Deviations for Speed by Road Type and Time of Day (Free-Flow)

	FCC ROAD CLASS											
	1 Limited access			2 Major arterial			3 Minor arterial			Total		
	2007	2009	Change	2007	2009	Change	2007	2009	Change	2007	2009	Change
TIMEDAY	Std Dev			Std Dev			Std Dev			Std Dev		
1 Late night (0000-0559)	8.82	7.73	-1.09	10.33	10.18	-0.15	10.90	10.53	-0.37	12.03	12.99	0.96
2 Morning peak 3 hrs (0600-0859)	9.20	8.08	-1.12	10.97	10.47	-0.51	10.86	10.53	-0.33	12.79	13.90	1.12
3 Mid-day 7 hrs (0900-1559)	9.13	7.86	-1.27	10.74	10.34	-0.40	10.95	10.49	-0.46	13.09	14.32	1.24
4 Evening peak 3 hrs (1600-1859)	9.47	9.22	-0.25	11.00	10.41	-0.59	11.10	10.55	-0.55	13.23	14.49	1.26
5 Early night 5 hrs (1900-2359)	9.03	7.71	-1.32	10.48	10.04	-0.44	10.50	10.07	-0.43	13.01	14.25	1.24
Total	9.15	8.11	-1.03	10.76	10.33	-0.43	10.91	10.46	-0.44	12.99	14.21	1.22

Table C-6a. Speed Estimate of Speed by Road Type and Light Condition (Spring; Day=6 a.m.-9 p.m., Night=9 p.m.-6 a.m.) (Free-Flow)

		FCC ROAD CLASS											
		1 Limited access			2 Major arterial			3 Minor arterial/collector			Total		
		2007	2009	Change	2007	2009	Change	2007	2009	Change	2007	2009	Change
LIGHTCONDITION		Speed Estimate			Speed Estimate			Speed Estimate			Speed Estimate		
1 Day (0600-2059)	Mean	64.97	70.98	6.00	53.73	53.41	-0.33	46.85	47.00	0.15	54.25	56.06	1.81
	Median	65.13	71.89	6.76	54.29	53.51	-0.79	45.86	46.14	0.28	54.63	55.35	0.72
	Quantile (0.85)	74.13	78.76	4.63	64.51	63.85	-0.66	58.31	57.85	-0.46	68.38	72.99	4.62
	Quantile (0.95)	79.41	82.15	2.73	70.77	70.25	-0.52	65.97	65.58	-0.39	75.08	78.99	3.92
2 Night (2100-0559)	Mean	63.80	68.91	5.11	53.06	52.62	-0.44	46.81	47.08	0.27	55.65	57.96	2.31
	Median	63.90	68.88	4.98	53.00	52.27	-0.73	45.69	46.20	0.51	56.46	59.00	2.54
	Quantile (0.85)	72.67	76.48	3.81	63.68	63.00	-0.68	58.25	57.71	-0.54	68.78	72.99	4.21
	Quantile (0.95)	77.93	80.46	2.53	70.14	69.83	-0.31	65.76	65.16	-0.60	75.00	78.00	3.00
Total	Mean	64.69	70.50	5.80	53.62	53.28	-0.34	46.85	47.01	0.17	54.51	56.39	1.88
	Median	64.86	70.84	5.98	54.10	53.37	-0.73	45.85	46.15	0.29	55.02	56.00	0.98
	Quantile (0.85)	73.77	77.96	4.18	64.46	63.68	-0.78	58.30	57.82	-0.48	68.48	72.99	4.51
	Quantile (0.95)	79.20	81.83	2.63	70.64	70.14	-0.50	65.95	65.56	-0.39	75.06	78.99	3.93

Table C-6b. Standard Error of Speed by Road Type and Light Condition (Spring; Day=6 a.m.-9 p.m., Night=9 p.m.-6 a.m.) (Free-Flow)

		FCC ROAD CLASS											
		1 Limited access			2 Major arterial			3 Minor arterial/collector			Total		
		2007	2009	Change	2007	2009	Change	2007	2009	Change	2007	2009	Change
LIGHTCONDITION		Standard Error			Standard Error			Standard Error			Standard Error		
1 Day (0600-2059)	Mean	0.76	1.02	0.74	1.72	1.22	0.57	1.47	1.27	0.40	1.25	1.51	0.77
	Median	0.77	2.05	1.88	2.20	1.34	1.07	1.65	1.39	0.63	1.84	2.07	0.98
	Quantile (0.85)	0.68	1.16	1.01	1.31	1.43	0.63	2.17	2.01	0.73	0.95	1.61	1.26
	Quantile (0.95)	0.92	0.77	0.82	1.19	1.54	1.31	1.79	1.70	0.99	0.81	1.26	1.05
2 Night (2100-0559)	Mean	0.75	0.97	0.66	1.70	1.23	0.55	1.27	1.08	0.40	1.18	1.37	0.66
	Median	0.73	1.06	0.86	2.52	1.49	1.30	1.45	1.26	0.58	1.49	1.97	1.19
	Quantile (0.85)	0.76	0.91	0.60	1.86	1.76	0.64	1.86	1.70	0.71	0.79	1.26	0.87
	Quantile (0.95)	0.70	0.77	0.72	1.90	1.72	1.37	1.32	1.35	0.53	0.69	1.06	1.25
Total	Mean	0.76	1.02	0.71	1.71	1.22	0.56	1.43	1.23	0.39	1.23	1.47	0.74
	Median	0.79	0.84	0.78	2.22	1.30	1.02	1.62	1.37	0.64	1.66	2.03	0.93
	Quantile (0.85)	0.73	1.63	1.40	1.38	1.49	0.71	2.09	1.97	0.69	0.92	1.55	1.15
	Quantile (0.95)	0.80	0.74	0.70	1.28	1.46	1.27	1.69	1.66	0.95	0.77	1.38	1.14

Table C-6b. Standard Error of Speed by Road Type and Light Condition (Spring; Day=6 a.m.-9 p.m., Night=9 p.m.-6 a.m.) (Free-Flow)

	FCC ROAD CLASS											
	1 Limited access			2 Major arterial			3 Minor arterial/collector			Total		
	2007	2009	Change	2007	2009	Change	2007	2009	Change	2007	2009	Change
LIGHTCONDITION	Std Dev			Std Dev			Std Dev			Std Dev		
1 Day (0600-2059)	9.22	8.17	-1.05	10.85	10.38	-0.48	10.94	10.49	-0.46	13.09	14.31	1.23
2 Night (2100-0559)	8.86	7.71	-1.15	10.28	10.05	-0.23	10.70	10.31	-0.39	12.51	13.60	1.09
Total	9.15	8.11	-1.03	10.76	10.33	-0.43	10.91	10.46	-0.44	12.99	14.21	1.22

Table C-7a. Speed Estimate of Speed by Road Type and Day of Week (Free-Flow)

		FCC ROAD CLASS											
		1 Limited access			2 Major arterial			3 Minor arterial/collector			Total		
		2007	2009	Change	2007	2009	Change	2007	2009	Change	2007	2009	Change
DAYWEEK		Speed Estimate			Speed Estimate			Speed Estimate			Speed Estimate		
Mon	Mean	65.72	67.61	1.89	54.67	52.24	-2.43	47.50	46.53	-0.97	54.40	52.53	-1.86
	Median	66.00	66.93	0.93	55.37	52.30	-3.07	46.85	45.16	-1.69	54.78	51.94	-2.84
	Quantile (0.85)	75.06	74.97	-0.10	65.07	65.05	-0.02	58.58	58.17	-0.41	68.06	67.21	-0.85
	Quantile (0.95)	81.00	79.58	-1.42	71.07	71.48	0.41	65.00	65.87	0.87	75.10	74.17	-0.92
Tue	Mean	64.68	70.25	5.56	52.12	55.36	3.25	47.16	46.88	-0.28	55.41	54.14	-1.28
	Median	64.19	70.59	6.41	52.14	55.31	3.17	45.48	46.59	1.11	55.41	53.36	-2.06
	Quantile (0.85)	74.13	77.31	3.18	63.63	63.85	0.22	59.70	56.73	-2.97	69.64	69.00	-0.64
	Quantile (0.95)	80.24	80.90	0.67	70.07	69.86	-0.22	71.14	63.29	-7.85	76.56	76.00	-0.56
Wed	Mean	63.33	67.61	4.28	58.83	52.46	-6.38	50.20	47.08	-3.12	54.78	53.82	-0.95
	Median	63.39	67.60	4.21	58.92	52.68	-6.24	49.48	45.36	-4.12	55.22	53.37	-1.85
	Quantile (0.85)	73.49	75.23	1.74	65.81	62.37	-3.44	62.35	59.01	-3.34	67.07	69.00	1.92
	Quantile (0.95)	79.42	79.49	0.07	70.14	68.89	-1.25	70.18	66.45	-3.73	74.08	75.00	0.92
Thu	Mean	65.63	69.84	4.21	54.80	52.71	-2.09	44.17	49.23	5.06	49.89	57.86	7.96
	Median	65.83	69.75	3.92	55.47	53.99	-1.48	43.54	48.38	4.84	48.76	59.00	10.24
	Quantile (0.85)	73.77	77.84	4.07	66.50	64.88	-1.63	53.75	62.22	8.48	64.05	74.00	9.95
	Quantile (0.95)	79.27	81.85	2.58	73.78	71.56	-2.22	60.12	69.97	9.85	72.04	79.00	6.96
Fri	Mean	65.12	71.39	6.28	51.71	54.00	2.29	47.71	46.14	-1.57	57.10	60.13	3.03
	Median	65.27	71.12	5.84	50.72	53.74	3.03	46.98	45.36	-1.62	58.58	63.00	4.42
	Quantile (0.85)	73.27	78.42	5.14	62.21	64.46	2.24	59.97	56.71	-3.26	70.02	75.97	5.95
	Quantile (0.95)	78.06	82.44	4.38	69.32	70.57	1.26	66.32	63.50	-2.82	75.57	80.98	5.42
Sat	Mean	64.43	72.30	7.87	56.21	51.73	-4.48	44.86	47.21	2.35	55.87	55.73	-0.14
	Median	64.22	72.83	8.61	56.38	51.94	-4.45	43.51	47.33	3.83	57.45	53.89	-3.56
	Quantile (0.85)	73.64	78.98	5.34	65.71	60.31	-5.40	56.17	56.80	0.63	69.92	73.27	3.36
	Quantile (0.95)	79.32	82.46	3.14	72.12	65.82	-6.31	63.17	63.20	0.03	76.37	79.00	2.63

Table C-7a. Speed Estimate of Speed by Road Type and Day of Week (Free-Flow) (continued)

		FCC ROAD CLASS											
		1 Limited access			2 Major arterial			3 Minor arterial/collector			Total		
		2007	2009	Change	2007	2009	Change	2007	2009	Change	2007	2009	Change
DAYWEEK		Speed Estimate			Speed Estimate			Speed Estimate			Speed Estimate		
Sun	Mean	63.26	71.57	8.31	48.84	55.27	6.43	45.75	44.89	-0.86	51.34	59.04	7.70
	Median	63.62	72.51	8.90	47.76	53.98	6.22	44.73	44.88	0.15	50.00	59.59	9.59
	Quantile (0.85)	72.97	78.83	5.86	60.30	65.19	4.90	56.55	53.65	-2.90	65.82	75.81	10.00
	Quantile (0.95)	77.99	82.26	4.27	67.98	71.88	3.90	64.01	59.46	-4.55	72.99	79.98	7.00
Total	Mean	64.69	70.50	5.80	53.62	53.28	-0.34	46.85	47.01	0.17	54.51	56.39	1.88
	Median	64.86	70.84	5.98	54.10	53.37	-0.73	45.85	46.15	0.29	55.02	56.00	0.98
	Quantile (0.85)	73.77	77.96	4.18	64.46	63.68	-0.78	58.30	57.82	-0.48	68.48	72.99	4.51
	Quantile (0.95)	79.20	81.83	2.63	70.64	70.14	-0.50	65.95	65.56	-0.39	75.06	78.99	3.93

Table C-7b. Standard Error of Speed by Road Type and Day of Week (Free-Flow)

		FCC ROAD CLASS											
		1 Limited access			2 Major arterial			3 Minor arterial/collector			Total		
		2007	2009	Change	2007	2009	Change	2007	2009	Change	2007	2009	Change
DAYWEEK		Standard Error			Standard Error			Standard Error			Standard Error		
Mon	Mean	0.67	1.55	1.21	4.46	5.62	3.82	1.86	2.52	2.55	1.18	2.05	1.94
	Median	0.90	1.61	1.32	4.07	7.44	4.58	2.41	2.54	2.71	1.57	3.73	2.92
	Quantile (0.85)	0.81	1.09	1.05	2.11	5.85	4.65	2.54	3.89	3.12	1.97	1.93	2.77
	Quantile (0.95)	1.30	0.93	1.25	1.12	5.18	5.65	1.62	3.94	2.85	1.77	1.75	2.05
Tue	Mean	1.67	2.19	2.69	1.39	1.32	1.96	3.80	2.03	4.28	2.29	2.18	2.79
	Median	1.94	1.92	2.69	1.64	1.55	2.11	3.02	2.20	3.53	2.24	2.15	2.46
	Quantile (0.85)	1.47	1.14	1.87	1.74	0.93	1.77	6.77	2.49	7.72	2.39	4.57	5.35
	Quantile (0.95)	1.67	1.10	1.98	2.01	1.04	2.11	10.21	2.84	11.24	2.01	2.80	3.83
Wed	Mean	3.34	1.58	2.63	1.81	2.61	3.72	2.79	3.93	4.21	1.90	1.53	1.95
	Median	3.42	1.38	2.75	1.76	2.17	3.29	3.07	3.13	3.24	2.11	2.11	2.38
	Quantile (0.85)	3.93	1.71	2.94	0.22	2.62	2.62	3.95	7.39	8.33	1.92	2.52	2.66
	Quantile (0.95)	4.01	1.93	2.65	2.53	2.71	3.21	4.09	7.95	9.19	2.56	2.31	2.17
Thu	Mean	1.60	1.88	1.61	4.22	6.28	6.46	1.34	2.93	2.68	1.85	2.85	3.35
	Median	1.80	2.55	2.22	3.50	5.29	5.90	1.64	3.97	3.78	2.32	3.78	4.62
	Quantile (0.85)	1.64	1.38	1.42	4.29	5.10	6.29	1.32	4.44	4.00	2.59	2.78	3.62
	Quantile (0.95)	1.55	1.34	1.39	5.50	5.02	7.02	1.40	3.58	2.87	1.58	2.55	2.40
Fri	Mean	1.49	1.39	1.11	1.56	4.36	3.88	2.15	1.59	2.11	3.16	2.06	3.41
	Median	1.07	1.73	1.13	2.26	5.03	4.59	3.32	2.03	2.91	4.36	3.01	5.54
	Quantile (0.85)	0.98	1.44	1.17	2.61	4.76	5.54	2.76	1.69	2.90	1.86	1.28	1.22
	Quantile (0.95)	1.31	1.37	1.41	2.52	4.34	5.37	2.55	1.95	3.28	1.51	1.54	1.32
Sat	Mean	1.12	2.66	2.93	2.72	3.61	4.26	2.11	1.57	2.11	3.08	3.28	4.65
	Median	0.81	2.72	2.91	2.04	4.25	4.40	2.49	1.65	2.51	3.62	3.15	5.11
	Quantile (0.85)	1.27	1.12	1.75	1.48	3.00	3.17	3.41	1.90	3.44	2.33	6.05	6.75
	Quantile (0.95)	1.65	0.97	1.92	2.16	2.34	3.05	2.67	2.72	3.41	2.16	2.49	3.38

Table C-7b. Standard Error of Speed by Road Type and Day of Week (Free-Flow) (continued)

		FCC ROAD CLASS											
		1 Limited access			2 Major arterial			3 Minor arterial/collector			Total		
		2007	2009	Change	2007	2009	Change	2007	2009	Change	2007	2009	Change
DAYWEEK		Standard Error			Standard Error			Standard Error			Standard Error		
Sun	Mean	3.30	1.52	3.68	4.39	3.44	6.97	2.92	0.95	3.36	2.25	4.57	5.12
	Median	4.23	1.77	4.70	4.05	4.86	7.77	2.47	0.97	2.96	3.05	8.47	9.22
	Quantile (0.85)	3.72	0.28	3.73	7.02	4.06	10.09	5.23	0.76	5.26	3.72	3.55	5.54
	Quantile (0.95)	4.02	0.72	4.01	8.52	3.30	11.01	5.07	1.30	5.09	3.47	1.60	3.98
Total	Mean	0.76	1.02	0.71	1.71	1.22	0.56	1.43	1.23	0.39	1.23	1.47	0.74
	Median	0.79	0.84	0.78	2.22	1.30	1.02	1.62	1.37	0.64	1.66	2.03	0.93
	Quantile (0.85)	0.73	1.63	1.40	1.38	1.49	0.71	2.09	1.97	0.69	0.92	1.55	1.15
	Quantile (0.95)	0.80	0.74	0.70	1.28	1.46	1.27	1.69	1.66	0.95	0.77	1.38	1.14

Table C-7c. Standard Deviation of Speed by Road Type and Day of Week (Free-Flow)

	FCC ROAD CLASS											
	1 Limited access			2 Major arterial			3 Minor arterial			Total		
	2007	2009	Change	2007	2009	Change	2007	2009	Change	2007	2009	Change
DAYWEEK	Std Dev			Std Dev			Std Dev			Std Dev		
Mon	9.70	7.98	-1.73	10.93	11.71	0.79	10.49	10.75	0.26	12.91	13.14	0.23
Tue	9.19	8.59	-0.60	10.92	8.82	-2.10	12.15	9.71	-2.44	13.16	12.85	-0.31
Wed	9.78	8.99	-0.79	7.39	10.21	2.83	11.53	10.80	-0.72	11.97	13.20	1.24
Thu	8.40	8.37	-0.02	11.82	12.51	0.70	9.40	11.83	2.43	12.68	14.50	1.82
Fri	8.30	7.38	-0.92	9.92	10.02	0.10	11.34	10.09	-1.26	12.56	14.79	2.22
Sat	9.05	7.49	-1.56	9.81	8.81	-1.00	10.47	9.68	-0.79	13.39	14.00	0.61
Sun	10.06	7.81	-2.25	10.62	9.29	-1.34	10.08	8.87	-1.21	12.72	14.59	1.86
Total	9.15	8.11	-1.03	10.76	10.33	-0.43	10.91	10.46	-0.44	12.99	14.21	1.22

Table C-8a. Speed Estimate of Speed by Road Type and Horizontal Curvature Class (Free-Flow)

		FCC ROAD CLASS											
		1 Limited access			2 Major arterial			3 Minor arterial/collector			Total		
		Speed Estimate			Speed Estimate			Speed Estimate			Speed Estimate		
		2007	2009	Change	2007	2009	Change	2007	2009	Change	2007	2009	Change
HOR_CURVERDCLASS		Estimate	Estimate	Estimate	Estimate	Estimate	Estimate	Estimate	Estimate	Estimate	Estimate	Estimate	Estimate
1 Straight	Mean	64.89	70.69	5.80	53.32	52.99	-0.33	47.63	47.71	0.08	55.03	56.72	1.69
	Median	65.08	70.92	5.83	53.92	52.99	-0.93	46.59	46.88	0.29	55.35	56.06	0.71
	Quantile (0.85)	74.00	78.69	4.69	64.19	63.52	-0.66	58.93	58.35	-0.57	68.78	73.00	4.21
	Quantile (0.95)	79.35	82.00	2.65	70.39	70.09	-0.30	66.56	66.08	-0.48	75.27	78.99	3.73
2 Moderate	Mean	60.57	68.91	8.33	58.97	58.45	-0.52	41.11	41.92	0.81	47.73	52.87	5.14
	Median	60.77	69.33	8.56	58.68	58.70	0.02	39.39	39.81	0.42	46.00	53.55	7.56
	Quantile (0.85)	70.25	76.89	6.64	68.09	65.70	-2.39	52.14	53.95	1.81	62.85	70.99	8.14
	Quantile (0.95)	75.59	80.32	4.73	74.00	70.84	-3.17	60.26	60.36	0.11	70.19	76.99	6.80
3 Sharp	Mean	63.87	68.56	4.70	59.23	58.19	-1.03	42.04	41.09	-0.95	53.04	54.30	1.26
	Median	63.53	67.77	4.24	59.34	58.20	-1.14	39.69	39.04	-0.65	55.62	57.50	1.88
	Quantile (0.85)	71.95	74.88	2.92	69.01	65.12	-3.89	54.38	52.63	-1.75	68.20	71.98	3.78
	Quantile (0.95)	77.25	78.36	1.10	75.72	69.82	-5.90	60.98	59.52	-1.46	73.95	76.97	3.02
Total	Mean	64.69	70.50	5.80	53.62	53.28	-0.34	46.85	47.01	0.17	54.51	56.39	1.88
	Median	64.86	70.84	5.98	54.10	53.37	-0.73	45.85	46.15	0.29	55.02	56.00	0.98
	Quantile (0.85)	73.77	77.96	4.18	64.46	63.68	-0.78	58.30	57.82	-0.48	68.48	72.99	4.51
	Quantile (0.95)	79.20	81.83	2.63	70.64	70.14	-0.50	65.95	65.56	-0.39	75.06	78.99	3.93

Table C-8b. Standard Error of Speed by Road Type and Horizontal Curvature Class (Free-Flow)

		FCC ROAD CLASS											
		1 Limited access			2 Major arterial			3 Minor arterial/collector			Total		
		Standard Error			Standard Error			Standard Error			Standard Error		
		2007	2009	Change	2007	2009	Change	2007	2009	Change	2007	2009	Change
HOR_CURVERDCLASS		Estimate	Estimate	Estimate	Estimate	Estimate	Estimate	Estimate	Estimate	Estimate	Estimate	Estimate	Estimate
1 Straight	Mean	0.68	1.01	0.72	1.69	1.20	0.55	1.41	1.25	0.32	1.22	1.55	0.74
	Median	0.73	1.72	1.64	2.38	1.31	1.28	1.56	1.39	0.56	1.54	2.19	1.09
	Quantile (0.85)	0.70	1.56	1.39	1.38	1.63	0.76	1.93	2.05	0.49	0.82	1.65	1.33
	Quantile (0.95)	0.81	0.73	0.77	1.18	1.57	1.40	1.85	1.70	1.02	0.79	1.26	1.08
2 Moderate	Mean	4.40	3.98	4.93	2.61	1.70	1.80	1.96	1.83	1.35	2.60	3.35	3.11
	Median	4.26	4.66	5.09	2.87	2.10	2.41	1.44	1.72	1.48	5.08	4.95	4.44
	Quantile (0.85)	3.46	3.44	3.90	4.10	0.96	3.57	4.39	3.19	2.35	2.61	6.00	6.09
	Quantile (0.95)	3.31	2.85	3.87	4.20	1.11	3.59	3.06	2.36	1.99	2.27	5.12	4.97
3 Sharp	Mean	3.61	1.78	2.08	.	.	.	2.93	1.75	1.20	6.69	5.03	3.69
	Median	4.38	2.57	2.15	.	.	.	3.17	1.32	1.94	12.59	11.89	7.82
	Quantile (0.85)	4.70	1.86	3.12	.	.	.	7.25	5.15	2.39	4.96	3.48	4.71
	Quantile (0.95)	5.99	1.34	4.79	.	.	.	5.52	4.38	1.70	2.24	2.90	3.00
Total	Mean	0.76	1.02	0.71	1.71	1.22	0.56	1.43	1.23	0.39	1.23	1.47	0.74
	Median	0.79	0.84	0.78	2.22	1.30	1.02	1.62	1.37	0.64	1.66	2.03	0.93
	Quantile (0.85)	0.73	1.63	1.40	1.38	1.49	0.71	2.09	1.97	0.69	0.92	1.55	1.15
	Quantile (0.95)	0.80	0.74	0.70	1.28	1.46	1.27	1.69	1.66	0.95	0.77	1.38	1.14

Table C-8c. Standard Deviation of Speed by Road Type and Horizontal Curvature Class (Free-Flow)

	FCC ROAD CLASS											
	1 Limited access			2 Major arterial			3 Minor arterial			Total		
	2007	2009	Change	2007	2009	Change	2007	2009	Change	2007	2009	Change
HOR_CURVERDCLASS	Std Dev			Std Dev			Std Dev			Std Dev		
1 Straight	9.13	8.12	-1.01	10.77	10.38	-0.39	10.79	10.33	-0.47	12.79	14.03	1.24
2 Moderate	9.52	8.59	-0.93	8.95	7.83	-1.12	10.06	10.14	0.07	13.29	15.37	2.09
3 Sharp	8.36	6.39	-1.97	9.93	7.22	-2.71	10.15	9.42	-0.73	14.27	15.64	1.37
Total	9.15	8.11	-1.03	10.76	10.33	-0.43	10.91	10.46	-0.44	12.99	14.21	1.22

Table C-9a. Speed Estimate of Speed by Road Type and Vertical Curvature Class (Free-Flow)

		FCC ROAD CLASS											
		1 Limited access			2 Major arterial			3 Minor arterial/collector			Total		
		Speed Estimate			Speed Estimate			Speed Estimate			Speed Estimate		
		2007	2009	Change	2007	2009	Change	2007	2009	Change	2007	2009	Change
VER_CURVERDCLASS		Estimate	Estimate	Estimate	Estimate	Estimate	Estimate	Estimate	Estimate	Estimate	Estimate	Estimate	Estimate
1 Flat	Mean	64.76	70.56	5.81	53.57	53.26	-0.30	46.99	47.13	0.14	54.71	56.69	1.98
	Median	64.98	70.88	5.90	54.04	53.37	-0.67	45.97	46.38	0.41	55.22	56.38	1.16
	Quantile (0.85)	73.93	77.99	4.06	64.46	63.74	-0.72	58.37	57.82	-0.56	68.69	73.00	4.31
	Quantile (0.95)	79.33	81.87	2.55	70.56	70.14	-0.42	66.00	65.56	-0.44	75.23	78.99	3.76
2 Moderate	Mean	62.99	66.67	3.68	55.03	52.59	-2.45	45.86	46.93	1.08	51.64	50.72	-0.93
	Median	62.69	65.68	2.99	55.39	52.19	-3.20	43.49	44.77	1.27	52.78	49.82	-2.96
	Quantile (0.85)	70.39	71.81	1.42	59.72	57.77	-1.95	59.30	59.54	0.24	64.98	65.00	0.02
	Quantile (0.95)	75.07	75.70	0.63	62.71	62.62	-0.09	65.13	66.45	1.32	70.50	70.91	0.41
3 Steep	Mean	61.01	68.59	7.58	56.25	55.62	-0.63	41.47	39.73	-1.74	46.08	44.53	-1.56
	Median	60.89	68.45	7.56	57.29	57.02	-0.27	41.58	39.48	-2.10	43.49	42.60	-0.89
	Quantile (0.85)	67.61	74.55	6.94	71.89	67.45	-4.44	48.13	47.63	-0.50	59.23	58.37	-0.87
	Quantile (0.95)	72.57	77.99	5.42	78.86	73.27	-5.59	52.92	52.59	-0.32	70.92	67.07	-3.85
Total	Mean	64.69	70.50	5.80	53.62	53.28	-0.34	46.85	47.01	0.17	54.51	56.39	1.88
	Median	64.86	70.84	5.98	54.10	53.37	-0.73	45.85	46.15	0.29	55.02	56.00	0.98
	Quantile (0.85)	73.77	77.96	4.18	64.46	63.68	-0.78	58.30	57.82	-0.48	68.48	72.99	4.51
	Quantile (0.95)	79.20	81.83	2.63	70.64	70.14	-0.50	65.95	65.56	-0.39	75.06	78.99	3.93

Table C-9b. Standard Error of Speed by Road Type and Vertical Curvature Class (Free-Flow)

		FCC ROAD CLASS											
		1 Limited access			2 Major arterial			3 Minor arterial/collector			Total		
		Standard Error			Standard Error			Standard Error			Standard Error		
		2007	2009	Change	2007	2009	Change	2007	2009	Change	2007	2009	Change
VER_CURVERDCLASS		Std Err	Std Err	Std Err	Std Err	Std Err	Std Err	Std Err	Std Err	Std Err	Std Err	Std Err	Std Err
1 Flat	Mean	0.78	1.02	0.72	1.71	1.24	0.54	1.37	1.17	0.40	1.22	1.49	0.76
	Median	0.88	1.23	1.18	2.19	1.30	0.97	1.47	1.32	0.55	1.51	2.13	1.11
	Quantile (0.85)	0.74	2.09	1.95	1.37	1.56	0.60	1.93	1.86	0.81	0.86	1.80	1.48
	Quantile (0.95)	0.86	0.72	0.77	1.12	1.54	1.20	1.86	1.65	1.18	0.79	1.26	1.00
2 Moderate	Mean	.	.	.	.	.	.	4.49	4.05	1.48	4.73	3.44	2.19
	Median	.	.	.	.	.	.	4.52	4.46	1.90	8.17	5.87	4.65
	Quantile (0.85)	.	.	.	.	.	.	8.31	5.34	3.39	4.67	4.57	0.84
	Quantile (0.95)	.	.	.	.	.	.	6.22	4.75	1.79	4.90	4.02	1.34
3 Steep	Mean	.	.	.	13.67	10.87	2.95	3.56	2.73	0.95	4.71	4.44	0.82
	Median	.	.	.	15.00	11.80	3.49	4.46	3.68	1.72	2.29	3.12	1.20
	Quantile (0.85)	.	.	.	21.25	14.19	7.09	2.37	3.32	1.32	11.94	10.26	2.66
	Quantile (0.95)	.	.	.	20.68	14.60	6.11	3.20	3.79	1.03	14.98	11.97	3.45
Total	Mean	0.76	1.02	0.71	1.71	1.22	0.56	1.43	1.23	0.39	1.23	1.47	0.74
	Median	0.79	0.84	0.78	2.22	1.30	1.02	1.62	1.37	0.64	1.66	2.03	0.93
	Quantile (0.85)	0.73	1.63	1.40	1.38	1.49	0.71	2.09	1.97	0.69	0.92	1.55	1.15
	Quantile (0.95)	0.80	0.74	0.70	1.28	1.46	1.27	1.69	1.66	0.95	0.77	1.38	1.14

Table C-9c. Standard Deviation of Speed by Road Type and Vertical Curvature Class (Free-Flow)

	FCC ROAD CLASS											
	1 Limited access			2 Major arterial			3 Minor arterial			Total		
	2007	2009	Change	2007	2009	Change	2007	2009	Change	2007	2009	Change
VER_CURVERDCLASS	Std Dev			Std Dev			Std Dev			Std Dev		
1 Flat	9.20	8.13	-1.07	10.76	10.35	-0.40	10.93	10.43	-0.50	12.99	14.21	1.22
2 Moderate	7.14	5.46	-1.68	5.10	5.79	0.69	11.01	11.02	0.01	12.45	12.33	-0.12
3 Steep	6.92	7.16	0.24	13.98	11.76	-2.22	7.14	7.54	0.41	11.89	11.67	-0.22
Total	9.15	8.11	-1.03	10.76	10.33	-0.43	10.91	10.46	-0.44	12.99	14.21	1.22

Table C-10a. Speed Estimate of Speed by Road Type by Urbanicity (Urban/Suburban, Suburban, Rural) (Free-Flow)

		FCC ROAD CLASS											
		1 Limited access			2 Major arterial			3 Minor arterial/collector			Total		
		Speed Estimate			Speed Estimate			Speed Estimate			Speed Estimate		
		2007	2009	Change	2007	2009	Change	2007	2009	Change	2007	2009	Change
URBANICITY		Estimate	Estimate	Estimate	Estimate	Estimate	Estimate	Estimate	Estimate	Estimate	Estimate	Estimate	Estimate
1 Urban	Mean	52.79	61.53	8.74	43.77	47.34	3.57	39.20	39.82	0.62	40.75	44.33	3.58
	Median	57.79	63.20	5.41	43.05	46.85	3.80	38.73	39.65	0.92	39.77	42.27	2.50
	Quantile (0.85)	65.75	70.58	4.83	50.32	53.65	3.33	47.25	47.20	-0.06	49.84	57.23	7.39
	Quantile (0.95)	69.75	74.92	5.16	55.88	58.94	3.06	52.75	52.68	-0.08	58.73	66.99	8.25
2 Urban-Suburban	Mean	65.57	71.60	6.02	55.38	54.65	-0.73	47.70	47.83	0.13	55.53	57.84	2.31
	Median	65.75	71.98	6.22	55.36	54.35	-1.01	47.01	47.24	0.23	55.67	57.34	1.67
	Quantile (0.85)	74.38	78.77	4.39	64.49	63.85	-0.63	58.59	58.30	-0.28	68.96	74.00	5.04
	Quantile (0.95)	79.79	81.99	2.20	70.19	70.09	-0.10	65.56	65.77	0.21	75.40	79.00	3.60
3 Suburban	Mean	62.74	67.37	4.63	46.41	47.48	1.07	44.07	44.53	0.46	51.92	53.24	1.32
	Median	62.85	66.79	3.94	45.97	47.21	1.23	42.89	43.55	0.66	51.52	52.10	0.58
	Quantile (0.85)	71.65	74.90	3.25	57.13	58.84	1.71	54.27	54.26	-0.01	66.66	69.97	3.31
	Quantile (0.95)	76.71	79.32	2.62	63.85	66.10	2.24	62.45	61.00	-1.45	72.98	75.96	2.98
4 Rural	Mean	66.65	72.97	6.32	56.26	54.79	-1.47	53.21	51.89	-1.32	58.34	58.54	0.20
	Median	66.51	73.00	6.48	57.05	55.74	-1.31	53.83	52.25	-1.58	59.25	58.97	-0.29
	Quantile (0.85)	76.03	80.38	4.35	67.85	65.95	-1.89	65.59	63.97	-1.62	71.06	74.00	2.94
	Quantile (0.95)	81.84	84.29	2.45	74.50	72.18	-2.32	72.74	70.23	-2.51	77.84	79.99	2.14
Total	Mean	64.69	70.50	5.80	53.62	53.28	-0.34	46.85	47.01	0.17	54.51	56.39	1.88
	Median	64.86	70.84	5.98	54.10	53.37	-0.73	45.85	46.15	0.29	55.02	56.00	0.98
	Quantile (0.85)	73.77	77.96	4.18	64.46	63.68	-0.78	58.30	57.82	-0.48	68.48	72.99	4.51
	Quantile (0.95)	79.20	81.83	2.63	70.64	70.14	-0.50	65.95	65.56	-0.39	75.06	78.99	3.93

Table C-10b. Standard Error of Speed by Road Type by Urbanicity (Urban/Suburban, Suburban, Rural) (Free-Flow)

		FCC ROAD CLASS											
		1 Limited access			2 Major arterial			3 Minor arterial/collector			Total		
		Standard Error			Standard Error			Standard Error			Standard Error		
		2007	2009	Change	2007	2009	Change	2007	2009	Change	2007	2009	Change
URBANICITY		Std Err	Std Err	Std Err	Std Err	Std Err	Std Err	Std Err	Std Err	Std Err	Std Err	Std Err	Std Err
1 Urban	Mean	.	.	.	.	3.79	.	1.85	2.83	1.15	1.34	4.85	4.08
	Median	.	.	.	.	3.74	.	1.75	2.78	1.29	1.35	3.49	2.33
	Quantile (0.85)	.	.	.	.	5.48	.	2.90	3.62	1.16	2.17	10.27	9.42
	Quantile (0.95)	.	.	.	.	6.71	.	2.81	4.00	1.51	4.87	12.91	14.73
2 Urban-Suburban	Mean	0.62	1.14	0.77	2.48	1.79	0.78	1.82	1.57	0.34	1.66	1.91	0.81
	Median	0.64	1.34	1.21	2.95	1.92	1.36	2.04	1.67	0.69	2.59	2.88	1.38
	Quantile (0.85)	0.76	0.92	1.31	2.14	2.74	0.87	2.64	2.39	0.86	0.53	2.01	1.99
	Quantile (0.95)	0.89	0.86	1.31	1.19	3.13	2.04	1.78	2.19	1.13	0.53	1.08	1.27
3 Suburban	Mean	1.40	0.51	1.15	3.17	3.12	0.80	2.17	1.44	1.13	2.27	1.25	1.74
	Median	1.72	0.49	1.42	3.30	3.15	0.99	2.12	1.58	1.11	3.35	2.48	3.08
	Quantile (0.85)	1.04	0.68	0.43	3.97	3.61	1.19	3.07	2.25	2.08	2.08	2.26	2.34
	Quantile (0.95)	1.08	0.72	0.61	3.45	4.22	1.74	3.14	2.47	1.85	1.36	0.95	0.91
4 Rural	Mean	.	.	.	1.58	2.07	0.52	5.57	6.19	0.97	3.08	6.20	3.19
	Median	.	.	.	0.81	1.20	0.53	6.89	8.46	2.19	3.04	7.26	4.38
	Quantile (0.85)	.	.	.	0.68	0.68	1.33	6.61	6.30	0.84	3.71	8.93	5.25
	Quantile (0.95)	.	.	.	0.73	0.85	1.57	5.51	3.88	1.68	3.32	8.12	4.90
Total	Mean	0.76	1.02	0.71	1.71	1.22	0.56	1.43	1.23	0.39	1.23	1.47	0.74
	Median	0.79	0.84	0.78	2.22	1.30	1.02	1.62	1.37	0.64	1.66	2.03	0.93
	Quantile (0.85)	0.73	1.63	1.40	1.38	1.49	0.71	2.09	1.97	0.69	0.92	1.55	1.15
	Quantile (0.95)	0.8	0.7	0.7	1.3	1.5	1.3	1.7	1.7	1.0	0.8	1.4	1.1

Table C-10c. Standard Deviation of Speed by Road Type by Urbanicity (Urban/Suburban, Suburban, Rural) (Free-Flow)

	FCC ROAD CLASS											
	1 Limited access			2 Major arterial			3 Minor arterial			Total		
	2007	2009	Change	2007	2009	Change	2007	2009	Change	2007	2009	Change
URBANICITY	Std Dev	Std Dev		Std Dev	Std Dev		Std Dev	Std Dev		Std Dev	Std Dev	
1 Urban	15.29	12.87	-2.42	6.67	6.73	0.05	7.91	7.60	-0.31	9.38	11.64	2.25
2 Urban-Suburban	8.96	7.47	-1.49	9.17	9.08	-0.10	10.53	10.38	-0.15	12.56	13.98	1.43
3 Suburban	8.84	8.14	-0.71	10.54	11.17	0.63	9.94	9.30	-0.64	13.11	14.10	0.99
Rural	9.10	7.79	-1.31	11.46	11.09	-0.37	12.11	11.41	-0.70	12.40	13.62	1.22
Total	9.15	8.11	-1.03	10.76	10.33	-0.43	10.91	10.46	-0.44	12.99	14.21	1.22

Table C-11a. Speed Estimate of Speed by Road Type by Vehicle Length Class (<20, 20-29, 30-39, 40-49, 50-79, 80-10) (Free-Flow)

		FCC ROAD CLASS											
		1 Limited access			2 Major arterial			3 Minor arterial/collector			Total		
		Speed Estimate			Speed Estimate			Speed Estimate			Speed Estimate		
		2007	2009	Change	2007	2009	Change	2007	2009	Change	2007	2009	Change
VEH_LENGTH		Estimate	Estimate	Estimate	Estimate	Estimate	Estimate	Estimate	Estimate	Estimate	Estimate	Estimate	Estimate
1 (<20 ft)	Mean	64.72	71.33	6.61	52.45	51.05	-1.39	45.80	45.03	-0.77	52.88	54.95	2.07
	Median	65.08	71.93	6.84	52.75	51.34	-1.42	44.74	44.21	-0.53	52.63	53.37	0.74
	Quantile (0.85)	73.84	78.82	4.99	63.00	60.79	-2.22	56.53	55.22	-1.31	67.44	72.99	5.55
	Quantile (0.95)	79.04	82.43	3.39	69.18	66.46	-2.73	64.30	62.06	-2.24	74.21	79.00	4.79
2 (20-<30 ft)	Mean	67.08	71.80	4.72	58.59	56.71	-1.88	52.75	50.68	-2.07	60.10	58.09	-2.01
	Median	67.33	72.64	5.31	59.54	56.96	-2.58	53.82	50.06	-3.76	61.03	57.74	-3.29
	Quantile (0.85)	76.41	78.88	2.47	68.91	67.06	-1.85	64.48	62.00	-2.48	72.67	73.74	1.07
	Quantile (0.95)	81.80	82.18	0.38	75.22	73.16	-2.06	71.87	69.40	-2.46	78.62	78.99	0.38
3 (30-<40 ft)	Mean	61.53	67.59	6.06	53.29	56.34	3.05	49.18	51.37	2.19	54.95	57.73	2.78
	Median	61.38	67.72	6.34	54.51	56.31	1.80	49.30	50.83	1.53	55.50	58.00	2.50
	Quantile (0.85)	70.29	75.91	5.62	63.75	67.60	3.85	61.09	62.92	1.83	66.79	71.23	4.44
	Quantile (0.95)	76.17	79.88	3.71	70.53	75.05	4.51	68.11	71.30	3.19	73.28	77.29	4.01
4 (40-<50 ft)	Mean	60.24	66.71	6.47	53.59	56.18	2.59	49.60	51.92	2.32	55.17	58.97	3.80
	Median	60.32	66.74	6.42	54.34	56.76	2.42	50.03	52.14	2.11	55.61	60.00	4.39
	Quantile (0.85)	68.89	74.46	5.57	63.60	66.10	2.50	60.43	62.25	1.82	65.95	71.00	5.05
	Quantile (0.95)	74.41	78.31	3.90	69.60	72.61	3.01	66.70	69.08	2.38	71.90	76.04	4.14
5 (50-<80 ft)	Mean	62.36	65.36	3.00	56.15	55.80	-0.35	53.08	52.87	-0.21	60.40	63.30	2.90
	Median	62.48	64.95	2.47	56.86	56.79	-0.08	54.16	54.28	0.11	61.03	64.00	2.97
	Quantile (0.85)	69.29	71.58	2.29	64.64	65.86	1.22	63.05	63.58	0.53	68.25	71.00	2.74
	Quantile (0.95)	74.12	75.26	1.13	70.04	72.14	2.10	68.18	69.34	1.16	73.21	75.00	1.79
6 (80-<100 ft)	Mean	66.54	66.15	-0.38	61.71	58.48	-3.23	57.18	55.01	-2.18	65.43	64.93	-0.50
	Median	66.41	66.05	-0.36	62.93	59.53	-3.40	58.56	56.42	-2.14	65.76	65.96	0.21
	Quantile (0.85)	74.18	72.80	-1.38	70.23	66.58	-3.65	68.56	63.85	-4.71	73.68	72.93	-0.75
	Quantile (0.95)	80.05	76.67	-3.38	75.03	71.51	-3.52	72.72	69.97	-2.75	79.53	76.32	-3.21
Total	Mean	64.69	70.50	5.80	53.62	53.28	-0.34	46.85	47.01	0.17	54.51	56.39	1.88
	Median	64.86	70.84	5.98	54.10	53.37	-0.73	45.85	46.15	0.29	55.02	56.00	0.98
	Quantile (0.85)	73.77	77.96	4.18	64.46	63.68	-0.78	58.30	57.82	-0.48	68.48	72.99	4.51
	Quantile (0.95)	79.20	81.83	2.63	70.64	70.14	-0.50	65.95	65.56	-0.39	75.06	78.99	3.93

Table C-11b. Standard Error of Speed by Road Type by Vehicle Length Class (<20, 20-29, 30-39, 40-49, 50-79, 80-10) (Free-Flow)

		FCC ROAD CLASS											
		1 Limited access			2 Major arterial			3 Minor arterial/collector			Total		
		Standard Error			Standard Error			Standard Error			Standard Error		
		2007	2009	Change	2007	2009	Change	2007	2009	Change	2007	2009	Change
VEH_LENGTH		Std Err	Std Err	Std Err	Std Err	Std Err	Std Err	Std Err	Std Err	Std Err	Std Err	Std Err	Std Err
1 (<20 ft)	Mean	0.86	1.26	1.02	1.56	0.93	0.72	1.29	1.04	0.50	1.07	1.59	1.04
	Median	0.93	1.45	1.27	2.15	0.96	1.37	1.23	1.18	0.65	1.72	1.97	1.16
	Quantile (0.85)	0.91	1.28	1.19	1.52	1.24	0.59	2.09	1.47	1.12	1.02	2.17	2.02
	Quantile (0.95)	0.92	1.08	0.96	1.29	1.31	0.95	2.19	1.66	1.13	0.89	1.26	1.15
2 (20-<30 ft)	Mean	0.73	0.95	0.69	1.69	1.44	0.54	1.71	1.38	0.55	1.08	1.17	0.82
	Median	0.88	1.23	1.14	1.32	1.56	0.49	2.10	1.58	0.94	0.87	1.44	0.94
	Quantile (0.85)	0.87	0.21	0.78	0.76	1.50	1.20	1.16	1.86	1.15	0.69	1.68	1.46
	Quantile (0.95)	0.96	0.49	0.81	0.89	1.25	1.39	1.42	1.48	1.30	0.65	0.45	0.62
3 (30-<40 ft)	Mean	0.60	1.00	0.85	1.96	1.21	0.94	1.56	1.24	0.51	1.12	1.04	0.53
	Median	0.75	0.79	0.96	2.43	1.35	1.45	2.84	1.70	1.32	0.68	1.28	0.84
	Quantile (0.85)	0.65	0.34	0.61	1.46	1.17	1.05	0.98	1.08	0.86	0.77	1.30	1.28
	Quantile (0.95)	0.43	0.63	0.81	0.98	0.85	0.84	1.82	1.04	1.79	0.89	1.49	1.58
4 (40-<50 ft)	Mean	0.88	0.93	0.73	1.59	0.96	0.88	1.77	1.58	0.35	1.02	1.05	0.79
	Median	0.67	0.88	0.77	1.66	1.19	0.78	2.92	1.79	1.27	0.76	1.07	1.11
	Quantile (0.85)	0.66	0.70	0.65	1.07	0.76	1.08	1.15	1.04	0.76	0.46	1.10	1.18
	Quantile (0.95)	0.83	0.56	0.73	1.89	1.03	2.02	1.35	0.81	1.55	0.68	1.55	1.50
5 (50-<80 ft)	Mean	1.18	1.41	0.36	1.44	1.42	0.55	1.72	2.19	0.70	1.21	1.42	0.38
	Median	1.18	1.85	1.34	1.45	1.38	0.29	2.51	2.58	0.60	1.00	1.56	1.15
	Quantile (0.85)	1.03	1.33	0.59	1.38	0.65	1.42	0.55	1.05	1.09	0.88	2.45	2.02
	Quantile (0.95)	0.93	0.92	0.33	2.24	0.70	1.84	1.29	0.63	1.06	0.75	0.92	0.93
6 (80-<100 ft)	Mean	1.58	1.71	0.80	1.41	3.20	3.32	2.78	2.15	1.36	1.39	1.58	0.79
	Median	1.03	1.55	0.81	1.12	2.35	1.71	4.90	1.23	4.15	0.94	1.33	0.72
	Quantile (0.85)	1.83	1.95	0.41	3.71	2.42	5.86	3.40	0.57	3.50	1.53	2.52	1.32
	Quantile (0.95)	2.56	1.56	1.64	4.42	2.78	6.72	2.47	0.32	2.75	1.97	1.60	1.03
Total	Mean	0.76	1.02	0.71	1.71	1.22	0.56	1.43	1.23	0.39	1.23	1.47	0.74
	Median	0.79	0.84	0.78	2.22	1.30	1.02	1.62	1.37	0.64	1.66	2.03	0.93
	Quantile (0.85)	0.73	1.63	1.40	1.38	1.49	0.71	2.09	1.97	0.69	0.92	1.55	1.15
	Quantile (0.95)	0.80	0.74	0.70	1.28	1.46	1.27	1.69	1.66	0.95	0.77	1.38	1.14

Table C-11c. Standard Deviation of Speed by Road Type by Vehicle Length Class (<20, 20-29, 30-39, 40-49, 50-79, 80-10) (Free-Flow)

	FCC ROAD CLASS											
	1 Limited access			2 Major arterial			3 Minor arterial			Total		
	2007	2009	Change	2007	2009	Change	2007	2009	Change	2007	2009	Change
VEH_LENGTH	Std Dev	Std Dev		Std Dev	Std Dev		Std Dev	Std Dev		Std Dev	Std Dev	
1 (<20 ft)	9.32	7.84	-1.48	10.45	9.72	-0.72	10.41	9.74	-0.66	13.01	14.84	1.83
2 (20-<30 ft)	9.18	7.92	-1.27	11.18	10.19	-0.99	12.06	10.68	-1.38	12.48	13.22	0.74
3 (30-<40 ft)	8.91	9.01	0.10	10.95	10.99	0.04	11.51	11.14	-0.37	11.82	12.50	0.68
4 (40-<50 ft)	8.87	8.86	-0.01	10.23	10.30	0.07	10.66	10.53	-0.12	10.88	11.79	0.91
5 (50-<80 ft)	7.16	7.04	-0.12	9.17	10.67	1.49	10.11	11.08	0.97	8.57	9.00	0.43
6 (80-<100 ft)	7.75	7.79	0.04	9.97	8.94	-1.03	10.71	10.08	-0.63	8.64	8.62	-0.01
Total	9.15	8.11	-1.03	10.76	10.33	-0.43	10.91	10.46	-0.44	12.99	14.21	1.22

Table C-12a. Speed Estimate of Speed by Road Type, Horizontal Curvature Class, and Vertical Curvature Class (Free-Flow)

			FCC ROAD CLASS											
			1 Limited access			2 Major arterial			3 Minor arterial/collector			Total		
			Speed Estimate			Speed Estimate			Speed Estimate			Speed Estimate		
			2007	2009	Change	2007	2009	Change	2007	2009	Change	2007	2009	Change
HOR_ CURVERD CLASS	VER_ CURVERD CLASS		Estimate	Estimate	Estimate	Estimate	Estimate	Estimate	Estimate	Estimate	Estimate	Estimate	Estimate	Estimate
1 Straight	1 Flat	Mean	64.89	70.69	5.80	53.25	52.96	-0.29	47.73	47.85	0.11	55.24	57.01	1.77
		Median	65.09	70.92	5.83	53.78	52.97	-0.81	46.81	47.11	0.30	55.50	56.51	1.01
		Quantile (0.85)	74.00	78.69	4.69	64.09	63.52	-0.57	58.93	58.37	-0.55	68.91	73.00	4.09
		Quantile (0.95)	79.35	82.00	2.65	70.28	70.09	-0.19	66.70	66.09	-0.60	75.41	79.00	3.59
	2 Moderate	Mean	.	.	.	55.03	52.59	-2.45	45.84	45.68	-0.16	47.04	46.66	-0.38
		Median	.	.	.	55.39	52.19	-3.20	42.98	43.31	0.33	45.29	44.99	-0.30
		Quantile (0.85)	.	.	.	59.72	57.77	-1.95	60.65	58.77	-1.88	60.31	58.67	-1.65
		Quantile (0.95)	.	.	.	62.71	62.62	-0.09	65.84	66.45	0.62	65.47	65.62	0.15
	3 Steep	Mean	61.01	68.59	7.58	56.73	56.05	-0.68	45.17	43.68	-1.49	50.35	49.13	-1.22
		Median	60.89	68.45	7.56	57.69	57.39	-0.29	44.70	43.54	-1.15	46.52	46.48	-0.04
		Quantile (0.85)	67.61	74.55	6.94	71.92	67.60	-4.32	50.41	49.92	-0.49	63.85	62.13	-1.72
		Quantile (0.95)	72.57	77.99	5.42	78.87	73.33	-5.54	54.96	54.16	-0.80	73.98	69.68	-4.30
	Total	Mean	64.89	70.69	5.80	53.32	52.99	-0.33	47.63	47.71	0.08	55.03	56.72	1.69
		Median	65.08	70.92	5.83	53.92	52.99	-0.93	46.59	46.88	0.29	55.35	56.06	0.71
		Quantile (0.85)	74.00	78.69	4.69	64.19	63.52	-0.66	58.93	58.35	-0.57	68.78	73.00	4.21
		Quantile (0.95)	79.35	82.00	2.65	70.39	70.09	-0.30	66.56	66.08	-0.48	75.27	78.99	3.73
2 Moderate	1 Flat	Mean	60.57	68.91	8.33	59.12	58.57	-0.55	40.26	40.59	0.33	48.08	53.58	5.50
		Median	60.77	69.33	8.56	58.70	58.71	0.00	38.66	39.15	0.49	46.57	54.60	8.04
		Quantile (0.85)	70.25	76.89	6.64	68.11	65.70	-2.41	50.48	50.90	0.42	63.48	72.00	8.52
		Quantile (0.95)	75.59	80.32	4.73	74.01	70.84	-3.17	59.58	57.73	-1.85	70.84	77.96	7.11
	2 Moderate	Mean	.	.	.	.	.	.	50.82	54.22	3.40	50.82	54.22	3.40
		Median	.	.	.	.	.	.	50.64	54.60	3.96	50.64	54.60	3.96
		Quantile (0.85)	.	.	.	.	.	.	59.54	62.31	2.77	59.54	62.31	2.77
		Quantile (0.95)	.	.	.	.	.	.	64.77	68.18	3.41	64.77	68.18	3.41
	3 Steep	Mean	.	.	.	33.10	31.39	-1.72	36.89	34.89	-2.00	36.81	34.83	-1.98
		Median	.	.	.	32.17	30.91	-1.26	36.52	33.64	-2.88	36.29	33.64	-2.65
		Quantile (0.85)	.	.	.	38.65	36.12	-2.53	42.33	40.22	-2.10	42.29	40.19	-2.11
		Quantile (0.95)	.	.	.	44.03	38.91	-5.13	46.89	45.15	-1.74	46.82	45.14	-1.68

Table C-12a. Speed Estimate of Speed by Road Type, Horizontal Curvature Class, and Vertical Curvature Class (Free-Flow)

			FCC ROAD CLASS											
			1 Limited access			2 Major arterial			3 Minor arterial/collector			Total		
			Speed Estimate			Speed Estimate			Speed Estimate			Speed Estimate		
			2007	2009	Change	2007	2009	Change	2007	2009	Change	2007	2009	Change
HOR_ CURVERD CLASS	VER_ CURVERD CLASS		Estimate	Estimate	Estimate	Estimate	Estimate	Estimate	Estimate	Estimate	Estimate	Estimate	Estimate	Estimate
	Total	Mean	60.57	68.91	8.33	58.97	58.45	-0.52	41.11	41.92	0.81	47.73	52.87	5.14
		Median	60.77	69.33	8.56	58.68	58.70	0.02	39.39	39.81	0.42	46.00	53.55	7.56
		Quantile (0.85)	70.25	76.89	6.64	68.09	65.70	-2.39	52.14	53.95	1.81	62.85	70.99	8.14
		Quantile (0.95)	75.59	80.32	4.73	74.00	70.84	-3.17	60.26	60.36	0.11	70.19	76.99	6.80
3 Sharp	1 Flat	Mean	67.78	70.15	2.38	59.23	58.19	-1.03	42.42	40.95	-1.47	48.22	52.37	4.15
		Median	68.31	70.21	1.90	59.34	58.20	-1.14	39.89	38.57	-1.32	44.70	52.13	7.43
		Quantile (0.85)	76.78	76.34	-0.44	69.01	65.12	-3.89	55.88	52.89	-2.99	65.98	71.99	6.02
		Quantile (0.95)	83.46	79.46	-4.00	75.72	69.82	-5.90	61.92	59.55	-2.37	74.61	76.98	2.38
	2 Moderate	Mean	62.99	66.67	3.68	.	.	.	41.07	41.87	0.80	57.28	59.07	1.79
		Median	62.69	65.68	2.99	.	.	.	39.30	39.90	0.59	59.79	63.95	4.16
		Quantile (0.85)	70.39	71.81	1.42	.	.	.	49.05	49.97	0.92	68.98	70.89	1.91
		Quantile (0.95)	75.07	75.70	0.63	.	.	.	57.75	58.78	1.03	73.61	74.98	1.37
	3 Steep	Mean	.	.	.	.	.	.	43.16	37.06	-6.09	43.16	37.06	-6.09
		Median	.	.	.	.	.	.	42.82	36.32	-6.49	42.82	36.32	-6.49
		Quantile (0.85)	.	.	.	.	.	.	47.88	44.24	-3.65	47.88	44.24	-3.65
		Quantile (0.95)	.	.	.	.	.	.	52.20	57.04	4.84	52.20	57.04	4.84
	Total	Mean	63.87	68.56	4.70	59.23	58.19	-1.03	42.04	41.09	-0.95	53.04	54.30	1.26
		Median	63.53	67.77	4.24	59.34	58.20	-1.14	39.69	39.04	-0.65	55.62	57.50	1.88
		Quantile (0.85)	71.95	74.88	2.92	69.01	65.12	-3.89	54.38	52.63	-1.75	68.20	71.98	3.78
		Quantile (0.95)	77.25	78.36	1.10	75.72	69.82	-5.90	60.98	59.52	-1.46	73.95	76.97	3.02
Total	1 Flat	Mean	64.76	70.56	5.81	53.57	53.26	-0.30	46.99	47.13	0.14	54.71	56.69	1.98
		Median	64.98	70.88	5.90	54.04	53.37	-0.67	45.97	46.38	0.41	55.22	56.38	1.16
		Quantile (0.85)	73.93	77.99	4.06	64.46	63.74	-0.72	58.37	57.82	-0.56	68.69	73.00	4.31
		Quantile (0.95)	79.33	81.87	2.55	70.56	70.14	-0.42	66.00	65.56	-0.44	75.23	78.99	3.76
	2 Moderate	Mean	62.99	66.67	3.68	55.03	52.59	-2.45	45.86	46.93	1.08	51.64	50.72	-0.93
		Median	62.69	65.68	2.99	55.39	52.19	-3.20	43.49	44.77	1.27	52.78	49.82	-2.96
		Quantile (0.85)	70.39	71.81	1.42	59.72	57.77	-1.95	59.30	59.54	0.24	64.98	65.00	0.02
		Quantile (0.95)	75.07	75.70	0.63	62.71	62.62	-0.09	65.13	66.45	1.32	70.50	70.91	0.41

Table C-12a. Speed Estimate of Speed by Road Type, Horizontal Curvature Class, and Vertical Curvature Class (continued)

			FCC ROAD CLASS											
			1 Limited access			2 Major arterial			3 Minor arterial/collector			Total		
			Speed Estimate			Speed Estimate			Speed Estimate			Speed Estimate		
			2007	2009	Change	2007	2009	Change	2007	2009	Change	2007	2009	Change
HOR_ CURVERD CLASS	VER_ CURVERD CLASS		Estimate	Estimate	Estimate	Estimate	Estimate	Estimate	Estimate	Estimate	Estimate	Estimate	Estimate	Estimate
	3 Steep	Mean	61.01	68.59	7.58	56.25	55.62	-0.63	41.47	39.73	-1.74	46.08	44.53	-1.56
		Median	60.89	68.45	7.56	57.29	57.02	-0.27	41.58	39.48	-2.10	43.49	42.60	-0.89
		Quantile (0.85)	67.61	74.55	6.94	71.89	67.45	-4.44	48.13	47.63	-0.50	59.23	58.37	-0.87
		Quantile (0.95)	72.57	77.99	5.42	78.86	73.27	-5.59	52.92	52.59	-0.32	70.92	67.07	-3.85
	Total	Mean	64.69	70.50	5.80	53.62	53.28	-0.34	46.85	47.01	0.17	54.51	56.39	1.88
		Median	64.86	70.84	5.98	54.10	53.37	-0.73	45.85	46.15	0.29	55.02	56.00	0.98
		Quantile (0.85)	73.77	77.96	4.18	64.46	63.68	-0.78	58.30	57.82	-0.48	68.48	72.99	4.51
		Quantile (0.95)	79.20	81.83	2.63	70.64	70.14	-0.50	65.95	65.56	-0.39	75.06	78.99	3.93

Table C-12b. Standard Error of Speed by Road Type, Horizontal Curvature Class, and Vertical Curvature Class (Free-Flow)

			FCC ROAD CLASS											
			1 Limited access			2 Major arterial			3 Minor arterial/collector			Total		
			Standard Error			Standard Error			Standard Error			Standard Error		
			2007	2009	Change	2007	2009	Change	2007	2009	Change	2007	2009	Change
HOR_ CURVERD CLASS	VER_ CURVERD CLASS		Std Err	Std Err	Std Err	Std Err	Std Err	Std Err	Std Err	Std Err	Std Err	Std Err	Std Err	Std Err
1 Straight	1 Flat	Mean	0.68	1.01	0.71	1.69	1.22	0.53	1.32	1.17	0.34	1.18	1.55	0.76
		Median	0.73	1.72	1.65	2.35	1.30	1.22	1.41	1.26	0.53	1.44	2.23	1.24
		Quantile (0.85)	0.69	1.56	1.40	1.40	1.65	0.72	1.82	1.93	0.60	0.81	2.47	2.14
		Quantile (0.95)	0.81	0.73	0.77	1.06	1.63	1.38	1.86	1.67	1.08	0.84	1.26	1.08
	2 Moderate	Mean	.	.	.	.	.	.	6.60	5.91	0.95	7.56	6.64	1.11
		Median	.	.	.	.	.	.	5.43	4.35	1.38	8.10	5.99	2.47
		Quantile (0.85)	.	.	.	.	.	.	13.48	11.95	2.25	13.10	11.66	1.71
		Quantile (0.95)	.	.	.	.	.	.	13.47	14.42	1.66	13.11	13.69	1.15
	3 Steep	Mean	.	.	.	14.36	11.41	3.12	1.94	2.82	1.20	5.49	4.78	2.11
		Median	.	.	.	15.27	12.08	3.40	1.18	2.70	1.65	2.90	2.93	2.10
		Quantile (0.85)	.	.	.	21.35	14.34	7.01	2.25	3.48	1.30	12.72	10.52	2.97
		Quantile (0.95)	.	.	.	20.71	14.67	6.06	2.93	3.73	0.94	14.29	11.84	2.98
	Total	Mean	0.68	1.01	0.72	1.69	1.20	0.55	1.41	1.25	0.32	1.22	1.55	0.74
		Median	0.73	1.72	1.64	2.38	1.31	1.28	1.56	1.39	0.56	1.54	2.19	1.09
		Quantile (0.85)	0.70	1.56	1.39	1.38	1.63	0.76	1.93	2.05	0.49	0.82	1.65	1.33
		Quantile (0.95)	0.81	0.73	0.77	1.18	1.57	1.40	1.85	1.70	1.02	0.79	1.26	1.08
2 Moderate	1 Flat	Mean	4.40	3.98	4.93	2.60	1.60	1.84	1.89	1.68	1.53	3.02	3.66	3.46
		Median	4.26	4.66	5.09	2.96	2.08	2.43	1.09	1.34	1.40	6.16	5.75	5.57
		Quantile (0.85)	3.46	3.44	3.90	4.10	0.95	3.59	5.17	4.21	2.60	2.87	6.03	6.03
		Quantile (0.95)	3.31	2.85	3.87	4.17	1.10	3.56	4.22	3.08	2.24	2.37	4.79	4.63
	2 Moderate	Mean	.	.	.	.	.	.	3.11	3.51	0.79	3.11	3.51	0.79
		Median	.	.	.	.	.	.	3.23	2.98	0.71	3.23	2.98	0.71
		Quantile (0.85)	.	.	.	.	.	.	4.14	3.65	1.37	4.14	3.65	1.37
		Quantile (0.95)	.	.	.	.	.	.	3.77	5.37	1.72	3.77	5.37	1.72
	3 Steep	Mean	.	.	.	.	.	.	3.86	2.49	1.37	3.70	2.39	1.31
		Median	.	.	.	.	.	.	3.69	2.60	1.65	3.62	2.52	1.53
		Quantile (0.85)	.	.	.	.	.	.	4.76	5.56	1.48	4.64	5.46	1.54
		Quantile (0.95)	.	.	.	.	.	.	5.79	7.45	1.90	5.62	7.33	1.84

Table C-12b. Standard Error of Speed by Road Type, Horizontal Curvature Class, and Vertical Curvature Class (continued)

			FCC ROAD CLASS											
			1 Limited access			2 Major arterial			3 Minor arterial/collector			Total		
			Standard Error			Standard Error			Standard Error			Standard Error		
			2007	2009	Change	2007	2009	Change	2007	2009	Change	2007	2009	Change
HOR_ CURVERD CLASS	VER_ CURVERD CLASS		Std Err	Std Err	Std Err	Std Err	Std Err	Std Err	Std Err	Std Err	Std Err	Std Err	Std Err	Std Err
	Total	Mean	4.40	3.98	4.93	2.61	1.70	1.80	1.96	1.83	1.35	2.60	3.35	3.11
		Median	4.26	4.66	5.09	2.87	2.10	2.41	1.44	1.72	1.48	5.08	4.95	4.44
		Quantile (0.85)	3.46	3.44	3.90	4.10	0.96	3.57	4.39	3.19	2.35	2.61	6.00	6.09
		Quantile (0.95)	3.31	2.85	3.87	4.20	1.11	3.59	3.06	2.36	1.99	2.27	5.12	4.97
3 Sharp	1 Flat	Mean	.	2.09	.	.	.	.	3.01	1.97	1.11	6.33	4.96	6.24
		Median	.	2.62	.	.	.	.	2.56	1.44	1.33	7.06	10.78	8.67
		Quantile (0.85)	.	0.98	.	.	.	.	8.59	5.68	3.34	13.53	4.13	11.88
		Quantile (0.95)	.	0.29	.	.	.	.	8.18	5.80	2.63	11.49	1.44	10.56
	2 Moderate	Mean	.	.	.	.	.	.	7.06	4.73	2.60	14.81	15.83	1.16
		Median	.	.	.	.	.	.	8.95	5.71	3.32	18.45	21.55	3.63
		Quantile (0.85)	.	.	.	.	.	.	10.83	9.52	1.99	16.46	17.54	1.46
		Quantile (0.95)	.	.	.	.	.	.	9.75	9.98	1.26	13.16	13.77	0.66
	3 Steep	Mean	.	.	.	.	.	.	.	0.93	.	.	0.93	.
		Median	.	.	.	.	.	.	.	1.22	.	.	1.22	.
		Quantile (0.85)	.	.	.	.	.	.	.	0.32	.	.	0.32	.
		Quantile (0.95)	.	.	.	.	.	.	.	6.76	.	.	6.76	.
	Total	Mean	3.61	1.78	2.08	.	.	.	2.93	1.75	1.20	6.69	5.03	3.69
		Median	4.38	2.57	2.15	.	.	.	3.17	1.32	1.94	12.59	11.89	7.82
		Quantile (0.85)	4.70	1.86	3.12	.	.	.	7.25	5.15	2.39	4.96	3.48	4.71
		Quantile (0.95)	5.99	1.34	4.79	.	.	.	5.52	4.38	1.70	2.24	2.90	3.00
Total	1 Flat	Mean	0.78	1.02	0.72	1.71	1.24	0.54	1.37	1.17	0.40	1.22	1.49	0.76
		Median	0.88	1.23	1.18	2.19	1.30	0.97	1.47	1.32	0.55	1.51	2.13	1.11
		Quantile (0.85)	0.74	2.09	1.95	1.37	1.56	0.60	1.93	1.86	0.81	0.86	1.80	1.48
		Quantile (0.95)	0.86	0.72	0.77	1.12	1.54	1.20	1.86	1.65	1.18	0.79	1.26	1.00
	2 Moderate	Mean	.	.	.	.	.	.	4.49	4.05	1.48	4.73	3.44	2.19
		Median	.	.	.	.	.	.	4.52	4.46	1.90	8.17	5.87	4.65
		Quantile (0.85)	.	.	.	.	.	.	8.31	5.34	3.39	4.67	4.57	0.84
		Quantile (0.95)	.	.	.	.	.	.	6.22	4.75	1.79	4.90	4.02	1.34

Table C-12b. Standard Error of Speed by Road Type, Horizontal Curvature Class, and Vertical Curvature Class (continued)

			FCC ROAD CLASS											
			1 Limited access			2 Major arterial			3 Minor arterial/collector			Total		
			Standard Error			Standard Error			Standard Error			Standard Error		
			2007	2009	Change	2007	2009	Change	2007	2009	Change	2007	2009	Change
HOR_ CURVERD CLASS	VER_ CURVERD CLASS		Std Err	Std Err	Std Err	Std Err	Std Err	Std Err	Std Err	Std Err	Std Err	Std Err	Std Err	Std Err
	3 Steep	Mean	.	.	.	13.67	10.87	2.95	3.56	2.73	0.95	4.71	4.44	0.82
		Median	.	.	.	15.00	11.80	3.49	4.46	3.68	1.72	2.29	3.12	1.20
		Quantile (0.85)	.	.	.	21.25	14.19	7.09	2.37	3.32	1.32	11.94	10.26	2.66
		Quantile (0.95)	.	.	.	20.68	14.60	6.11	3.20	3.79	1.03	14.98	11.97	3.45
	Total	Mean	0.76	1.02	0.71	1.71	1.22	0.56	1.43	1.23	0.39	1.23	1.47	0.74
		Median	0.79	0.84	0.78	2.22	1.30	1.02	1.62	1.37	0.64	1.66	2.03	0.93
		Quantile (0.85)	0.73	1.63	1.40	1.38	1.49	0.71	2.09	1.97	0.69	0.92	1.55	1.15
		Quantile (0.95)	0.80	0.74	0.70	1.28	1.46	1.27	1.69	1.66	0.95	0.77	1.38	1.14

Table C-12c. Standard Deviation of Speed by Road Type, Horizontal Curvature Class, and Vertical Curvature Class (Free-Flow)

		FCC ROAD CLASS											
		1 Limited access			2 Major arterial			3 Minor arterial			Total		
		2007	2009	Change	2007	2009	Change	2007	2009	Change	2007	2009	Change
HOR_CURVERD CLASS	VER_CURVERD CLASS	Std Dev	Std Dev		Std Dev	Std Dev		Std Dev	Std Dev		Std Dev	Std Dev	
1 Straight	1 Flat	9.13	8.12	-1.01	10.77	10.41	-0.36	10.78	10.30	-0.48	12.77	14.02	1.25
	2 Moderate	.	.	.	5.10	5.79	0.69	11.64	11.01	-0.62	11.43	10.71	-0.73
	3 Steep	6.92	7.16	0.24	13.69	11.38	-2.31	5.79	6.64	0.85	11.52	11.00	-0.53
	Total	9.13	8.12	-1.01	10.77	10.38	-0.39	10.79	10.33	-0.47	12.79	14.03	1.24
2 Moderate	1 Flat	9.52	8.59	-0.93	8.75	7.64	-1.11	9.84	9.11	-0.72	13.60	15.58	1.98
	2 Moderate	.	.	.	.	.	.	8.41	8.79	0.38	8.41	8.79	0.38
	3 Steep	.	.	.	5.93	5.58	-0.35	5.88	5.34	-0.54	5.91	5.36	-0.54
	Total	9.52	8.59	-0.93	8.95	7.83	-1.12	10.06	10.14	0.07	13.29	15.37	2.09
3 Sharp	1 Flat	11.66	6.68	-4.98	9.93	7.22	-2.71	10.79	9.64	-1.15	14.95	16.15	1.21
	2 Moderate	7.14	5.46	-1.68	.	.	.	8.25	8.29	0.04	12.17	13.13	0.97
	3 Steep	.	.	.	.	.	.	5.35	9.55	4.20	5.35	9.55	4.20
	Total	8.36	6.39	-1.97	9.93	7.22	-2.71	10.15	9.42	-0.73	14.27	15.64	1.37
Total	1 Flat	9.20	8.13	-1.07	10.76	10.35	-0.40	10.93	10.43	-0.50	12.99	14.21	1.22
	2 Moderate	7.14	5.46	-1.68	5.10	5.79	0.69	11.01	11.02	0.01	12.45	12.33	-0.12
	3 Steep	6.92	7.16	0.24	13.98	11.76	-2.22	7.14	7.54	0.41	11.89	11.67	-0.22
	Total	9.15	8.11	-1.03	10.76	10.33	-0.43	10.91	10.46	-0.44	12.99	14.21	1.22

Table C-13a. Speed Estimate of Speed by Road Type, Length Class, and Horizontal Curvature Class (Free-Flow)

			FCC ROAD CLASS											
			1 Limited access			2 Major arterial			3 Minor arterial/collector			Total		
			Speed Estimate			Speed Estimate			Speed Estimate			Speed Estimate		
			2007	2009	Change	2007	2009	Change	2007	2009	Change	2007	2009	Change
HOR_ CURVERD CLASS	VEH_ LENGTH		Estimate	Estimate	Estimate	Estimate	Estimate	Estimate	Estimate	Estimate	Estimate	Estimate	Estimate	Estimate
1 Straight	1 (<20 ft)	Mean	64.91	71.55	6.63	52.16	50.80	-1.36	46.55	45.77	-0.78	53.40	55.42	2.02
		Median	65.25	71.96	6.72	52.32	50.93	-1.40	45.50	45.07	-0.43	53.00	53.65	0.65
		Quantile (0.85)	74.06	78.89	4.83	62.66	60.55	-2.11	57.06	55.62	-1.44	67.72	73.00	5.28
		Quantile (0.95)	79.28	82.62	3.34	68.98	66.39	-2.59	64.93	62.61	-2.32	74.47	79.00	4.53
	2 (20-<30 ft)	Mean	67.24	71.96	4.73	58.27	56.42	-1.85	53.64	51.20	-2.44	60.52	58.10	-2.42
		Median	67.55	72.75	5.20	59.30	56.51	-2.79	54.38	50.52	-3.86	61.38	57.63	-3.75
		Quantile (0.85)	76.68	78.96	2.28	68.59	67.01	-1.57	65.11	62.48	-2.63	72.89	73.51	0.63
		Quantile (0.95)	81.86	82.44	0.58	74.89	73.18	-1.71	72.38	69.90	-2.48	78.83	79.00	0.17
	3 (30-<40 ft)	Mean	61.71	67.74	6.04	52.97	56.21	3.24	49.80	51.74	1.94	55.31	57.86	2.55
		Median	61.63	67.81	6.19	54.18	56.06	1.88	49.94	51.07	1.13	55.66	58.08	2.42
		Quantile (0.85)	70.51	75.96	5.45	63.40	67.73	4.34	61.73	63.24	1.50	66.99	71.57	4.57
		Quantile (0.95)	76.25	79.99	3.73	70.51	75.05	4.54	68.74	71.61	2.87	73.67	77.62	3.95
	4 (40-<50 ft)	Mean	60.53	66.88	6.36	53.37	56.08	2.71	50.12	52.25	2.12	55.45	59.08	3.63
		Median	60.53	66.90	6.36	54.14	56.68	2.54	50.69	52.28	1.59	55.84	60.00	4.16
		Quantile (0.85)	69.02	74.62	5.60	63.30	66.32	3.01	60.66	62.65	1.99	66.00	71.59	5.59
		Quantile (0.95)	74.73	78.46	3.73	69.27	72.81	3.54	66.82	69.60	2.78	72.04	76.80	4.76
	5 (50-<80 ft)	Mean	62.63	65.71	3.08	56.04	55.63	-0.41	53.53	53.31	-0.22	60.67	63.64	2.98
		Median	62.62	65.74	3.12	56.81	56.50	-0.31	54.53	54.64	0.12	61.26	65.00	3.74
		Quantile (0.85)	69.39	71.77	2.38	64.54	66.29	1.75	63.24	63.87	0.63	68.50	72.00	3.50
		Quantile (0.95)	74.13	75.41	1.28	69.91	72.20	2.29	68.28	69.63	1.36	73.34	75.80	2.46
	6 (80-<100 ft)	Mean	66.81	66.57	-0.23	61.26	58.26	-3.00	57.79	54.92	-2.87	65.70	65.27	-0.43
		Median	66.45	66.35	-0.10	62.65	59.35	-3.30	58.66	56.31	-2.35	65.98	65.98	0.00
		Quantile (0.85)	74.38	73.07	-1.31	69.42	66.65	-2.77	68.84	63.76	-5.08	73.77	72.96	-0.81
		Quantile (0.95)	80.23	76.84	-3.38	73.99	71.59	-2.41	72.81	69.96	-2.85	79.55	76.53	-3.02
	Total	Mean	64.89	70.69	5.80	53.32	52.99	-0.33	47.63	47.71	0.08	55.03	56.72	1.69
		Median	65.08	70.92	5.83	53.92	52.99	-0.93	46.59	46.88	0.29	55.35	56.06	0.71
		Quantile (0.85)	74.00	78.69	4.69	64.19	63.52	-0.66	58.93	58.35	-0.57	68.78	73.00	4.21
		Quantile (0.95)	79.35	82.00	2.65	70.39	70.09	-0.30	66.56	66.08	-0.48	75.27	78.99	3.73

Table C-13a. Speed Estimate of Speed by Road Type, Length Class, and Horizontal Curvature Class (Free-Flow) (continued)

			FCC ROAD CLASS											
			1 Limited access			2 Major arterial			3 Minor arterial/collector			Total		
			Speed Estimate			Speed Estimate			Speed Estimate			Speed Estimate		
			2007	2009	Change	2007	2009	Change	2007	2009	Change	2007	2009	Change
HOR_ CURVERD CLASS	VEH_ LENGTH		Estimate	Estimate	Estimate	Estimate	Estimate	Estimate	Estimate	Estimate	Estimate	Estimate	Estimate	Estimate
2 Moderate	1 (<20 ft)	Mean	60.60	69.50	8.90	57.94	56.74	-1.20	40.39	39.95	-0.45	45.95	49.45	3.50
		Median	60.31	69.64	9.33	57.67	57.08	-0.59	38.83	37.96	-0.87	43.02	46.47	3.45
		Quantile (0.85)	70.16	77.14	6.98	66.72	64.13	-2.59	50.28	50.81	0.52	60.89	68.97	8.08
		Quantile (0.95)	75.47	80.67	5.20	72.10	68.28	-3.83	59.00	57.85	-1.15	68.52	76.89	8.36
	2 (20-<30 ft)	Mean	64.40	71.60	7.20	63.10	60.61	-2.49	45.22	46.34	1.11	54.23	58.12	3.88
		Median	64.44	72.15	7.72	62.80	60.75	-2.05	45.42	44.95	-0.47	56.30	59.47	3.17
		Quantile (0.85)	74.06	77.77	3.72	72.43	67.85	-4.58	58.30	57.74	-0.56	68.76	74.00	5.24
		Quantile (0.95)	79.36	80.79	1.43	77.46	73.06	-4.40	64.38	63.95	-0.43	75.48	78.98	3.50
	3 (30-<40 ft)	Mean	56.93	65.80	8.87	58.09	58.57	0.48	44.31	47.83	3.52	50.03	56.18	6.15
		Median	56.45	65.40	8.95	57.03	58.30	1.28	42.89	48.04	5.15	51.49	57.05	5.56
		Quantile (0.85)	66.14	75.09	8.95	67.08	65.77	-1.31	56.84	58.53	1.69	62.85	68.99	6.14
		Quantile (0.95)	71.34	79.17	7.83	72.27	74.60	2.32	63.09	65.36	2.27	68.96	76.29	7.33
	4 (40-<50 ft)	Mean	54.72	64.42	9.70	57.04	57.74	0.70	45.01	48.14	3.13	51.10	57.46	6.36
		Median	55.22	64.02	8.80	56.17	57.67	1.50	42.89	49.15	6.26	52.12	58.57	6.46
		Quantile (0.85)	64.95	72.29	7.34	64.54	64.54	0.00	57.51	58.21	0.71	63.07	68.00	4.93
		Quantile (0.95)	70.15	76.77	6.61	72.38	69.40	-2.99	65.01	63.47	-1.55	68.77	74.00	5.22
	5 (50-<80 ft)	Mean	57.07	60.08	3.01	58.08	57.91	-0.16	47.07	48.41	1.34	55.81	58.70	2.89
		Median	58.17	61.01	2.84	57.33	58.08	0.75	47.18	50.32	3.14	56.94	60.00	3.05
		Quantile (0.85)	65.72	67.07	1.35	66.71	63.86	-2.85	57.92	58.08	0.17	65.11	66.95	1.84
		Quantile (0.95)	68.79	71.45	2.66	72.35	67.03	-5.32	62.17	62.65	0.49	69.26	71.00	1.74
	6 (80-<100 ft)	Mean	61.56	60.45	-1.11	65.08	60.10	-4.98	53.09	56.86	3.76	61.58	60.29	-1.29
		Median	62.26	62.28	0.01	63.78	59.53	-4.24	54.23	60.86	6.63	62.33	61.77	-0.57
		Quantile (0.85)	68.44	67.71	-0.74	72.56	64.88	-7.68	62.87	65.63	2.76	68.63	67.65	-0.98
		Quantile (0.95)	71.67	70.98	-0.69	80.20	67.88	-12.32	65.17	70.58	5.41	74.76	70.56	-4.21
	Total	Mean	60.57	68.91	8.33	58.97	58.45	-0.52	41.11	41.92	0.81	47.73	52.87	5.14
		Median	60.77	69.33	8.56	58.68	58.70	0.02	39.39	39.81	0.42	46.00	53.55	7.56
		Quantile (0.85)	70.25	76.89	6.64	68.09	65.70	-2.39	52.14	53.95	1.81	62.85	70.99	8.14
		Quantile (0.95)	75.59	80.32	4.73	74.00	70.84	-3.17	60.26	60.36	0.11	70.19	76.99	6.80

Table C-13a. Speed Estimate of Speed by Road Type, Length Class, and Horizontal Curvature Class (Free-Flow) (continued)

			FCC ROAD CLASS											
			1 Limited access			2 Major arterial			3 Minor arterial/collector			Total		
			Speed Estimate			Speed Estimate			Speed Estimate			Speed Estimate		
			2007	2009	Change	2007	2009	Change	2007	2009	Change	2007	2009	Change
HOR_ CURVERD CLASS	VEH_ LENGTH		Estimate	Estimate	Estimate	Estimate	Estimate	Estimate	Estimate	Estimate	Estimate	Estimate	Estimate	Estimate
3 Sharp	1 (<20 ft)	Mean	63.91	68.66	4.75	59.50	56.83	-2.68	41.62	39.63	-1.99	52.20	52.89	0.69
		Median	63.68	67.83	4.16	59.19	57.03	-2.16	39.29	38.02	-1.27	54.40	54.58	0.17
		Quantile (0.85)	71.97	74.95	2.98	68.20	63.28	-4.91	53.99	49.17	-4.82	67.95	71.00	3.04
		Quantile (0.95)	76.99	78.42	1.43	75.14	67.47	-7.67	60.79	57.10	-3.69	73.64	75.99	2.35
	2 (20-<30 ft)	Mean	65.76	69.01	3.25	62.40	60.79	-1.62	45.83	44.95	-0.88	58.36	57.34	-1.01
		Median	65.47	68.49	3.02	62.36	60.55	-1.81	45.27	43.33	-1.94	60.61	60.48	-0.12
		Quantile (0.85)	73.01	75.27	2.26	72.88	66.91	-5.97	57.60	56.78	-0.82	70.60	72.38	1.78
		Quantile (0.95)	79.11	78.65	-0.46	78.62	71.92	-6.70	63.23	62.46	-0.78	76.98	76.87	-0.11
	3 (30-<40 ft)	Mean	61.97	66.79	4.82	56.29	55.45	-0.84	46.34	46.68	0.33	54.46	56.77	2.31
		Median	61.40	65.79	4.39	57.90	55.22	-2.69	48.97	45.83	-3.14	57.00	59.56	2.56
		Quantile (0.85)	69.49	72.89	3.40	68.99	64.93	-4.05	58.00	58.79	0.80	66.05	69.96	3.91
		Quantile (0.95)	75.14	76.70	1.56	73.09	71.68	-1.42	61.90	64.46	2.56	71.98	74.98	3.00
	4 (40-<50 ft)	Mean	60.34	66.59	6.25	53.43	54.81	1.38	43.80	47.96	4.16	55.00	59.15	4.15
		Median	59.98	66.03	6.05	50.82	55.22	4.40	41.14	48.90	7.75	57.00	61.73	4.73
		Quantile (0.85)	67.58	72.05	4.48	63.26	62.43	-0.83	55.55	59.90	4.35	65.32	69.97	4.65
		Quantile (0.95)	72.50	75.05	2.55	78.78	65.55	-13.23	63.00	65.08	2.09	71.33	73.89	2.57
	5 (50-<80 ft)	Mean	59.14	64.34	5.20	53.74	52.61	-1.13	45.12	45.85	0.73	57.17	60.70	3.53
		Median	58.58	63.09	4.52	54.52	52.14	-2.38	44.60	44.97	0.37	57.74	61.99	4.25
		Quantile (0.85)	65.31	69.43	4.12	65.94	60.59	-5.36	56.99	60.95	3.95	64.99	68.49	3.50
		Quantile (0.95)	69.57	73.58	4.02	70.40	69.69	-0.72	61.93	65.14	3.21	69.47	73.65	4.18
	6 (80-<100 ft)	Mean	61.36	65.43	4.07	59.49	60.47	0.97	36.18	46.75	10.57	59.65	65.12	5.46
		Median	60.96	64.29	3.32	59.49	60.47	0.97	35.43	43.27	7.84	60.17	63.97	3.81
		Quantile (0.85)	66.41	70.29	3.88	59.49	60.47	0.97	38.57	52.99	14.41	66.34	70.09	3.76
		Quantile (0.95)	71.98	73.76	1.77	59.49	60.47	0.97	40.22	53.48	13.27	71.48	73.42	1.94
	Total	Mean	63.87	68.56	4.70	59.23	58.19	-1.03	42.04	41.09	-0.95	53.04	54.30	1.26
		Median	63.53	67.77	4.24	59.34	58.20	-1.14	39.69	39.04	-0.65	55.62	57.50	1.88
		Quantile (0.85)	71.95	74.88	2.92	69.01	65.12	-3.89	54.38	52.63	-1.75	68.20	71.98	3.78
		Quantile (0.95)	77.25	78.36	1.10	75.72	69.82	-5.90	60.98	59.52	-1.46	73.95	76.97	3.02

Table C-13a. Speed Estimate of Speed by Road Type, Length Class, and Horizontal Curvature Class (Free-Flow) (continued)

			FCC ROAD CLASS											
			1 Limited access			2 Major arterial			3 Minor arterial/collector			Total		
			Speed Estimate			Speed Estimate			Speed Estimate			Speed Estimate		
			2007	2009	Change	2007	2009	Change	2007	2009	Change	2007	2009	Change
HOR_ CURVERD CLASS	VEH_ LENGTH		Estimate	Estimate	Estimate	Estimate	Estimate	Estimate	Estimate	Estimate	Estimate	Estimate	Estimate	Estimate
Total	1 (<20 ft)	Mean	64.72	71.33	6.61	52.45	51.05	-1.39	45.80	45.03	-0.77	52.88	54.95	2.07
		Median	65.08	71.93	6.84	52.75	51.34	-1.42	44.74	44.21	-0.53	52.63	53.37	0.74
		Quantile (0.85)	73.84	78.82	4.99	63.00	60.79	-2.22	56.53	55.22	-1.31	67.44	72.99	5.55
		Quantile (0.95)	79.04	82.43	3.39	69.18	66.46	-2.73	64.30	62.06	-2.24	74.21	79.00	4.79
	2 (20-<30 ft)	Mean	67.08	71.80	4.72	58.59	56.71	-1.88	52.75	50.68	-2.07	60.10	58.09	-2.01
		Median	67.33	72.64	5.31	59.54	56.96	-2.58	53.82	50.06	-3.76	61.03	57.74	-3.29
		Quantile (0.85)	76.41	78.88	2.47	68.91	67.06	-1.85	64.48	62.00	-2.48	72.67	73.74	1.07
		Quantile (0.95)	81.80	82.18	0.38	75.22	73.16	-2.06	71.87	69.40	-2.46	78.62	78.99	0.38
	3 (30-<40 ft)	Mean	61.53	67.59	6.06	53.29	56.34	3.05	49.18	51.37	2.19	54.95	57.73	2.78
		Median	61.38	67.72	6.34	54.51	56.31	1.80	49.30	50.83	1.53	55.50	58.00	2.50
		Quantile (0.85)	70.29	75.91	5.62	63.75	67.60	3.85	61.09	62.92	1.83	66.79	71.23	4.44
		Quantile (0.95)	76.17	79.88	3.71	70.53	75.05	4.51	68.11	71.30	3.19	73.28	77.29	4.01
	4 (40-<50 ft)	Mean	60.24	66.71	6.47	53.59	56.18	2.59	49.60	51.92	2.32	55.17	58.97	3.80
		Median	60.32	66.74	6.42	54.34	56.76	2.42	50.03	52.14	2.11	55.61	60.00	4.39
		Quantile (0.85)	68.89	74.46	5.57	63.60	66.10	2.50	60.43	62.25	1.82	65.95	71.00	5.05
		Quantile (0.95)	74.41	78.31	3.90	69.60	72.61	3.01	66.70	69.08	2.38	71.90	76.04	4.14
	5 (50-<80 ft)	Mean	62.36	65.36	3.00	56.15	55.80	-0.35	53.08	52.87	-0.21	60.40	63.30	2.90
		Median	62.48	64.95	2.47	56.86	56.79	-0.08	54.16	54.28	0.11	61.03	64.00	2.97
		Quantile (0.85)	69.29	71.58	2.29	64.64	65.86	1.22	63.05	63.58	0.53	68.25	71.00	2.74
		Quantile (0.95)	74.12	75.26	1.13	70.04	72.14	2.10	68.18	69.34	1.16	73.21	75.00	1.79
	6 (80-<100 ft)	Mean	66.54	66.15	-0.38	61.71	58.48	-3.23	57.18	55.01	-2.18	65.43	64.93	-0.50
		Median	66.41	66.05	-0.36	62.93	59.53	-3.40	58.56	56.42	-2.14	65.76	65.96	0.21
		Quantile (0.85)	74.18	72.80	-1.38	70.23	66.58	-3.65	68.56	63.85	-4.71	73.68	72.93	-0.75
		Quantile (0.95)	80.05	76.67	-3.38	75.03	71.51	-3.52	72.72	69.97	-2.75	79.53	76.32	-3.21
	Total	Mean	64.69	70.50	5.80	53.62	53.28	-0.34	46.85	47.01	0.17	54.51	56.39	1.88
		Median	64.86	70.84	5.98	54.10	53.37	-0.73	45.85	46.15	0.29	55.02	56.00	0.98
		Quantile (0.85)	73.77	77.96	4.18	64.46	63.68	-0.78	58.30	57.82	-0.48	68.48	72.99	4.51
		Quantile (0.95)	79.20	81.83	2.63	70.64	70.14	-0.50	65.95	65.56	-0.39	75.06	78.99	3.93

Table C-13b. Standard Error of Speed by Road Type, Length Class, and Horizontal Curvature Class (Free-Flow)

			FCC ROAD CLASS											
			1 Limited access			2 Major arterial			3 Minor arterial/collector			Total		
			Standard Error			Standard Error			Standard Error			Standard Error		
			2007	2009	Change	2007	2009	Change	2007	2009	Change	2007	2009	Change
HOR_ CURVERD CLASS	VEH_ LENGTH		Std Err	Std Err	Std Err	Std Err	Std Err	Std Err	Std Err	Std Err	Std Err	Std Err	Std Err	Std Err
1 Straight	1 (<20 ft)	Mean	0.80	1.29	1.03	1.54	0.92	0.75	1.27	1.07	0.42	1.08	1.69	1.06
		Median	0.91	1.29	1.39	2.27	0.89	1.62	1.26	1.17	0.56	1.78	2.05	1.20
		Quantile (0.85)	0.78	0.95	1.09	1.40	1.37	0.60	2.18	1.48	1.04	1.05	2.98	2.64
		Quantile (0.95)	0.93	1.08	1.02	1.33	1.29	1.08	2.07	1.81	1.10	0.96	1.79	1.73
	2 (20-<30 ft)	Mean	0.69	0.97	0.74	1.65	1.46	0.53	1.58	1.40	0.49	0.99	1.19	0.82
		Median	0.76	1.02	0.98	1.39	1.64	0.73	1.71	1.64	0.83	0.77	1.59	1.14
		Quantile (0.85)	0.93	0.18	0.83	0.75	1.61	1.52	1.03	1.89	1.13	0.57	1.80	1.67
		Quantile (0.95)	0.82	0.47	0.64	1.00	1.30	1.74	1.43	1.40	1.52	0.84	0.31	0.93
	3 (30-<40 ft)	Mean	0.52	1.05	0.89	1.93	1.24	0.90	1.50	1.25	0.54	1.09	1.07	0.48
		Median	0.71	0.90	1.03	2.56	1.30	1.66	2.77	1.76	1.19	0.74	1.27	0.82
		Quantile (0.85)	0.65	0.45	0.65	1.25	1.34	0.73	1.11	1.09	0.81	0.77	1.59	1.56
		Quantile (0.95)	0.81	0.70	1.13	1.09	0.96	1.01	1.98	1.08	1.94	0.79	1.51	1.63
	4 (40-<50 ft)	Mean	0.73	0.96	0.70	1.59	0.97	0.88	1.64	1.59	0.31	0.93	1.08	0.71
		Median	0.72	1.33	1.03	1.65	1.16	0.77	2.88	1.92	1.15	0.68	1.09	1.04
		Quantile (0.85)	0.59	0.68	0.65	1.26	0.70	1.26	0.94	0.91	0.57	0.60	1.56	1.58
		Quantile (0.95)	0.72	0.56	0.67	2.00	1.06	1.95	1.58	0.92	1.95	0.60	1.51	1.47
	5 (50-<80 ft)	Mean	1.07	1.28	0.33	1.39	1.31	0.52	1.66	2.18	0.75	1.13	1.37	0.38
		Median	0.97	1.48	0.90	1.32	1.26	0.45	2.36	2.47	0.66	0.97	1.28	0.61
		Quantile (0.85)	0.97	1.24	0.71	1.54	0.81	1.58	0.72	0.73	1.12	0.90	1.28	0.76
		Quantile (0.95)	0.68	0.86	0.26	2.45	0.44	2.08	1.71	0.72	1.44	0.68	1.93	1.56
	6 (80-<100 ft)	Mean	1.53	1.67	0.87	1.59	3.13	3.46	2.34	2.08	1.31	1.32	1.56	0.83
		Median	1.15	1.57	0.86	1.01	2.29	2.07	4.17	1.19	3.63	0.93	1.73	1.29
		Quantile (0.85)	1.61	1.88	0.44	3.90	2.35	6.08	3.74	0.83	3.70	1.58	1.92	1.17
		Quantile (0.95)	2.52	1.39	1.57	4.63	2.07	6.49	3.04	0.46	3.47	1.99	1.48	1.24
	Total	Mean	0.68	1.01	0.72	1.69	1.20	0.55	1.41	1.25	0.32	1.22	1.55	0.74
		Median	0.73	1.72	1.64	2.38	1.31	1.28	1.56	1.39	0.56	1.54	2.19	1.09
		Quantile (0.85)	0.70	1.56	1.39	1.38	1.63	0.76	1.93	2.05	0.49	0.82	1.65	1.33
		Quantile (0.95)	0.81	0.73	0.77	1.18	1.57	1.40	1.85	1.70	1.02	0.79	1.26	1.08

Table C-13b. Standard Error of Speed by Road Type, Length Class, and Horizontal Curvature Class (Free-Flow) (continued)

			FCC ROAD CLASS											
			1 Limited access			2 Major arterial			3 Minor arterial/collector			Total		
			Standard Error			Standard Error			Standard Error			Standard Error		
			2007	2009	Change	2007	2009	Change	2007	2009	Change	2007	2009	Change
HOR_ CURVERD CLASS	VEH_ LENGTH		Std Err	Std Err	Std Err	Std Err	Std Err	Std Err	Std Err	Std Err	Std Err	Std Err	Std Err	Std Err
2 Moderate	1 (<20 ft)	Mean	4.76	3.82	5.19	2.21	1.75	1.62	1.74	1.63	1.36	2.31	2.96	2.51
		Median	5.32	4.64	5.86	2.63	1.92	2.21	1.12	1.44	1.30	3.34	5.70	3.59
		Quantile (0.85)	3.74	3.68	4.35	3.94	1.73	2.91	4.49	4.17	2.27	2.75	5.82	5.94
		Quantile (0.95)	3.47	3.34	3.94	3.65	1.19	2.96	3.63	2.42	2.71	2.20	5.66	5.59
	2 (20-<30 ft)	Mean	3.79	3.69	3.92	3.20	1.54	2.25	3.14	2.08	1.95	3.20	4.26	4.38
		Median	3.76	4.33	4.55	3.26	2.05	2.06	3.83	2.57	2.34	3.52	4.59	4.92
		Quantile (0.85)	2.83	2.21	2.90	4.66	1.39	3.81	2.95	2.45	1.77	2.53	6.76	6.87
		Quantile (0.95)	2.78	1.69	2.54	4.12	1.43	3.00	2.39	2.44	1.60	1.82	4.52	4.46
	3 (30-<40 ft)	Mean	4.02	3.86	4.80	2.92	1.52	1.84	2.79	1.79	1.75	2.43	2.41	2.65
		Median	4.71	3.53	5.13	2.43	1.97	1.23	4.95	2.44	3.29	2.61	2.47	2.95
		Quantile (0.85)	2.74	4.42	4.52	5.16	1.59	6.65	3.30	1.63	2.79	1.97	4.22	4.43
		Quantile (0.95)	2.62	3.98	4.36	3.42	1.41	4.34	2.72	2.09	2.48	1.62	3.59	3.65
	4 (40-<50 ft)	Mean	5.17	3.02	4.66	2.74	2.57	1.14	3.24	1.97	2.12	2.84	2.29	3.28
		Median	5.13	2.27	4.69	2.86	3.31	1.64	5.62	1.98	4.24	3.17	2.89	4.31
		Quantile (0.85)	3.39	2.36	3.34	3.48	2.68	1.36	4.15	1.26	3.89	2.10	3.86	4.08
		Quantile (0.95)	2.41	3.03	3.41	4.98	1.84	3.90	3.44	0.59	3.38	1.86	3.82	4.03
	5 (50-<80 ft)	Mean	4.46	3.21	3.94	3.62	3.08	1.60	2.90	2.46	1.01	3.01	2.47	2.50
		Median	3.78	3.29	4.03	4.01	3.20	2.09	4.91	2.32	2.81	2.87	3.57	3.91
		Quantile (0.85)	2.41	2.64	1.73	5.35	1.55	3.95	2.68	1.02	2.52	2.25	2.57	2.24
		Quantile (0.95)	2.07	2.34	1.12	4.80	0.64	4.58	2.45	2.00	2.03	1.82	2.62	1.56
	6 (80-<100 ft)	Mean	4.12	4.02	4.42	0.64	4.04	3.89	6.21	5.85	4.12	2.97	3.25	3.13
		Median	3.14	4.40	5.16	3.36	4.76	1.56	7.41	11.26	7.61	2.33	3.83	3.96
		Quantile (0.85)	1.32	1.29	1.62	4.18	4.95	8.89	4.80	1.05	5.51	1.45	1.35	1.68
		Quantile (0.95)	3.44	2.09	3.17	3.96	5.35	7.95	4.93	4.62	7.46	6.03	1.59	5.47
	Total	Mean	4.40	3.98	4.93	2.61	1.70	1.80	1.96	1.83	1.35	2.60	3.35	3.11
		Median	4.26	4.66	5.09	2.87	2.10	2.41	1.44	1.72	1.48	5.08	4.95	4.44
		Quantile (0.85)	3.46	3.44	3.90	4.10	0.96	3.57	4.39	3.19	2.35	2.61	6.00	6.09
		Quantile (0.95)	3.31	2.85	3.87	4.20	1.11	3.59	3.06	2.36	1.99	2.27	5.12	4.97

Table C-13b. Standard Error of Speed by Road Type, Length Class, and Horizontal Curvature Class (Free-Flow) (continued)

			FCC ROAD CLASS											
			1 Limited access			2 Major arterial			3 Minor arterial/collector			Total		
			Standard Error			Standard Error			Standard Error			Standard Error		
			2007	2009	Change	2007	2009	Change	2007	2009	Change	2007	2009	Change
HOR_ CURVERD CLASS	VEH_ LENGTH		Std Err	Std Err	Std Err	Std Err	Std Err	Std Err	Std Err	Std Err	Std Err	Std Err	Std Err	Std Err
3 Sharp	1 (<20 ft)	Mean	0.86	1.26	1.02	1.56	0.93	0.72	1.29	1.04	0.50	1.07	1.59	1.04
		Median	0.93	1.45	1.27	2.15	0.96	1.37	1.23	1.18	0.65	1.72	1.97	1.16
		Quantile (0.85)	0.91	1.28	1.19	1.52	1.24	0.59	2.09	1.47	1.12	1.02	2.17	2.02
		Quantile (0.95)	0.92	1.08	0.96	1.29	1.31	0.95	2.19	1.66	1.13	0.89	1.26	1.15
	2 (20-<30 ft)	Mean	0.73	0.95	0.69	1.69	1.44	0.54	1.71	1.38	0.55	1.08	1.17	0.82
		Median	0.88	1.23	1.14	1.32	1.56	0.49	2.10	1.58	0.94	0.87	1.44	0.94
		Quantile (0.85)	0.87	0.21	0.78	0.76	1.50	1.20	1.16	1.86	1.15	0.69	1.68	1.46
		Quantile (0.95)	0.96	0.49	0.81	0.89	1.25	1.39	1.42	1.48	1.30	0.65	0.45	0.62
	3 (30-<40 ft)	Mean	0.60	1.00	0.85	1.96	1.21	0.94	1.56	1.24	0.51	1.12	1.04	0.53
		Median	0.75	0.79	0.96	2.43	1.35	1.45	2.84	1.70	1.32	0.68	1.28	0.84
		Quantile (0.85)	0.65	0.34	0.61	1.46	1.17	1.05	0.98	1.08	0.86	0.77	1.30	1.28
		Quantile (0.95)	0.43	0.63	0.81	0.98	0.85	0.84	1.82	1.04	1.79	0.89	1.49	1.58
	4 (40-<50 ft)	Mean	0.88	0.93	0.73	1.59	0.96	0.88	1.77	1.58	0.35	1.02	1.05	0.79
		Median	0.67	0.88	0.77	1.66	1.19	0.78	2.92	1.79	1.27	0.76	1.07	1.11
		Quantile (0.85)	0.66	0.70	0.65	1.07	0.76	1.08	1.15	1.04	0.76	0.46	1.10	1.18
		Quantile (0.95)	0.83	0.56	0.73	1.89	1.03	2.02	1.35	0.81	1.55	0.68	1.55	1.50
	5 (50-<80 ft)	Mean	1.18	1.41	0.36	1.44	1.42	0.55	1.72	2.19	0.70	1.21	1.42	0.38
		Median	1.18	1.85	1.34	1.45	1.38	0.29	2.51	2.58	0.60	1.00	1.56	1.15
		Quantile (0.85)	1.03	1.33	0.59	1.38	0.65	1.42	0.55	1.05	1.09	0.88	2.45	2.02
		Quantile (0.95)	0.93	0.92	0.33	2.24	0.70	1.84	1.29	0.63	1.06	0.75	0.92	0.93
	6 (80-<100 ft)	Mean	1.58	1.71	0.80	1.41	3.20	3.32	2.78	2.15	1.36	1.39	1.58	0.79
		Median	1.03	1.55	0.81	1.12	2.35	1.71	4.90	1.23	4.15	0.94	1.33	0.72
		Quantile (0.85)	1.83	1.95	0.41	3.71	2.42	5.86	3.40	0.57	3.50	1.53	2.52	1.32
		Quantile (0.95)	2.56	1.56	1.64	4.42	2.78	6.72	2.47	0.32	2.75	1.97	1.60	1.03
	Total	Mean	0.76	1.02	0.71	1.71	1.22	0.56	1.43	1.23	0.39	1.23	1.47	0.74
		Median	0.79	0.84	0.78	2.22	1.30	1.02	1.62	1.37	0.64	1.66	2.03	0.93
		Quantile (0.85)	0.73	1.63	1.40	1.38	1.49	0.71	2.09	1.97	0.69	0.92	1.55	1.15
		Quantile (0.95)	0.80	0.74	0.70	1.28	1.46	1.27	1.69	1.66	0.95	0.77	1.38	1.14

Table C-13b. Standard Error of Speed by Road Type, Length Class, and Horizontal Curvature Class (Free-Flow) (continued)

			FCC ROAD CLASS											
			1 Limited access			2 Major arterial			3 Minor arterial/collector			Total		
			Standard Error			Standard Error			Standard Error			Standard Error		
			2007	2009	Change	2007	2009	Change	2007	2009	Change	2007	2009	Change
HOR_ CURVERD CLASS	VEH_ LENGTH		Std Err	Std Err	Std Err	Std Err	Std Err	Std Err	Std Err	Std Err	Std Err	Std Err	Std Err	Std Err
Total	1 (<20 ft)	Mean	64.72	71.33	6.61	52.45	51.05	-1.39	45.80	45.03	-0.77	52.88	54.95	2.07
		Median	65.08	71.93	6.84	52.75	51.34	-1.42	44.74	44.21	-0.53	52.63	53.37	0.74
		Quantile (0.85)	73.84	78.82	4.99	63.00	60.79	-2.22	56.53	55.22	-1.31	67.44	72.99	5.55
		Quantile (0.95)	79.04	82.43	3.39	69.18	66.46	-2.73	64.30	62.06	-2.24	74.21	79.00	4.79
	2 (20-<30 ft)	Mean	67.08	71.80	4.72	58.59	56.71	-1.88	52.75	50.68	-2.07	60.10	58.09	-2.01
		Median	67.33	72.64	5.31	59.54	56.96	-2.58	53.82	50.06	-3.76	61.03	57.74	-3.29
		Quantile (0.85)	76.41	78.88	2.47	68.91	67.06	-1.85	64.48	62.00	-2.48	72.67	73.74	1.07
		Quantile (0.95)	81.80	82.18	0.38	75.22	73.16	-2.06	71.87	69.40	-2.46	78.62	78.99	0.38
	3 (30-<40 ft)	Mean	61.53	67.59	6.06	53.29	56.34	3.05	49.18	51.37	2.19	54.95	57.73	2.78
		Median	61.38	67.72	6.34	54.51	56.31	1.80	49.30	50.83	1.53	55.50	58.00	2.50
		Quantile (0.85)	70.29	75.91	5.62	63.75	67.60	3.85	61.09	62.92	1.83	66.79	71.23	4.44
		Quantile (0.95)	76.17	79.88	3.71	70.53	75.05	4.51	68.11	71.30	3.19	73.28	77.29	4.01
	4 (40-<50 ft)	Mean	60.24	66.71	6.47	53.59	56.18	2.59	49.60	51.92	2.32	55.17	58.97	3.80
		Median	60.32	66.74	6.42	54.34	56.76	2.42	50.03	52.14	2.11	55.61	60.00	4.39
		Quantile (0.85)	68.89	74.46	5.57	63.60	66.10	2.50	60.43	62.25	1.82	65.95	71.00	5.05
		Quantile (0.95)	74.41	78.31	3.90	69.60	72.61	3.01	66.70	69.08	2.38	71.90	76.04	4.14
	5 (50-<80 ft)	Mean	62.36	65.36	3.00	56.15	55.80	-0.35	53.08	52.87	-0.21	60.40	63.30	2.90
		Median	62.48	64.95	2.47	56.86	56.79	-0.08	54.16	54.28	0.11	61.03	64.00	2.97
		Quantile (0.85)	69.29	71.58	2.29	64.64	65.86	1.22	63.05	63.58	0.53	68.25	71.00	2.74
		Quantile (0.95)	74.12	75.26	1.13	70.04	72.14	2.10	68.18	69.34	1.16	73.21	75.00	1.79
	6 (80-<100 ft)	Mean	66.54	66.15	-0.38	61.71	58.48	-3.23	57.18	55.01	-2.18	65.43	64.93	-0.50
		Median	66.41	66.05	-0.36	62.93	59.53	-3.40	58.56	56.42	-2.14	65.76	65.96	0.21
		Quantile (0.85)	74.18	72.80	-1.38	70.23	66.58	-3.65	68.56	63.85	-4.71	73.68	72.93	-0.75
		Quantile (0.95)	80.05	76.67	-3.38	75.03	71.51	-3.52	72.72	69.97	-2.75	79.53	76.32	-3.21
	Total	Mean	64.69	70.50	5.80	53.62	53.28	-0.34	46.85	47.01	0.17	54.51	56.39	1.88
		Median	64.86	70.84	5.98	54.10	53.37	-0.73	45.85	46.15	0.29	55.02	56.00	0.98
		Quantile (0.85)	73.77	77.96	4.18	64.46	63.68	-0.78	58.30	57.82	-0.48	68.48	72.99	4.51
		Quantile (0.95)	79.20	81.83	2.63	70.64	70.14	-0.50	65.95	65.56	-0.39	75.06	78.99	3.93

Table C-13c. Standard Deviation of Speed by Road Type, Length Class, and Horizontal Curvature Class (Free-Flow)

		FCC ROAD CLASS											
		1 Limited access			2 Major arterial			3 Minor arterial			Total		
		2007	2009	Change	2007	2009	Change	2007	2009	Change	2007	2009	Change
HOR_CURVERDCLASS	VEH_LENGTH	Std Dev	Std Dev		Std Dev	Std Dev		Std Dev	Std Dev		Std Dev	Std Dev	
1 Straight	1 (<20 ft)	9.34	7.86	-1.48	10.44	9.73	-0.71	10.30	9.60	-0.70	12.82	14.65	1.82
	2 (20-<30 ft)	9.19	8.04	-1.15	11.26	10.31	-0.96	11.77	10.59	-1.18	12.24	13.10	0.86
	3 (30-<40 ft)	8.89	9.05	0.16	11.00	11.13	0.13	11.39	11.08	-0.31	11.69	12.48	0.79
	4 (40-<50 ft)	8.76	8.94	0.17	10.28	10.53	0.25	10.48	10.48	0.00	10.77	11.84	1.08
	5 (50-<80 ft)	7.00	6.82	-0.18	9.21	10.94	1.73	9.95	11.00	1.04	8.45	8.90	0.45
	6 (80-<100 ft)	7.68	7.56	-0.12	10.07	9.32	-0.75	10.38	9.98	-0.40	8.55	8.55	0.00
	Total	9.13	8.12	-1.01	10.77	10.38	-0.39	10.79	10.33	-0.47	12.79	14.03	1.24
2 Moderate	1 (<20 ft)	9.19	8.08	-1.11	8.81	7.74	-1.08	9.56	9.35	-0.20	12.78	15.58	2.80
	2 (20-<30 ft)	9.50	7.05	-2.45	8.60	7.46	-1.14	12.04	10.33	-1.72	14.20	14.28	0.08
	3 (30-<40 ft)	9.27	9.28	0.00	8.39	8.45	0.06	11.15	10.87	-0.28	12.13	12.47	0.33
	4 (40-<50 ft)	10.06	8.44	-1.61	8.51	7.27	-1.24	11.01	10.25	-0.76	11.47	11.06	-0.41
	5 (50-<80 ft)	8.72	8.39	-0.33	7.93	6.91	-1.02	9.98	10.25	0.27	9.49	9.05	-0.44
	6 (80-<100 ft)	7.76	8.78	1.03	8.74	5.01	-3.73	11.15	11.95	0.80	9.02	8.52	-0.50
	Total	9.52	8.59	-0.93	8.95	7.83	-1.12	10.06	10.14	0.07	13.29	15.37	2.09
3 Sharp	1 (<20 ft)	8.48	6.30	-2.18	8.80	6.65	-2.15	9.94	8.63	-1.30	14.43	16.13	1.70
	2 (20-<30 ft)	7.67	6.58	-1.09	10.43	6.47	-3.97	11.06	10.06	-1.00	13.20	14.25	1.05
	3 (30-<40 ft)	7.50	6.09	-1.41	12.18	9.28	-2.91	11.93	11.58	-0.35	12.60	13.22	0.61
	4 (40-<50 ft)	7.03	5.91	-1.12	12.06	7.61	-4.45	11.17	11.00	-0.17	11.55	11.59	0.05
	5 (50-<80 ft)	6.10	5.30	-0.79	11.45	9.27	-2.18	11.00	13.19	2.20	8.61	10.04	1.43
	6 (80-<100 ft)	5.49	4.96	-0.52	0.00	0.00	0.00	3.28	8.72	5.44	8.09	4.99	-3.09
	Total	8.36	6.39	-1.97	9.93	7.22	-2.71	10.15	9.42	-0.73	14.27	15.64	1.37
Total	1 (<20 ft)	9.32	7.84	-1.48	10.45	9.72	-0.72	10.41	9.74	-0.66	13.01	14.84	1.83
	2 (20-<30 ft)	9.18	7.92	-1.27	11.18	10.19	-0.99	12.06	10.68	-1.38	12.48	13.22	0.74
	3 (30-<40 ft)	8.91	9.01	0.10	10.95	10.99	0.04	11.51	11.14	-0.37	11.82	12.50	0.68
	4 (40-<50 ft)	8.87	8.86	-0.01	10.23	10.30	0.07	10.66	10.53	-0.12	10.88	11.79	0.91
	5 (50-<80 ft)	7.16	7.04	-0.12	9.17	10.67	1.49	10.11	11.08	0.97	8.57	9.00	0.43
	6 (80-<100 ft)	7.75	7.79	0.04	9.97	8.94	-1.03	10.71	10.08	-0.63	8.64	8.62	-0.01
	Total	9.15	8.11	-1.03	10.76	10.33	-0.43	10.91	10.46	-0.44	12.99	14.21	1.22

Table C-14a. Speed Estimate of Speed by Road Type, Length Class, and Vertical Curvature Class (Free-Flow)

			FCC ROAD CLASS											
			1 Limited access			2 Major arterial			3 Minor arterial/collector			Total		
			Speed Estimate			Speed Estimate			Speed Estimate			Speed Estimate		
			2007	2009	Change	2007	2009	Change	2007	2009	Change	2007	2009	Change
VER_ CURVERD CLASS	VEH_ LENGTH		Estimate	Estimate	Estimate	Estimate	Estimate	Estimate	Estimate	Estimate	Estimate	Estimate	Estimate	Estimate
1 Flat	1 (<20 ft)	Mean	64.80	71.41	6.61	52.37	51.02	-1.35	45.98	45.17	-0.81	53.08	55.31	2.23
		Median	65.15	71.94	6.79	52.75	51.30	-1.44	44.98	44.45	-0.52	52.78	53.88	1.10
		Quantile (0.85)	74.00	78.84	4.84	63.00	60.77	-2.23	56.82	55.26	-1.57	67.60	73.00	5.40
		Quantile (0.95)	79.24	82.48	3.24	69.05	66.46	-2.59	64.47	62.13	-2.34	74.38	79.00	4.62
	2 (20-<30 ft)	Mean	67.13	71.90	4.77	58.55	56.72	-1.83	52.81	50.72	-2.09	60.28	58.29	-1.98
		Median	67.44	72.71	5.27	59.54	57.01	-2.53	53.87	50.10	-3.77	61.13	58.00	-3.14
		Quantile (0.85)	76.47	78.90	2.43	68.91	67.10	-1.81	64.51	62.00	-2.51	72.85	74.00	1.15
		Quantile (0.95)	81.84	82.24	0.40	75.15	73.22	-1.93	72.04	69.40	-2.64	78.71	79.00	0.28
	3 (30-<40 ft)	Mean	61.53	67.62	6.09	53.34	56.33	2.99	49.33	51.36	2.03	55.11	57.86	2.76
		Median	61.39	67.75	6.36	54.59	56.30	1.70	49.62	50.78	1.16	55.55	58.11	2.57
		Quantile (0.85)	70.41	75.93	5.52	63.77	67.61	3.84	61.11	62.73	1.62	66.83	71.56	4.72
		Quantile (0.95)	76.18	79.92	3.74	70.51	75.05	4.54	68.19	71.25	3.06	73.49	77.62	4.13
	4 (40-<50 ft)	Mean	60.23	66.73	6.49	53.62	56.17	2.55	49.64	51.86	2.22	55.28	59.10	3.82
		Median	60.33	66.76	6.43	54.35	56.76	2.42	50.09	52.07	1.99	55.62	60.00	4.38
		Quantile (0.85)	68.91	74.49	5.58	63.48	66.10	2.63	60.15	62.14	1.99	65.98	71.17	5.19
		Quantile (0.95)	74.54	78.34	3.80	69.31	72.57	3.26	66.70	68.88	2.18	72.00	76.48	4.48
	5 (50-<80 ft)	Mean	62.40	65.37	2.97	56.07	55.77	-0.30	52.80	52.51	-0.28	60.48	63.36	2.88
		Median	62.58	64.96	2.37	56.78	56.73	-0.04	53.99	53.98	-0.01	61.07	64.00	2.93
		Quantile (0.85)	69.32	71.60	2.28	64.54	65.83	1.29	62.93	62.92	-0.01	68.38	71.00	2.62
		Quantile (0.95)	74.12	75.27	1.15	69.84	72.13	2.29	68.26	69.01	0.76	73.21	75.00	1.79
	6 (80-<100 ft)	Mean	66.61	66.17	-0.45	61.63	58.48	-3.15	56.11	54.86	-1.25	65.47	64.98	-0.49
		Median	66.42	66.07	-0.35	62.79	59.53	-3.26	56.55	56.31	-0.24	65.83	65.96	0.13
		Quantile (0.85)	74.23	72.82	-1.41	69.59	66.63	-2.96	66.27	63.29	-2.98	73.72	72.93	-0.79
		Quantile (0.95)	80.12	76.69	-3.43	75.10	71.52	-3.58	72.84	69.14	-3.70	79.55	76.35	-3.20
	Total	Mean	64.76	70.56	5.81	53.57	53.26	-0.30	46.99	47.13	0.14	54.71	56.69	1.98
		Median	64.98	70.88	5.90	54.04	53.37	-0.67	45.97	46.38	0.41	55.22	56.38	1.16
		Quantile (0.85)	73.93	77.99	4.06	64.46	63.74	-0.72	58.37	57.82	-0.56	68.69	73.00	4.31
		Quantile (0.95)	79.33	81.87	2.55	70.56	70.14	-0.42	66.00	65.56	-0.44	75.23	78.99	3.76

Table C-14a. Speed Estimate of Speed by Road Type, Length Class, and Vertical Curvature Class (Free-Flow) (continued)

			FCC ROAD CLASS											
			1 Limited access			2 Major arterial			3 Minor arterial/collector			Total		
			Speed Estimate			Speed Estimate			Speed Estimate			Speed Estimate		
			2007	2009	Change	2007	2009	Change	2007	2009	Change	2007	2009	Change
VER_ CURVERD CLASS	VEH_ LENGTH		Estimate	Estimate	Estimate	Estimate	Estimate	Estimate	Estimate	Estimate	Estimate	Estimate	Estimate	Estimate
2 Moderate	1 (<20 ft)	Mean	62.80	66.84	4.04	54.56	51.53	-3.03	43.95	44.44	0.49	50.30	48.67	-1.63
		Median	62.49	65.80	3.31	54.93	51.48	-3.45	41.68	42.53	0.85	50.29	46.28	-4.01
		Quantile (0.85)	69.89	71.98	2.10	59.22	56.30	-2.92	55.84	56.09	0.25	64.09	63.85	-0.24
		Quantile (0.95)	74.33	75.90	1.57	61.85	60.33	-1.52	62.76	62.52	-0.24	70.02	69.96	-0.06
	2 (20-<30 ft)	Mean	65.65	66.96	1.31	58.22	54.48	-3.73	53.49	51.67	-1.82	57.44	54.48	-2.95
		Median	65.45	66.08	0.62	58.93	53.80	-5.13	55.22	51.15	-4.08	59.36	55.00	-4.36
		Quantile (0.85)	72.84	72.03	-0.81	62.79	59.83	-2.96	65.13	63.86	-1.26	68.33	66.97	-1.36
		Quantile (0.95)	78.91	75.68	-3.23	65.56	65.22	-0.34	69.94	70.53	0.59	73.65	72.50	-1.15
	3 (30-<40 ft)	Mean	61.52	65.60	4.08	56.78	52.00	-4.78	48.34	52.95	4.61	52.98	54.82	1.84
		Median	60.80	64.56	3.76	57.15	50.70	-6.45	48.39	53.35	4.96	54.91	55.83	0.93
		Quantile (0.85)	69.01	70.51	1.50	60.80	57.97	-2.83	61.64	65.04	3.40	64.99	66.95	1.96
		Quantile (0.95)	75.32	74.78	-0.54	62.33	64.32	1.99	66.45	73.36	6.91	70.00	73.62	3.62
	4 (40-<50 ft)	Mean	60.44	65.25	4.81	55.78	50.68	-5.09	50.15	53.97	3.82	53.84	55.59	1.74
		Median	60.15	64.43	4.28	56.19	49.90	-6.28	50.06	55.27	5.21	56.11	57.00	0.89
		Quantile (0.85)	67.43	70.03	2.61	59.76	54.05	-5.71	63.28	64.92	1.64	64.10	66.96	2.87
		Quantile (0.95)	72.09	73.89	1.80	62.03	58.12	-3.91	66.23	72.21	5.97	68.99	72.49	3.50
	5 (50-<80 ft)	Mean	58.68	62.89	4.20	53.55	51.50	-2.04	56.21	57.91	1.69	57.17	59.50	2.33
		Median	58.06	62.21	4.15	53.99	51.49	-2.50	59.12	60.38	1.26	58.50	61.45	2.95
		Quantile (0.85)	64.69	66.16	1.47	59.84	54.36	-5.48	64.43	67.23	2.81	64.47	66.86	2.39
		Quantile (0.95)	69.05	69.33	0.28	60.29	59.00	-1.29	67.39	71.78	4.39	68.17	70.78	2.60
	6 (80-<100 ft)	Mean	60.86	64.16	3.31	.	.	.	65.63	58.83	-6.80	62.87	61.58	-1.29
		Median	60.68	63.36	2.68	.	.	.	64.74	63.41	-1.33	62.90	63.57	0.66
		Quantile (0.85)	65.68	68.28	2.61	.	.	.	69.64	69.95	0.31	68.94	69.91	0.97
		Quantile (0.95)	69.30	70.65	1.35	.	.	.	71.47	70.05	-1.42	72.19	70.40	-1.79
	Total	Mean	62.99	66.67	3.68	55.03	52.59	-2.45	45.86	46.93	1.08	51.64	50.72	-0.93
		Median	62.69	65.68	2.99	55.39	52.19	-3.20	43.49	44.77	1.27	52.78	49.82	-2.96
		Quantile (0.85)	70.39	71.81	1.42	59.72	57.77	-1.95	59.30	59.54	0.24	64.98	65.00	0.02
		Quantile (0.95)	75.07	75.70	0.63	62.71	62.62	-0.09	65.13	66.45	1.32	70.50	70.91	0.41

Table C-14a. Speed Estimate of Speed by Road Type, Length Class, and Vertical Curvature Class (Free-Flow) (continued)

			FCC ROAD CLASS											
			1 Limited access			2 Major arterial			3 Minor arterial/collector			Total		
			Speed Estimate			Speed Estimate			Speed Estimate			Speed Estimate		
			2007	2009	Change	2007	2009	Change	2007	2009	Change	2007	2009	Change
VER_ CURVERD CLASS	VEH_ LENGTH		Estimate	Estimate	Estimate	Estimate	Estimate	Estimate	Estimate	Estimate	Estimate	Estimate	Estimate	Estimate
3 Steep	1 (<20 ft)	Mean	60.32	68.96	8.64	55.39	53.49	-1.90	41.24	38.75	-2.49	45.26	42.53	-2.73
		Median	60.33	68.62	8.29	55.29	54.84	-0.45	41.52	38.44	-3.08	43.02	41.02	-2.00
		Quantile (0.85)	66.68	74.52	7.84	70.39	65.33	-5.07	47.81	46.19	-1.62	56.32	53.44	-2.88
		Quantile (0.95)	71.10	77.73	6.63	78.67	71.60	-7.07	51.68	50.29	-1.40	69.09	64.45	-4.64
	2 (20-<30 ft)	Mean	64.30	68.99	4.69	62.35	58.29	-4.06	43.79	42.84	-0.95	49.96	48.48	-1.48
		Median	63.57	68.96	5.39	62.66	59.01	-3.65	44.40	42.96	-1.44	48.50	46.80	-1.70
		Quantile (0.85)	71.41	75.18	3.78	75.91	69.69	-6.22	54.77	50.90	-3.87	65.15	62.17	-2.98
		Quantile (0.95)	76.82	79.40	2.58	83.52	75.00	-8.53	60.59	55.84	-4.75	75.86	70.13	-5.72
	3 (30-<40 ft)	Mean	59.59	65.15	5.56	49.71	59.72	10.01	39.44	42.06	2.62	44.82	52.13	7.31
		Median	58.60	66.15	7.55	42.91	59.89	16.98	37.44	41.36	3.92	41.06	53.85	12.79
		Quantile (0.85)	66.68	73.11	6.43	64.04	68.90	4.86	48.55	52.72	4.17	60.57	65.32	4.75
		Quantile (0.95)	76.44	76.16	-0.27	73.35	75.61	2.26	60.86	60.24	-0.62	69.95	72.89	2.94
	4 (40-<50 ft)	Mean	57.10	65.54	8.44	52.38	59.29	6.90	40.46	38.29	-2.18	49.21	52.76	3.56
		Median	57.26	65.54	8.28	51.65	59.46	7.81	39.99	37.45	-2.54	45.08	56.09	11.01
		Quantile (0.85)	63.46	73.26	9.80	67.15	68.22	1.07	47.33	45.58	-1.76	65.10	65.67	0.57
		Quantile (0.95)	67.34	77.45	10.11	73.86	75.27	1.42	54.07	54.60	0.53	72.67	72.74	0.07
	5 (50-<80 ft)	Mean	58.25	61.40	3.14	60.74	59.91	-0.83	39.84	36.03	-3.80	57.91	55.16	-2.74
		Median	58.41	62.83	4.42	59.95	60.70	0.75	39.19	32.78	-6.40	58.80	58.37	-0.43
		Quantile (0.85)	65.10	70.50	5.40	73.21	68.09	-5.12	48.60	46.21	-2.39	72.97	67.49	-5.48
		Quantile (0.95)	69.52	75.33	5.80	77.28	73.03	-4.24	52.90	52.98	0.08	76.62	72.34	-4.28
	6 (80-<100 ft)	Mean	63.04	53.25	-9.79	74.01	58.14	-15.87	40.44	38.86	-1.58	67.19	49.75	-17.44
		Median	65.11	58.00	-7.11	74.01	50.08	-23.93	40.44	33.64	-6.80	71.11	45.49	-25.61
		Quantile (0.85)	67.39	67.20	-0.19	74.01	61.36	-12.65	40.44	40.95	0.51	73.14	65.04	-8.10
		Quantile (0.95)	68.82	72.80	3.98	74.01	64.59	-9.42	40.44	43.05	2.60	73.72	65.83	-7.89
	Total	Mean	61.01	68.59	7.58	56.25	55.62	-0.63	41.47	39.73	-1.74	46.08	44.53	-1.56
		Median	60.89	68.45	7.56	57.29	57.02	-0.27	41.58	39.48	-2.10	43.49	42.60	-0.89
		Quantile (0.85)	67.61	74.55	6.94	71.89	67.45	-4.44	48.13	47.63	-0.50	59.23	58.37	-0.87
		Quantile (0.95)	72.57	77.99	5.42	78.86	73.27	-5.59	52.92	52.59	-0.32	70.92	67.07	-3.85

Table C-14a. Speed Estimate of Speed by Road Type, Length Class, and Vertical Curvature Class (Free-Flow) (continued)

			FCC ROAD CLASS											
			1 Limited access			2 Major arterial			3 Minor arterial/collector			Total		
			Speed Estimate			Speed Estimate			Speed Estimate			Speed Estimate		
			2007	2009	Change	2007	2009	Change	2007	2009	Change	2007	2009	Change
VER_ CURVERD CLASS	VEH_ LENGTH		Estimate	Estimate	Estimate	Estimate	Estimate	Estimate	Estimate	Estimate	Estimate	Estimate	Estimate	Estimate
Total	1 (<20 ft)	Mean	64.72	71.33	6.61	52.45	51.05	-1.39	45.80	45.03	-0.77	52.88	54.95	2.07
		Median	65.08	71.93	6.84	52.75	51.34	-1.42	44.74	44.21	-0.53	52.63	53.37	0.74
		Quantile (0.85)	73.84	78.82	4.99	63.00	60.79	-2.22	56.53	55.22	-1.31	67.44	72.99	5.55
		Quantile (0.95)	79.04	82.43	3.39	69.18	66.46	-2.73	64.30	62.06	-2.24	74.21	79.00	4.79
	2 (20-<30 ft)	Mean	67.08	71.80	4.72	58.59	56.71	-1.88	52.75	50.68	-2.07	60.10	58.09	-2.01
		Median	67.33	72.64	5.31	59.54	56.96	-2.58	53.82	50.06	-3.76	61.03	57.74	-3.29
		Quantile (0.85)	76.41	78.88	2.47	68.91	67.06	-1.85	64.48	62.00	-2.48	72.67	73.74	1.07
		Quantile (0.95)	81.80	82.18	0.38	75.22	73.16	-2.06	71.87	69.40	-2.46	78.62	78.99	0.38
	3 (30-<40 ft)	Mean	61.53	67.59	6.06	53.29	56.34	3.05	49.18	51.37	2.19	54.95	57.73	2.78
		Median	61.38	67.72	6.34	54.51	56.31	1.80	49.30	50.83	1.53	55.50	58.00	2.50
		Quantile (0.85)	70.29	75.91	5.62	63.75	67.60	3.85	61.09	62.92	1.83	66.79	71.23	4.44
		Quantile (0.95)	76.17	79.88	3.71	70.53	75.05	4.51	68.11	71.30	3.19	73.28	77.29	4.01
	4 (40-<50 ft)	Mean	60.24	66.71	6.47	53.59	56.18	2.59	49.60	51.92	2.32	55.17	58.97	3.80
		Median	60.32	66.74	6.42	54.34	56.76	2.42	50.03	52.14	2.11	55.61	60.00	4.39
		Quantile (0.85)	68.89	74.46	5.57	63.60	66.10	2.50	60.43	62.25	1.82	65.95	71.00	5.05
		Quantile (0.95)	74.41	78.31	3.90	69.60	72.61	3.01	66.70	69.08	2.38	71.90	76.04	4.14
	5 (50-<80 ft)	Mean	62.36	65.36	3.00	56.15	55.80	-0.35	53.08	52.87	-0.21	60.40	63.30	2.90
		Median	62.48	64.95	2.47	56.86	56.79	-0.08	54.16	54.28	0.11	61.03	64.00	2.97
		Quantile (0.85)	69.29	71.58	2.29	64.64	65.86	1.22	63.05	63.58	0.53	68.25	71.00	2.74
		Quantile (0.95)	74.12	75.26	1.13	70.04	72.14	2.10	68.18	69.34	1.16	73.21	75.00	1.79
	6 (80-<100 ft)	Mean	66.54	66.15	-0.38	61.71	58.48	-3.23	57.18	55.01	-2.18	65.43	64.93	-0.50
		Median	66.41	66.05	-0.36	62.93	59.53	-3.40	58.56	56.42	-2.14	65.76	65.96	0.21
		Quantile (0.85)	74.18	72.80	-1.38	70.23	66.58	-3.65	68.56	63.85	-4.71	73.68	72.93	-0.75
		Quantile (0.95)	80.05	76.67	-3.38	75.03	71.51	-3.52	72.72	69.97	-2.75	79.53	76.32	-3.21
	Total	Mean	64.69	70.50	5.80	53.62	53.28	-0.34	46.85	47.01	0.17	54.51	56.39	1.88
		Median	64.86	70.84	5.98	54.10	53.37	-0.73	45.85	46.15	0.29	55.02	56.00	0.98
		Quantile (0.85)	73.77	77.96	4.18	64.46	63.68	-0.78	58.30	57.82	-0.48	68.48	72.99	4.51
		Quantile (0.95)	79.20	81.83	2.63	70.64	70.14	-0.50	65.95	65.56	-0.39	75.06	78.99	3.93

Table C-14b. Standard Error of Speed by Road Type, Length Class, and Vertical Curvature Class (Free-Flow)

			FCC ROAD CLASS											
			1 Limited access			2 Major arterial			3 Minor arterial/collector			Total		
			Standard Error			Standard Error			Standard Error			Standard Error		
			2007	2009	Change	2007	2009	Change	2007	2009	Change	2007	2009	Change
VER_ CURVERD CLASS	VEH_ LENGTH		Std Err	Std Err	Std Err	Std Err	Std Err	Std Err	Std Err	Std Err	Std Err	Std Err	Std Err	Std Err
1 Flat	1 (<20 ft)	Mean	0.90	1.26	1.04	1.54	0.93	0.71	1.26	1.00	0.51	1.06	1.62	1.08
		Median	0.96	1.39	1.33	2.13	0.94	1.38	1.24	1.10	0.59	1.70	2.05	1.22
		Quantile (0.85)	0.80	1.24	1.19	1.47	1.27	0.54	2.09	1.41	1.08	1.00	3.10	2.81
		Quantile (0.95)	0.95	1.07	1.00	1.11	1.31	0.89	2.21	1.65	1.18	0.97	1.79	1.70
	2 (20-<30 ft)	Mean	0.74	0.94	0.69	1.72	1.48	0.55	1.58	1.32	0.53	1.07	1.18	0.85
		Median	0.86	0.98	0.99	1.37	1.61	0.51	1.89	1.56	0.88	0.97	1.50	1.07
		Quantile (0.85)	0.85	0.19	0.75	0.77	1.54	1.12	1.14	1.84	1.29	0.65	1.80	1.56
		Quantile (0.95)	0.87	0.48	0.70	0.86	1.36	1.46	1.57	1.45	1.28	0.85	0.01	0.84
	3 (30-<40 ft)	Mean	0.62	1.01	0.86	1.92	1.27	0.85	1.47	1.14	0.54	1.10	1.05	0.53
		Median	0.79	0.81	1.00	2.45	1.41	1.43	2.72	1.61	1.32	0.73	1.34	0.96
		Quantile (0.85)	0.65	0.36	0.60	1.44	1.23	0.97	1.04	0.98	0.75	0.75	1.59	1.46
		Quantile (0.95)	0.51	0.63	0.84	0.75	0.90	0.59	1.83	1.06	1.67	0.86	1.49	1.58
	4 (40-<50 ft)	Mean	0.91	0.93	0.73	1.49	1.00	0.77	1.64	1.44	0.38	0.99	1.06	0.78
		Median	0.71	1.00	0.83	1.55	1.25	0.61	2.74	1.76	1.23	0.75	1.08	1.05
		Quantile (0.85)	0.66	0.70	0.67	1.03	0.77	1.12	1.26	0.79	0.62	0.48	1.67	1.66
		Quantile (0.95)	0.89	0.56	0.76	1.46	1.01	1.75	1.56	0.77	1.32	0.60	1.56	1.43
	5 (50-<80 ft)	Mean	1.18	1.41	0.37	1.49	1.49	0.48	1.42	1.85	0.78	1.22	1.43	0.38
		Median	1.17	1.97	1.60	1.53	1.48	0.29	2.05	2.16	0.49	0.99	1.75	1.41
		Quantile (0.85)	1.02	1.32	0.62	1.08	0.60	1.19	1.28	0.96	1.09	0.87	2.95	2.66
		Quantile (0.95)	0.91	0.91	0.29	1.88	0.70	1.49	1.74	0.90	1.33	0.73	1.47	1.30
	6 (80-<100 ft)	Mean	1.57	1.72	0.80	1.39	3.25	3.25	2.19	1.96	1.53	1.39	1.59	0.79
		Median	1.06	1.55	0.80	1.23	2.35	1.56	3.41	1.06	3.18	0.99	1.32	0.74
		Quantile (0.85)	1.80	1.95	0.42	3.52	2.53	5.84	4.76	1.19	4.32	1.56	2.13	1.14
		Quantile (0.95)	2.50	1.54	1.53	4.49	2.30	6.35	2.90	1.51	2.41	1.94	1.62	1.19
	Total	Mean	0.78	1.02	0.72	1.71	1.24	0.54	1.37	1.17	0.40	1.22	1.49	0.76
		Median	0.88	1.23	1.18	2.19	1.30	0.97	1.47	1.32	0.55	1.51	2.13	1.11
		Quantile (0.85)	0.74	2.09	1.95	1.37	1.56	0.60	1.93	1.86	0.81	0.86	1.80	1.48
		Quantile (0.95)	0.86	0.72	0.77	1.12	1.54	1.20	1.86	1.65	1.18	0.79	1.26	1.00

Table C-14b. Standard Error of Speed by Road Type, Length Class, and Vertical Curvature Class (Free-Flow) (continued)

			FCC ROAD CLASS											
			1 Limited access			2 Major arterial			3 Minor arterial/collector			Total		
			Standard Error			Standard Error			Standard Error			Standard Error		
			2007	2009	Change	2007	2009	Change	2007	2009	Change	2007	2009	Change
VER_ CURVERD CLASS	VEH_ LENGTH		Std Err	Std Err	Std Err	Std Err	Std Err	Std Err	Std Err	Std Err	Std Err	Std Err	Std Err	Std Err
2 Moderate	1 (<20 ft)	Mean	.	.	.	.	.	.	3.42	3.22	1.47	5.04	3.54	2.33
		Median	.	.	.	.	.	.	2.84	3.26	1.50	8.68	4.74	5.65
		Quantile (0.85)	.	.	.	.	.	.	7.40	5.16	3.61	5.87	6.55	2.00
		Quantile (0.95)	.	.	.	.	.	.	6.03	3.77	3.47	6.23	6.51	1.02
	2 (20-<30 ft)	Mean	.	.	.	.	.	.	6.07	4.60	1.77	3.46	3.08	1.31
		Median	.	.	.	.	.	.	7.36	6.32	2.30	3.48	4.86	2.73
		Quantile (0.85)	.	.	.	.	.	.	5.81	5.21	1.32	3.16	2.83	0.94
		Quantile (0.95)	.	.	.	.	.	.	5.06	4.99	1.03	4.12	2.50	2.42
	3 (30-<40 ft)	Mean	.	.	.	.	.	.	4.95	5.32	1.40	3.64	3.02	2.20
		Median	.	.	.	.	.	.	6.04	6.46	2.06	4.57	4.04	2.82
		Quantile (0.85)	.	.	.	.	.	.	5.67	6.21	1.10	2.82	2.16	1.11
		Quantile (0.95)	.	.	.	.	.	.	5.15	6.09	1.38	3.15	1.74	3.43
	4 (40-<50 ft)	Mean	.	.	.	.	.	.	6.43	6.63	1.14	3.32	2.96	1.99
		Median	.	.	.	.	.	.	7.52	8.43	2.35	4.53	2.89	2.72
		Quantile (0.85)	.	.	.	.	.	.	7.74	5.90	2.19	0.96	2.61	1.98
		Quantile (0.95)	.	.	.	.	.	.	2.67	7.80	5.63	2.81	1.62	2.90
	5 (50-<80 ft)	Mean	.	.	.	.	.	.	10.31	8.94	1.44	1.87	1.75	1.11
		Median	.	.	.	.	.	.	12.74	10.31	2.51	1.99	1.71	2.44
		Quantile (0.85)	.	.	.	.	.	.	8.62	6.40	2.23	0.94	1.14	0.44
		Quantile (0.95)	.	.	.	.	.	.	6.29	3.51	2.92	0.89	1.29	2.13
	6 (80-<100 ft)	Mean	.	.	.	.	.	.	11.39	1.97	9.98	3.16	2.79	5.88
		Median	.	.	.	.	.	.	15.00	9.98	9.27	2.73	0.39	2.59
		Quantile (0.85)	.	.	.	.	.	.	12.53	1.35	11.17	3.13	0.94	2.22
		Quantile (0.95)	.	.	.	.	.	.	12.20	2.37	14.57	2.70	0.84	3.30
	Total	Mean	.	.	.	.	.	.	4.49	4.05	1.48	4.73	3.44	2.19
		Median	.	.	.	.	.	.	4.52	4.46	1.90	8.17	5.87	4.65
		Quantile (0.85)	.	.	.	.	.	.	8.31	5.34	3.39	4.67	4.57	0.84
		Quantile (0.95)	.	.	.	.	.	.	6.22	4.75	1.79	4.90	4.02	1.34

Table C-14b. Standard Error of Speed by Road Type, Length Class, and Vertical Curvature Class (Free-Flow) (continued)

			FCC ROAD CLASS											
			1 Limited access			2 Major arterial			3 Minor arterial/collector			Total		
			Standard Error			Standard Error			Standard Error			Standard Error		
			2007	2009	Change	2007	2009	Change	2007	2009	Change	2007	2009	Change
VER_ CURVERD CLASS	VEH_ LENGTH		Std Err	Std Err	Std Err	Std Err	Std Err	Std Err	Std Err	Std Err	Std Err	Std Err	Std Err	Std Err
3 Steep	1 (<20 ft)	Mean	.	.	.	13.54	11.37	2.41	3.16	2.61	0.75	4.19	3.83	1.02
		Median	.	.	.	14.30	11.59	3.45	3.91	3.83	1.51	1.94	2.93	1.23
		Quantile (0.85)	.	.	.	20.81	15.50	5.39	2.45	2.75	1.30	11.98	9.56	3.70
		Quantile (0.95)	.	.	.	22.71	17.62	5.11	2.55	3.41	1.49	15.13	12.03	3.31
	2 (20-<30 ft)	Mean	.	.	.	12.73	9.93	3.43	6.91	2.98	3.95	6.05	4.61	1.99
		Median	.	.	.	14.59	10.53	4.50	10.47	3.16	7.62	5.46	3.01	3.22
		Quantile (0.85)	.	.	.	12.50	12.95	0.82	5.10	4.06	1.39	10.38	9.80	4.23
		Quantile (0.95)	.	.	.	12.47	13.95	1.60	5.01	4.06	1.58	11.03	11.35	1.72
	3 (30-<40 ft)	Mean	.	.	.	13.85	7.76	9.06	5.62	2.05	5.49	5.30	7.56	3.55
		Median	.	.	.	15.91	7.55	14.70	6.72	2.09	5.87	3.39	10.13	8.84
		Quantile (0.85)	.	.	.	20.52	7.93	12.85	5.43	2.98	6.89	12.98	7.70	5.70
		Quantile (0.95)	.	.	.	25.52	10.12	15.47	10.89	3.27	13.37	10.80	8.96	3.16
	4 (40-<50 ft)	Mean	.	.	.	13.35	15.55	8.50	4.50	4.86	0.47	8.69	12.33	5.52
		Median	.	.	.	13.70	15.93	9.73	6.65	7.38	3.64	10.75	15.11	13.33
		Quantile (0.85)	.	.	.	21.82	19.57	3.38	2.65	4.95	3.13	17.04	17.14	2.33
		Quantile (0.95)	.	.	.	23.61	24.44	0.96	6.04	10.95	7.56	17.50	9.71	8.43
	5 (50-<80 ft)	Mean	.	.	.	17.22	14.14	3.13	3.29	1.68	1.73	14.87	13.77	2.36
		Median	.	.	.	17.17	16.49	2.35	2.81	2.07	1.32	15.97	16.79	1.16
		Quantile (0.85)	.	.	.	26.01	15.72	10.32	2.96	11.35	8.83	21.92	14.76	7.23
		Quantile (0.95)	.	.	.	24.92	17.70	7.22	3.24	9.19	12.38	16.25	9.43	6.87
	6 (80-<100 ft)	Mean	.	.	.	.	.	.	.	6.40	.	20.43	10.03	10.60
		Median	.	.	.	0.00	.	.	0.00	4.53	4.53	31.45	11.27	23.75
		Quantile (0.85)	.	.	.	0.00	.	.	0.00	6.48	6.48	14.13	21.90	7.84
		Quantile (0.95)	.	.	.	0.00	.	.	0.00	8.16	8.16	6.55	19.92	13.46
	Total	Mean	.	.	.	13.67	10.87	2.95	3.56	2.73	0.95	4.71	4.44	0.82
		Median	.	.	.	15.00	11.80	3.49	4.46	3.68	1.72	2.29	3.12	1.20
		Quantile (0.85)	.	.	.	21.25	14.19	7.09	2.37	3.32	1.32	11.94	10.26	2.66
		Quantile (0.95)	.	.	.	20.68	14.60	6.11	3.20	3.79	1.03	14.98	11.97	3.45

Table C-14b. Standard Error of Speed by Road Type, Length Class, and Vertical Curvature Class (Free-Flow) (continued)

			FCC ROAD CLASS											
			1 Limited access			2 Major arterial			3 Minor arterial/collector			Total		
			Standard Error			Standard Error			Standard Error			Standard Error		
			2007	2009	Change	2007	2009	Change	2007	2009	Change	2007	2009	Change
VER_ CURVERD CLASS	VEH_ LENGTH		Std Err	Std Err	Std Err	Std Err	Std Err	Std Err	Std Err	Std Err	Std Err	Std Err	Std Err	Std Err
Total	1 (<20 ft)	Mean	0.86	1.26	1.02	1.56	0.93	0.72	1.29	1.04	0.50	1.07	1.59	1.04
		Median	0.93	1.45	1.27	2.15	0.96	1.37	1.23	1.18	0.65	1.72	1.97	1.16
		Quantile (0.85)	0.91	1.28	1.19	1.52	1.24	0.59	2.09	1.47	1.12	1.02	2.17	2.02
		Quantile (0.95)	0.92	1.08	0.96	1.29	1.31	0.95	2.19	1.66	1.13	0.89	1.26	1.15
	2 (20-<30 ft)	Mean	0.73	0.95	0.69	1.69	1.44	0.54	1.71	1.38	0.55	1.08	1.17	0.82
		Median	0.88	1.23	1.14	1.32	1.56	0.49	2.10	1.58	0.94	0.87	1.44	0.94
		Quantile (0.85)	0.87	0.21	0.78	0.76	1.50	1.20	1.16	1.86	1.15	0.69	1.68	1.46
		Quantile (0.95)	0.96	0.49	0.81	0.89	1.25	1.39	1.42	1.48	1.30	0.65	0.45	0.62
	3 (30-<40 ft)	Mean	0.60	1.00	0.85	1.96	1.21	0.94	1.56	1.24	0.51	1.12	1.04	0.53
		Median	0.75	0.79	0.96	2.43	1.35	1.45	2.84	1.70	1.32	0.68	1.28	0.84
		Quantile (0.85)	0.65	0.34	0.61	1.46	1.17	1.05	0.98	1.08	0.86	0.77	1.30	1.28
		Quantile (0.95)	0.43	0.63	0.81	0.98	0.85	0.84	1.82	1.04	1.79	0.89	1.49	1.58
	4 (40-<50 ft)	Mean	0.88	0.93	0.73	1.59	0.96	0.88	1.77	1.58	0.35	1.02	1.05	0.79
		Median	0.67	0.88	0.77	1.66	1.19	0.78	2.92	1.79	1.27	0.76	1.07	1.11
		Quantile (0.85)	0.66	0.70	0.65	1.07	0.76	1.08	1.15	1.04	0.76	0.46	1.10	1.18
		Quantile (0.95)	0.83	0.56	0.73	1.89	1.03	2.02	1.35	0.81	1.55	0.68	1.55	1.50
	5 (50-<80 ft)	Mean	1.18	1.41	0.36	1.44	1.42	0.55	1.72	2.19	0.70	1.21	1.42	0.38
		Median	1.18	1.85	1.34	1.45	1.38	0.29	2.51	2.58	0.60	1.00	1.56	1.15
		Quantile (0.85)	1.03	1.33	0.59	1.38	0.65	1.42	0.55	1.05	1.09	0.88	2.45	2.02
		Quantile (0.95)	0.93	0.92	0.33	2.24	0.70	1.84	1.29	0.63	1.06	0.75	0.92	0.93
	6 (80-<100 ft)	Mean	1.58	1.71	0.80	1.41	3.20	3.32	2.78	2.15	1.36	1.39	1.58	0.79
		Median	1.03	1.55	0.81	1.12	2.35	1.71	4.90	1.23	4.15	0.94	1.33	0.72
		Quantile (0.85)	1.83	1.95	0.41	3.71	2.42	5.86	3.40	0.57	3.50	1.53	2.52	1.32
		Quantile (0.95)	2.56	1.56	1.64	4.42	2.78	6.72	2.47	0.32	2.75	1.97	1.60	1.03
	Total	Mean	0.76	1.02	0.71	1.71	1.22	0.56	1.43	1.23	0.39	1.23	1.47	0.74
		Median	0.79	0.84	0.78	2.22	1.30	1.02	1.62	1.37	0.64	1.66	2.03	0.93
		Quantile (0.85)	0.73	1.63	1.40	1.38	1.49	0.71	2.09	1.97	0.69	0.92	1.55	1.15
		Quantile (0.95)	0.80	0.74	0.70	1.28	1.46	1.27	1.69	1.66	0.95	0.77	1.38	1.14

Table C-14c. Standard Deviation of Speed by Road Type, Length Class, and Vertical Curvature Class (Free-Flow)

		FCC ROAD CLASS											
		1 Limited access			2 Major arterial			3 Minor arterial			Total		
		2007	2009	Change	2007	2009	Change	2007	2009	Change	2007	2009	Change
VER_CURVERDCLASS	VEH_LENGTH	Std Dev	Std Dev		Std Dev	Std Dev		Std Dev	Std Dev		Std Dev	Std Dev	
1 Straight	1 (<20 ft)	9.40	7.86	-1.55	10.44	9.73	-0.70	10.45	9.74	-0.72	13.02	14.85	1.83
	2 (20-<30 ft)	9.23	7.93	-1.30	11.18	10.23	-0.96	12.06	10.64	-1.42	12.46	13.25	0.79
	3 (30-<40 ft)	8.94	9.05	0.10	10.93	11.02	0.09	11.47	11.05	-0.42	11.76	12.49	0.73
	4 (40-<50 ft)	8.93	8.89	-0.04	10.15	10.31	0.16	10.58	10.42	-0.17	10.83	11.77	0.94
	5 (50-<80 ft)	7.16	7.05	-0.11	9.10	10.69	1.59	10.09	10.95	0.86	8.55	8.98	0.43
	6 (80-<100 ft)	7.75	7.80	0.05	9.95	8.95	-1.01	10.76	9.71	-1.05	8.67	8.59	-0.09
	Total	9.20	8.13	-1.07	10.76	10.35	-0.40	10.93	10.43	-0.50	12.99	14.21	1.22
2 Moderate	1 (<20 ft)	6.96	5.48	-1.49	4.95	5.35	0.40	10.01	9.90	-0.11	12.38	12.23	-0.14
	2 (20-<30 ft)	7.43	5.37	-2.05	5.00	5.96	0.96	11.71	11.26	-0.45	11.69	11.47	-0.22
	3 (30-<40 ft)	7.41	5.43	-1.98	4.41	7.15	2.74	11.81	12.18	0.36	12.05	11.96	-0.09
	4 (40-<50 ft)	6.58	5.18	-1.40	4.24	4.15	-0.09	11.44	11.36	-0.07	11.00	11.13	0.13
	5 (50-<80 ft)	6.04	4.10	-1.94	5.42	4.52	-0.90	9.47	10.82	1.36	8.30	9.27	0.97
	6 (80-<100 ft)	5.11	3.89	-1.22	.	.	.	4.75	11.71	6.96	5.49	9.02	3.52
	Total	7.14	5.46	-1.68	5.10	5.79	0.69	11.01	11.02	0.01	12.45	12.33	-0.12
3 Steep	1 (<20 ft)	6.58	6.12	-0.46	13.87	12.03	-1.84	6.57	7.06	0.49	11.17	10.83	-0.34
	2 (20-<30 ft)	7.08	7.86	0.78	14.09	10.84	-3.26	10.31	7.89	-2.42	14.49	11.78	-2.71
	3 (30-<40 ft)	7.91	10.52	2.61	12.69	10.19	-2.50	9.69	9.87	0.18	12.49	13.37	0.88
	4 (40-<50 ft)	7.16	9.32	2.16	12.93	10.47	-2.46	8.46	9.10	0.64	12.98	14.05	1.07
	5 (50-<80 ft)	7.02	12.79	5.77	11.78	9.24	-2.54	7.98	9.80	1.82	13.35	13.41	0.07
	6 (80-<100 ft)	7.34	19.51	12.17	0.00	8.06	8.06	0.00	5.22	5.22	13.21	11.98	-1.23
	Total	6.92	7.16	0.24	13.98	11.76	-2.22	7.14	7.54	0.41	11.89	11.67	-0.22
Total	1 (<20 ft)	9.32	7.84	-1.48	10.45	9.72	-0.72	10.41	9.74	-0.66	13.01	14.84	1.83
	2 (20-<30 ft)	9.18	7.92	-1.27	11.18	10.19	-0.99	12.06	10.68	-1.38	12.48	13.22	0.74
	3 (30-<40 ft)	8.91	9.01	0.10	10.95	10.99	0.04	11.51	11.14	-0.37	11.82	12.50	0.68
	4 (40-<50 ft)	8.87	8.86	-0.01	10.23	10.30	0.07	10.66	10.53	-0.12	10.88	11.79	0.91
	5 (50-<80 ft)	7.16	7.04	-0.12	9.17	10.67	1.49	10.11	11.08	0.97	8.57	9.00	0.43
	6 (80-<100 ft)	7.75	7.79	0.04	9.97	8.94	-1.03	10.71	10.08	-0.63	8.64	8.62	-0.01
	Total	9.15	8.11	-1.03	10.76	10.33	-0.43	10.91	10.46	-0.44	12.99	14.21	1.22

Table C-15a. Speed Estimate of Speed by Road Type, Horizontal Curvature, and Light Condition (Free-Flow)

			FCC ROAD CLASS											
			1 Limited access			2 Major arterial			3 Minor arterial/collector			Total		
			Speed Estimate			Speed Estimate			Speed Estimate			Speed Estimate		
			2007	2009	Change	2007	2009	Change	2007	2009	Change	2007	2009	Change
LIGHT CONDITION	HOR_ CURVERD CLASS		Estimate	Estimate	Estimate	Estimate	Estimate	Estimate	Estimate	Estimate	Estimate	Estimate	Estimate	Estimate
1 Day (0600-2059)	1 Straight	Mean	65.16	71.17	6.01	53.42	53.10	-0.32	47.63	47.70	0.07	54.77	56.40	1.63
		Median	65.28	71.92	6.64	53.99	53.23	-0.76	46.59	46.86	0.27	55.09	55.54	0.45
		Quantile (0.85)	74.25	78.82	4.57	64.32	63.63	-0.68	58.94	58.36	-0.58	68.74	73.00	4.25
		Quantile (0.95)	79.61	82.36	2.75	70.50	70.16	-0.34	66.62	66.09	-0.53	75.27	79.00	3.72
	2 Moderate	Mean	60.85	69.26	8.42	59.21	58.70	-0.50	41.08	41.90	0.82	47.64	52.57	4.93
		Median	60.96	69.72	8.77	58.90	58.92	0.02	39.19	39.80	0.61	45.86	53.00	7.14
		Quantile (0.85)	70.38	77.05	6.66	68.18	65.88	-2.30	52.27	53.99	1.72	62.96	70.99	8.03
		Quantile (0.95)	76.19	80.45	4.26	74.14	71.16	-2.98	60.48	60.39	-0.09	70.26	76.98	6.72
	3 Sharp	Mean	64.39	69.05	4.65	59.36	58.48	-0.88	42.06	41.05	-1.01	52.49	53.31	0.82
		Median	64.12	68.42	4.30	59.38	58.34	-1.04	39.69	39.03	-0.66	54.71	55.00	0.28
		Quantile (0.85)	72.06	75.28	3.23	68.99	65.32	-3.67	54.79	52.63	-2.16	68.20	71.00	2.80
		Quantile (0.95)	77.97	78.59	0.63	75.81	70.05	-5.76	60.98	59.56	-1.42	73.99	76.80	2.80
	Total	Mean	64.97	70.98	6.00	53.73	53.41	-0.33	46.85	47.00	0.15	54.25	56.06	1.81
		Median	65.13	71.89	6.76	54.29	53.51	-0.79	45.86	46.14	0.28	54.63	55.35	0.72
		Quantile (0.85)	74.13	78.76	4.63	64.51	63.85	-0.66	58.31	57.85	-0.46	68.38	72.99	4.62
		Quantile (0.95)	79.41	82.15	2.73	70.77	70.25	-0.52	65.97	65.58	-0.39	75.08	78.99	3.92
2 Night (2100-0559)	1 Straight	Mean	64.02	69.07	5.06	52.84	52.41	-0.44	47.60	47.79	0.18	56.14	58.21	2.08
		Median	64.19	68.92	4.73	52.75	52.03	-0.72	46.59	47.00	0.41	56.97	59.01	2.04
		Quantile (0.85)	72.85	76.58	3.73	63.47	62.92	-0.56	58.92	58.30	-0.62	69.02	72.99	3.97
		Quantile (0.95)	78.17	80.61	2.44	69.99	69.82	-0.18	66.39	65.70	-0.69	75.23	78.00	2.77
	2 Moderate	Mean	59.57	67.58	8.01	57.63	56.98	-0.66	41.28	42.04	0.76	48.20	54.40	6.20
		Median	59.68	67.59	7.91	57.05	57.00	-0.05	39.62	40.40	0.78	47.04	55.27	8.23
		Quantile (0.85)	68.93	76.19	7.26	65.99	64.24	-1.75	51.70	53.40	1.70	62.45	71.99	9.54
		Quantile (0.95)	74.60	79.75	5.15	71.87	70.11	-1.76	59.26	59.53	0.27	69.58	77.95	8.37
	3 Sharp	Mean	62.53	67.42	4.89	58.09	55.88	-2.21	41.93	41.28	-0.65	54.99	57.92	2.92
		Median	62.21	66.26	4.05	57.88	56.34	-1.55	39.41	39.15	-0.26	57.69	62.00	4.30
		Quantile (0.85)	70.08	73.68	3.59	70.13	62.09	-8.04	54.00	52.56	-1.44	68.10	71.75	3.65
		Quantile (0.95)	75.14	77.64	2.50	75.47	67.13	-8.34	59.99	58.17	-1.82	73.00	76.78	3.77

Table C-15a. Speed Estimate of Speed by Road Type, Horizontal Curvature, and Light Condition (Free-Flow) (continued)

			FCC ROAD CLASS											
			1 Limited access			2 Major arterial			3 Minor arterial/collector			Total		
			Speed Estimate			Speed Estimate			Speed Estimate			Speed Estimate		
			2007	2009	Change	2007	2009	Change	2007	2009	Change	2007	2009	Change
LIGHT CONDITION	HOR_ CURVERD CLASS		Estimate	Estimate	Estimate	Estimate	Estimate	Estimate	Estimate	Estimate	Estimate	Estimate	Estimate	Estimate
	Total	Mean	63.80	68.91	5.11	53.06	52.62	-0.44	46.81	47.08	0.27	55.65	57.96	2.31
		Median	63.90	68.88	4.98	53.00	52.27	-0.73	45.69	46.20	0.51	56.46	59.00	2.54
		Quantile (0.85)	72.67	76.48	3.81	63.68	63.00	-0.68	58.25	57.71	-0.54	68.78	72.99	4.21
		Quantile (0.95)	77.93	80.46	2.53	70.14	69.83	-0.31	65.76	65.16	-0.60	75.00	78.00	3.00
Total	1 Straight	Mean	64.89	70.69	5.80	53.32	52.99	-0.33	47.63	47.71	0.08	55.03	56.72	1.69
		Median	65.08	70.92	5.83	53.92	52.99	-0.93	46.59	46.88	0.29	55.35	56.06	0.71
		Quantile (0.85)	74.00	78.69	4.69	64.19	63.52	-0.66	58.93	58.35	-0.57	68.78	73.00	4.21
		Quantile (0.95)	79.35	82.00	2.65	70.39	70.09	-0.30	66.56	66.08	-0.48	75.27	78.99	3.73
	2 Moderate	Mean	60.57	68.91	8.33	58.97	58.45	-0.52	41.11	41.92	0.81	47.73	52.87	5.14
		Median	60.77	69.33	8.56	58.68	58.70	0.02	39.39	39.81	0.42	46.00	53.55	7.56
		Quantile (0.85)	70.25	76.89	6.64	68.09	65.70	-2.39	52.14	53.95	1.81	62.85	70.99	8.14
		Quantile (0.95)	75.59	80.32	4.73	74.00	70.84	-3.17	60.26	60.36	0.11	70.19	76.99	6.80
	3 Sharp	Mean	63.87	68.56	4.70	59.23	58.19	-1.03	42.04	41.09	-0.95	53.04	54.30	1.26
		Median	63.53	67.77	4.24	59.34	58.20	-1.14	39.69	39.04	-0.65	55.62	57.50	1.88
		Quantile (0.85)	71.95	74.88	2.92	69.01	65.12	-3.89	54.38	52.63	-1.75	68.20	71.98	3.78
		Quantile (0.95)	77.25	78.36	1.10	75.72	69.82	-5.90	60.98	59.52	-1.46	73.95	76.97	3.02
	Total	Mean	64.69	70.50	5.80	53.62	53.28	-0.34	46.85	47.01	0.17	54.51	56.39	1.88
		Median	64.86	70.84	5.98	54.10	53.37	-0.73	45.85	46.15	0.29	55.02	56.00	0.98
		Quantile (0.85)	73.77	77.96	4.18	64.46	63.68	-0.78	58.30	57.82	-0.48	68.48	72.99	4.51
		Quantile (0.95)	79.20	81.83	2.63	70.64	70.14	-0.50	65.95	65.56	-0.39	75.06	78.99	3.93

Table C-15b. Standard Error of Speed by Road Type, Horizontal Curvature, and Light Condition (Free-Flow)

			FCC ROAD CLASS											
			1 Limited access			2 Major arterial			3 Minor arterial/collector			Total		
			Standard Error			Standard Error			Standard Error			Standard Error		
			2007	2009	Change	2007	2009	Change	2007	2009	Change	2007	2009	Change
LIGHT CONDITION	HOR_ CURVERD CLASS		Std Err	Std Err	Std Err	Std Err	Std Err	Std Err	Std Err	Std Err	Std Err	Std Err	Std Err	Std Err
1 Day (0600-2059)	1 Straight	Mean	0.67	1.01	0.74	1.69	1.20	0.56	1.44	1.28	0.33	1.24	1.58	0.76
		Median	0.79	1.33	1.41	2.18	1.30	1.04	1.58	1.38	0.56	1.73	2.13	0.94
		Quantile (0.85)	0.62	0.83	0.95	1.21	1.54	0.77	2.03	2.07	0.54	0.89	1.65	1.38
		Quantile (0.95)	0.95	0.77	0.94	1.14	1.55	1.56	1.89	1.75	1.04	0.87	1.26	1.15
	2 Moderate	Mean	4.48	3.79	4.78	2.59	1.81	1.79	2.02	1.84	1.41	2.61	3.19	2.99
		Median	4.67	4.47	5.11	2.87	2.11	2.12	1.57	1.78	1.58	5.00	4.89	4.25
		Quantile (0.85)	3.47	3.23	3.95	4.10	1.09	3.63	4.37	3.17	2.26	2.52	5.89	5.89
		Quantile (0.95)	3.25	2.68	3.40	4.09	1.43	3.37	3.02	2.41	2.05	2.26	4.77	4.81
	3 Sharp	Mean	3.58	1.82	2.04	.	.	.	2.94	1.86	1.15	6.24	4.90	3.13
		Median	4.24	2.61	2.03	.	.	.	3.20	1.33	1.96	12.22	12.50	7.60
		Quantile (0.85)	4.99	1.83	3.59	.	.	.	7.51	5.53	2.17	4.79	3.68	4.95
		Quantile (0.95)	5.91	1.33	4.67	.	.	.	5.39	4.51	1.11	2.61	3.04	2.80
	Total	Mean	0.76	1.02	0.74	1.72	1.22	0.57	1.47	1.27	0.40	1.25	1.51	0.77
		Median	0.77	2.05	1.88	2.20	1.34	1.07	1.65	1.39	0.63	1.84	2.07	0.98
		Quantile (0.85)	0.68	1.16	1.01	1.31	1.43	0.63	2.17	2.01	0.73	0.95	1.61	1.26
		Quantile (0.95)	0.92	0.77	0.82	1.19	1.54	1.31	1.79	1.70	0.99	0.81	1.26	1.05
2 Night (2100-0559)	1 Straight	Mean	0.71	0.97	0.67	1.71	1.23	0.55	1.29	1.14	0.34	1.19	1.46	0.69
		Median	0.66	1.12	0.83	2.63	1.38	1.41	1.51	1.37	0.48	1.48	2.14	1.40
		Quantile (0.85)	0.58	0.83	0.64	1.79	1.94	0.57	1.71	1.73	0.59	0.71	1.41	1.16
		Quantile (0.95)	0.85	0.76	0.76	1.89	1.78	1.42	1.54	1.39	0.77	0.55	2.03	1.96
	2 Moderate	Mean	4.10	4.75	5.47	2.89	1.18	2.11	1.66	1.77	1.01	2.74	4.21	3.87
		Median	3.84	5.46	5.78	3.72	1.65	2.43	1.17	1.73	1.29	5.33	5.28	5.27
		Quantile (0.85)	2.87	4.65	4.83	4.30	1.27	3.12	4.17	3.05	1.79	2.69	7.24	7.32
		Quantile (0.95)	2.53	3.89	4.00	4.01	1.41	2.83	3.02	2.18	1.97	2.37	6.16	6.10
	3 Sharp	Mean	2.24	1.68	0.96	.	.	.	2.95	1.36	1.97	9.05	5.20	6.26
		Median	3.22	2.33	1.24	.	.	.	2.82	1.53	2.22	14.67	6.59	9.89
		Quantile (0.85)	3.44	2.01	2.00	.	.	.	7.18	4.06	3.36	7.30	1.93	7.62
		Quantile (0.95)	4.24	1.56	3.26	.	.	.	5.46	2.92	2.73	3.06	2.23	4.01

Table C-15b. Standard Error of Speed by Road Type, Horizontal Curvature, and Light Condition (Free-Flow) (continued)

			FCC ROAD CLASS											
			1 Limited access			2 Major arterial			3 Minor arterial/collector			Total		
			Standard Error			Standard Error			Standard Error			Standard Error		
			2007	2009	Change	2007	2009	Change	2007	2009	Change	2007	2009	Change
LIGHT CONDITION	HOR_ CURVERD CLASS		Std Err	Std Err	Std Err	Std Err	Std Err	Std Err	Std Err	Std Err	Std Err	Std Err	Std Err	Std Err
	Total	Mean	0.75	0.97	0.66	1.70	1.23	0.55	1.27	1.08	0.40	1.18	1.37	0.66
		Median	0.73	1.06	0.86	2.52	1.49	1.30	1.45	1.26	0.58	1.49	1.97	1.19
		Quantile (0.85)	0.76	0.91	0.60	1.86	1.76	0.64	1.86	1.70	0.71	0.79	1.26	0.87
		Quantile (0.95)	0.70	0.77	0.72	1.90	1.72	1.37	1.32	1.35	0.53	0.69	1.06	1.25
Total	1 Straight	Mean	0.68	1.01	0.72	1.69	1.20	0.55	1.41	1.25	0.32	1.22	1.55	0.74
		Median	0.73	1.72	1.64	2.38	1.31	1.28	1.56	1.39	0.56	1.54	2.19	1.09
		Quantile (0.85)	0.70	1.56	1.39	1.38	1.63	0.76	1.93	2.05	0.49	0.82	1.65	1.33
		Quantile (0.95)	0.81	0.73	0.77	1.18	1.57	1.40	1.85	1.70	1.02	0.79	1.26	1.08
	2 Moderate	Mean	4.40	3.98	4.93	2.61	1.70	1.80	1.96	1.83	1.35	2.60	3.35	3.11
		Median	4.26	4.66	5.09	2.87	2.10	2.41	1.44	1.72	1.48	5.08	4.95	4.44
		Quantile (0.85)	3.46	3.44	3.90	4.10	0.96	3.57	4.39	3.19	2.35	2.61	6.00	6.09
		Quantile (0.95)	3.31	2.85	3.87	4.20	1.11	3.59	3.06	2.36	1.99	2.27	5.12	4.97
	3 Sharp	Mean	3.61	1.78	2.08	.	.	.	2.93	1.75	1.20	6.69	5.03	3.69
		Median	4.38	2.57	2.15	.	.	.	3.17	1.32	1.94	12.59	11.89	7.82
		Quantile (0.85)	4.70	1.86	3.12	.	.	.	7.25	5.15	2.39	4.96	3.48	4.71
		Quantile (0.95)	5.99	1.34	4.79	.	.	.	5.52	4.38	1.70	2.24	2.90	3.00
	Total	Mean	0.76	1.02	0.71	1.71	1.22	0.56	1.43	1.23	0.39	1.23	1.47	0.74
		Median	0.79	0.84	0.78	2.22	1.30	1.02	1.62	1.37	0.64	1.66	2.03	0.93
		Quantile (0.85)	0.73	1.63	1.40	1.38	1.49	0.71	2.09	1.97	0.69	0.92	1.55	1.15
		Quantile (0.95)	0.80	0.74	0.70	1.28	1.46	1.27	1.69	1.66	0.95	0.77	1.38	1.14

Table C-15c. Standard Deviation of Speed by Road Type, Horizontal Curvature, and Light Condition (Free-Flow)

		FCC ROAD CLASS											
		1 Limited access			2 Major arterial			3 Minor arterial			Total		
		2007	2009	Change	2007	2009	Change	2007	2009	Change	2007	2009	Change
LIGHTCONDITION	HOR_CURVERDCLASS	Std Dev	Std Dev		Std Dev	Std Dev		Std Dev	Std Dev		Std Dev	Std Dev	
1 Day (0600-2059)	1 Straight	9.20	8.18	-1.01	10.86	10.43	-0.43	10.82	10.35	-0.48	12.88	14.13	1.25
	2 Moderate	9.48	8.47	-1.01	9.07	7.81	-1.26	10.17	10.21	0.03	13.40	15.43	2.03
	3 Sharp	8.52	6.35	-2.17	9.73	7.18	-2.55	10.18	9.46	-0.72	14.52	15.80	1.27
	Total	9.22	8.17	-1.05	10.85	10.38	-0.48	10.94	10.49	-0.46	13.09	14.31	1.23
2 Night (2100-0559)	1 Straight	8.85	7.68	-1.17	10.31	10.10	-0.21	10.62	10.20	-0.42	12.32	13.43	1.11
	2 Moderate	9.59	8.90	-0.69	8.15	7.81	-0.33	9.45	9.70	0.25	12.69	14.99	2.29
	3 Sharp	7.77	6.34	-1.43	11.53	7.18	-4.35	9.99	9.18	-0.81	13.16	14.48	1.32
	Total	8.86	7.71	-1.15	10.28	10.05	-0.23	10.70	10.31	-0.39	12.51	13.60	1.09
Total	1 Straight	9.13	8.12	-1.01	10.77	10.38	-0.39	10.79	10.33	-0.47	12.79	14.03	1.24
	2 Moderate	9.52	8.59	-0.93	8.95	7.83	-1.12	10.06	10.14	0.07	13.29	15.37	2.09
	3 Sharp	8.36	6.39	-1.97	9.93	7.22	-2.71	10.15	9.42	-0.73	14.27	15.64	1.37
	Total	9.15	8.11	-1.03	10.76	10.33	-0.43	10.91	10.46	-0.44	12.99	14.21	1.22

Table C-16a. Speed Estimate of Speed by Road Type, Vertical Curvature, and Light Condition (Free-Flow)

			FCC ROAD CLASS											
			1 Limited access			2 Major arterial			3 Minor arterial/collector			Total		
			Speed Estimate			Speed Estimate			Speed Estimate			Speed Estimate		
			2007	2009	Change	2007	2009	Change	2007	2009	Change	2007	2009	Change
LIGHT CONDITION	VER_ CURVERD CLASS		Estimate	Estimate	Estimate	Estimate	Estimate	Estimate	Estimate	Estimate	Estimate	Estimate	Estimate	Estimate
1 Day (0600-2059)	1 Flat	Mean	65.03	71.03	6.00	53.68	53.39	-0.29	47.00	47.12	0.12	54.46	56.37	1.91
		Median	65.16	71.91	6.75	54.25	53.53	-0.72	45.97	46.37	0.40	54.88	55.81	0.93
		Quantile (0.85)	74.20	78.78	4.57	64.51	63.85	-0.66	58.39	57.85	-0.55	68.55	73.00	4.45
		Quantile (0.95)	79.57	82.20	2.63	70.64	70.25	-0.39	66.05	65.59	-0.46	75.25	79.00	3.75
	2 Moderate	Mean	63.32	67.13	3.81	55.03	52.68	-2.34	45.89	46.90	1.02	51.09	50.22	-0.87
		Median	62.96	66.17	3.21	55.35	52.21	-3.14	43.51	44.74	1.24	51.83	49.10	-2.73
		Quantile (0.85)	70.48	72.31	1.83	59.68	57.72	-1.96	59.34	59.55	0.21	64.46	64.45	-0.01
		Quantile (0.95)	75.14	76.06	0.92	62.68	62.62	-0.06	65.13	66.45	1.32	70.39	70.86	0.47
	3 Steep	Mean	61.10	69.32	8.21	56.36	55.86	-0.50	41.20	39.48	-1.72	45.86	44.38	-1.48
		Median	60.97	69.13	8.16	57.69	57.47	-0.22	41.47	39.27	-2.20	43.44	42.35	-1.09
		Quantile (0.85)	67.59	74.93	7.34	71.05	67.57	-3.47	47.92	47.09	-0.83	59.18	58.37	-0.81
		Quantile (0.95)	72.17	78.34	6.17	77.92	73.34	-4.58	52.78	52.10	-0.69	70.06	67.39	-2.68
	Total	Mean	64.97	70.98	6.00	53.73	53.41	-0.33	46.85	47.00	0.15	54.25	56.06	1.81
		Median	65.13	71.89	6.76	54.29	53.51	-0.79	45.86	46.14	0.28	54.63	55.35	0.72
		Quantile (0.85)	74.13	78.76	4.63	64.51	63.85	-0.66	58.31	57.85	-0.46	68.38	72.99	4.62
		Quantile (0.95)	79.41	82.15	2.73	70.77	70.25	-0.52	65.97	65.58	-0.39	75.08	78.99	3.92
2 Night (2100-0559)	1 Flat	Mean	63.87	68.98	5.11	53.00	52.61	-0.40	46.95	47.19	0.24	55.81	58.23	2.42
		Median	64.04	68.91	4.87	52.98	52.27	-0.71	45.97	46.40	0.44	56.61	59.48	2.86
		Quantile (0.85)	72.74	76.54	3.80	63.48	62.96	-0.52	58.28	57.74	-0.54	68.90	73.00	4.09
		Quantile (0.95)	78.00	80.52	2.53	69.92	69.83	-0.09	65.87	65.18	-0.69	75.08	78.00	2.92
	2 Moderate	Mean	62.30	65.71	3.42	55.10	51.69	-3.41	45.69	47.10	1.41	53.80	53.13	-0.67
		Median	61.91	64.71	2.79	55.84	50.99	-4.85	43.32	45.38	2.06	55.92	53.66	-2.26
		Quantile (0.85)	69.72	70.60	0.88	60.15	57.96	-2.19	59.28	59.31	0.02	66.39	66.96	0.57
		Quantile (0.95)	74.43	74.61	0.18	63.48	62.63	-0.86	65.47	65.78	0.32	71.35	71.70	0.34
	3 Steep	Mean	60.65	64.99	4.34	55.81	54.49	-1.32	42.79	41.04	-1.75	47.12	45.27	-1.85
		Median	60.38	64.45	4.06	55.16	54.83	-0.33	42.66	40.54	-2.12	44.02	43.50	-0.52
		Quantile (0.85)	68.08	71.51	3.43	72.94	66.78	-6.17	49.29	48.59	-0.71	59.48	57.65	-1.83
		Quantile (0.95)	73.36	75.04	1.68	79.47	72.80	-6.67	54.26	53.96	-0.30	72.04	67.01	-5.03

Table C-16a. Speed Estimate of Speed by Road Type, Vertical Curvature, and Light Condition (Free-Flow) (continued)

			FCC ROAD CLASS											
			1 Limited access			2 Major arterial			3 Minor arterial/collector			Total		
			Speed Estimate			Speed Estimate			Speed Estimate			Speed Estimate		
			2007	2009	Change	2007	2009	Change	2007	2009	Change	2007	2009	Change
LIGHT CONDITION	VER_ CURVERD CLASS		Estimate	Estimate	Estimate	Estimate	Estimate	Estimate	Estimate	Estimate	Estimate	Estimate	Estimate	Estimate
	Total	Mean	63.80	68.91	5.11	53.06	52.62	-0.44	46.81	47.08	0.27	55.65	57.96	2.31
		Median	63.90	68.88	4.98	53.00	52.27	-0.73	45.69	46.20	0.51	56.46	59.00	2.54
		Quantile (0.85)	72.67	76.48	3.81	63.68	63.00	-0.68	58.25	57.71	-0.54	68.78	72.99	4.21
		Quantile (0.95)	77.93	80.46	2.53	70.14	69.83	-0.31	65.76	65.16	-0.60	75.00	78.00	3.00
Total	1 Flat	Mean	64.76	70.56	5.81	53.57	53.26	-0.30	46.99	47.13	0.14	54.71	56.69	1.98
		Median	64.98	70.88	5.90	54.04	53.37	-0.67	45.97	46.38	0.41	55.22	56.38	1.16
		Quantile (0.85)	73.93	77.99	4.06	64.46	63.74	-0.72	58.37	57.82	-0.56	68.69	73.00	4.31
		Quantile (0.95)	79.33	81.87	2.55	70.56	70.14	-0.42	66.00	65.56	-0.44	75.23	78.99	3.76
	2 Moderate	Mean	62.99	66.67	3.68	55.03	52.59	-2.45	45.86	46.93	1.08	51.64	50.72	-0.93
		Median	62.69	65.68	2.99	55.39	52.19	-3.20	43.49	44.77	1.27	52.78	49.82	-2.96
		Quantile (0.85)	70.39	71.81	1.42	59.72	57.77	-1.95	59.30	59.54	0.24	64.98	65.00	0.02
		Quantile (0.95)	75.07	75.70	0.63	62.71	62.62	-0.09	65.13	66.45	1.32	70.50	70.91	0.41
	3 Steep	Mean	61.01	68.59	7.58	56.25	55.62	-0.63	41.47	39.73	-1.74	46.08	44.53	-1.56
		Median	60.89	68.45	7.56	57.29	57.02	-0.27	41.58	39.48	-2.10	43.49	42.60	-0.89
		Quantile (0.85)	67.61	74.55	6.94	71.89	67.45	-4.44	48.13	47.63	-0.50	59.23	58.37	-0.87
		Quantile (0.95)	72.57	77.99	5.42	78.86	73.27	-5.59	52.92	52.59	-0.32	70.92	67.07	-3.85
	Total	Mean	64.69	70.50	5.80	53.62	53.28	-0.34	46.85	47.01	0.17	54.51	56.39	1.88
		Median	64.86	70.84	5.98	54.10	53.37	-0.73	45.85	46.15	0.29	55.02	56.00	0.98
		Quantile (0.85)	73.77	77.96	4.18	64.46	63.68	-0.78	58.30	57.82	-0.48	68.48	72.99	4.51
		Quantile (0.95)	79.20	81.83	2.63	70.64	70.14	-0.50	65.95	65.56	-0.39	75.06	78.99	3.93

Table C-16b. Standard Error of Speed by Road Type, Vertical Curvature, and Light Condition (Free-Flow)

			FCC ROAD CLASS											
			1 Limited access			2 Major arterial			3 Minor arterial/collector			Total		
			Standard Error			Standard Error			Standard Error			Standard Error		
			2007	2009	Change	2007	2009	Change	2007	2009	Change	2007	2009	Change
LIGHT CONDITION	VER_ CURVERD CLASS		Std Err	Std Err	Std Err	Std Err	Std Err	Std Err	Std Err	Std Err	Std Err	Std Err	Std Err	Std Err
1 Day (0600-2059)	1 Flat	Mean	0.79	1.02	0.75	1.72	1.24	0.55	1.41	1.20	0.41	1.24	1.52	0.79
		Median	0.76	1.61	1.51	2.17	1.35	0.99	1.50	1.33	0.58	1.74	2.05	0.87
		Quantile (0.85)	0.67	1.13	1.04	1.32	1.53	0.61	2.00	1.92	0.77	0.92	1.87	1.54
		Quantile (0.95)	0.89	0.76	0.85	1.07	1.64	1.21	1.98	1.70	1.21	0.84	1.26	1.08
	2 Moderate	Mean	.	.	.	.	.	.	4.43	4.08	1.38	4.35	3.38	2.08
		Median	.	.	.	.	.	.	4.52	4.55	1.95	8.07	5.82	4.46
		Quantile (0.85)	.	.	.	.	.	.	8.14	5.39	3.26	4.29	4.26	1.21
		Quantile (0.95)	.	.	.	.	.	.	5.85	4.78	1.62	4.71	3.93	1.06
	3 Steep	Mean	.	.	.	13.22	10.85	2.61	3.45	2.55	1.08	4.72	4.58	0.68
		Median	.	.	.	14.66	11.87	3.00	4.55	3.44	1.71	2.26	3.38	1.45
		Quantile (0.85)	.	.	.	20.00	13.84	6.21	2.13	2.92	0.85	11.82	10.34	2.49
		Quantile (0.95)	.	.	.	18.74	14.20	4.63	3.14	3.43	0.88	14.38	12.33	2.83
	Total	Mean	0.76	1.02	0.74	1.72	1.22	0.57	1.47	1.27	0.40	1.25	1.51	0.77
		Median	0.77	2.05	1.88	2.20	1.34	1.07	1.65	1.39	0.63	1.84	2.07	0.98
		Quantile (0.85)	0.68	1.16	1.01	1.31	1.43	0.63	2.17	2.01	0.73	0.95	1.61	1.26
		Quantile (0.95)	0.92	0.77	0.82	1.19	1.54	1.31	1.79	1.70	0.99	0.81	1.26	1.05
2 Night (2100-0559)	1 Flat	Mean	0.79	0.97	0.68	1.68	1.23	0.53	1.17	1.00	0.39	1.17	1.40	0.67
		Median	0.79	1.13	0.81	2.46	1.47	1.24	1.37	1.21	0.55	1.47	2.21	1.23
		Quantile (0.85)	0.65	0.80	0.61	1.71	1.82	0.65	1.67	1.60	0.63	0.74	1.46	1.38
		Quantile (0.95)	0.89	0.75	0.87	1.57	1.79	1.28	1.28	1.32	0.68	0.66	2.47	2.23
	2 Moderate	Mean	.	.	.	.	.	.	4.83	3.91	2.13	6.80	4.93	2.37
		Median	.	.	.	.	.	.	4.62	4.33	2.73	9.96	6.78	4.48
		Quantile (0.85)	.	.	.	.	.	.	9.32	5.35	4.42	5.90	6.98	2.26
		Quantile (0.95)	.	.	.	.	.	.	7.99	5.23	3.30	5.19	4.81	1.13
	3 Steep	Mean	.	.	.	15.61	11.21	4.45	4.03	4.01	0.46	4.77	3.77	1.70
		Median	.	.	.	15.68	11.46	4.40	4.64	4.51	1.53	2.09	2.42	1.34
		Quantile (0.85)	.	.	.	24.47	15.19	9.43	3.60	5.08	1.64	12.62	9.30	3.88
		Quantile (0.95)	.	.	.	26.51	15.63	10.90	4.20	6.11	2.37	15.05	11.39	4.01

Table C-16b. Standard Error of Speed by Road Type, Vertical Curvature, and Light Condition (Free-Flow) (continued)

			FCC ROAD CLASS											
			1 Limited access			2 Major arterial			3 Minor arterial/collector			Total		
			Standard Error			Standard Error			Standard Error			Standard Error		
			2007	2009	Change	2007	2009	Change	2007	2009	Change	2007	2009	Change
LIGHT CONDITION	VER_ CURVERD CLASS		Std Err	Std Err	Std Err	Std Err	Std Err	Std Err	Std Err	Std Err	Std Err	Std Err	Std Err	Std Err
	Total	Mean	0.75	0.97	0.66	1.70	1.23	0.55	1.27	1.08	0.40	1.18	1.37	0.66
		Median	0.73	1.06	0.86	2.52	1.49	1.30	1.45	1.26	0.58	1.49	1.97	1.19
		Quantile (0.85)	0.76	0.91	0.60	1.86	1.76	0.64	1.86	1.70	0.71	0.79	1.26	0.87
		Quantile (0.95)	0.70	0.77	0.72	1.90	1.72	1.37	1.32	1.35	0.53	0.69	1.06	1.25
Total	1 Flat	Mean	0.78	1.02	0.72	1.71	1.24	0.54	1.37	1.17	0.40	1.22	1.49	0.76
		Median	0.88	1.23	1.18	2.19	1.30	0.97	1.47	1.32	0.55	1.51	2.13	1.11
		Quantile (0.85)	0.74	2.09	1.95	1.37	1.56	0.60	1.93	1.86	0.81	0.86	1.80	1.48
		Quantile (0.95)	0.86	0.72	0.77	1.12	1.54	1.20	1.86	1.65	1.18	0.79	1.26	1.00
	2 Moderate	Mean	.	.	.	.	.	.	4.49	4.05	1.48	4.73	3.44	2.19
		Median	.	.	.	.	.	.	4.52	4.46	1.90	8.17	5.87	4.65
		Quantile (0.85)	.	.	.	.	.	.	8.31	5.34	3.39	4.67	4.57	0.84
		Quantile (0.95)	.	.	.	.	.	.	6.22	4.75	1.79	4.90	4.02	1.34
	3 Steep	Mean	.	.	.	13.67	10.87	2.95	3.56	2.73	0.95	4.71	4.44	0.82
		Median	.	.	.	15.00	11.80	3.49	4.46	3.68	1.72	2.29	3.12	1.20
		Quantile (0.85)	.	.	.	21.25	14.19	7.09	2.37	3.32	1.32	11.94	10.26	2.66
		Quantile (0.95)	.	.	.	20.68	14.60	6.11	3.20	3.79	1.03	14.98	11.97	3.45
	Total	Mean	0.76	1.02	0.71	1.71	1.22	0.56	1.43	1.23	0.39	1.23	1.47	0.74
		Median	0.79	0.84	0.78	2.22	1.30	1.02	1.62	1.37	0.64	1.66	2.03	0.93
		Quantile (0.85)	0.73	1.63	1.40	1.38	1.49	0.71	2.09	1.97	0.69	0.92	1.55	1.15
		Quantile (0.95)	0.80	0.74	0.70	1.28	1.46	1.27	1.69	1.66	0.95	0.77	1.38	1.14

Table C-16c. Standard Deviation of Speed by Road Type, Vertical Curvature, and Light Condition (Free-Flow)

		FCC ROAD CLASS											
		1 Limited access			2 Major arterial			3 Minor arterial			Total		
		2007	2009	Change	2007	2009	Change	2007	2009	Change	2007	2009	Change
LIGHTCONDITION	VER_CURVERDCLASS	Std Dev	Std Dev		Std Dev	Std Dev		Std Dev	Std Dev		Std Dev	Std Dev	
1 Day (0600-2059)	1 Flat	9.27	8.19	-1.09	10.86	10.41	-0.45	10.96	10.45	-0.51	13.08	14.31	1.23
	2 Moderate	7.05	5.42	-1.64	5.04	5.72	0.69	11.03	11.08	0.06	12.42	12.23	-0.19
	3 Steep	6.74	7.03	0.29	13.78	11.83	-1.95	7.14	7.49	0.35	11.88	11.79	-0.09
	Total	9.22	8.17	-1.05	10.85	10.38	-0.48	10.94	10.49	-0.46	13.09	14.31	1.23
2 Night (2100-0559)	1 Flat	8.92	7.74	-1.18	10.22	10.05	-0.16	10.72	10.29	-0.42	12.49	13.58	1.09
	2 Moderate	7.26	5.41	-1.85	5.63	6.33	0.70	10.95	10.66	-0.28	12.33	12.50	0.17
	3 Steep	7.58	6.72	-0.86	14.82	11.37	-3.45	6.98	7.67	0.69	11.86	10.99	-0.87
	Total	8.86	7.71	-1.15	10.28	10.05	-0.23	10.70	10.31	-0.39	12.51	13.60	1.09
Total	1 Flat	9.20	8.13	-1.07	10.76	10.35	-0.40	10.93	10.43	-0.50	12.99	14.21	1.22
	2 Moderate	7.14	5.46	-1.68	5.10	5.79	0.69	11.01	11.02	0.01	12.45	12.33	-0.12
	3 Steep	6.92	7.16	0.24	13.98	11.76	-2.22	7.14	7.54	0.41	11.89	11.67	-0.22
	Total	9.15	8.11	-1.03	10.76	10.33	-0.43	10.91	10.46	-0.44	12.99	14.21	1.22

Table C-17a. Speed Estimate of Speed by Road Type, Length Class, and Light Condition (Free-Flow)

			FCC ROAD CLASS											
			1 Limited access			2 Major arterial			3 Minor arterial/collector			Total		
			Speed Estimate			Speed Estimate			Speed Estimate			Speed Estimate		
			2007	2009	Change	2007	2009	Change	2007	2009	Change	2007	2009	Change
LIGHT CONDITION	VEH_ LENGTH		Estimate	Estimate	Estimate	Estimate	Estimate	Estimate	Estimate	Estimate	Estimate	Estimate	Estimate	Estimate
1 Day (0600-2059)	1 (<20 ft)	Mean	65.03	71.83	6.80	52.60	51.19	-1.41	45.83	45.03	-0.80	52.71	54.63	1.92
		Median	65.45	72.50	7.05	53.00	51.52	-1.48	44.77	44.22	-0.55	52.27	52.75	0.48
		Quantile (0.85)	74.14	78.95	4.80	63.22	60.97	-2.25	56.69	55.23	-1.47	67.35	72.99	5.64
		Quantile (0.95)	79.36	82.73	3.36	69.35	66.64	-2.71	64.44	62.13	-2.31	74.23	79.00	4.76
	2 (20-<30 ft)	Mean	67.24	72.10	4.85	58.48	56.80	-1.68	52.49	50.63	-1.87	59.70	57.87	-1.83
		Median	67.56	72.81	5.25	59.54	57.06	-2.47	53.59	50.00	-3.59	60.75	57.52	-3.24
		Quantile (0.85)	76.69	78.95	2.25	68.91	67.11	-1.80	64.44	62.00	-2.44	72.49	73.36	0.86
		Quantile (0.95)	81.92	82.36	0.44	75.21	73.23	-1.98	71.73	69.52	-2.21	78.62	78.99	0.38
	3 (30-<40 ft)	Mean	61.57	67.72	6.15	53.26	56.32	3.06	48.85	51.13	2.28	54.47	57.48	3.01
		Median	61.38	67.83	6.45	54.60	56.32	1.72	48.99	50.55	1.56	55.41	57.72	2.30
		Quantile (0.85)	70.55	76.09	5.54	63.66	67.59	3.93	60.76	62.68	1.92	66.43	71.22	4.80
		Quantile (0.95)	76.41	80.12	3.71	70.53	75.05	4.52	67.48	71.10	3.62	73.13	77.55	4.42
	4 (40-<50 ft)	Mean	60.32	66.80	6.48	53.65	55.99	2.34	49.47	51.67	2.20	54.84	58.51	3.67
		Median	60.42	66.86	6.44	54.38	56.50	2.12	49.93	51.84	1.91	55.41	59.31	3.90
		Quantile (0.85)	68.99	74.72	5.73	63.67	65.88	2.21	60.23	62.13	1.90	65.72	71.00	5.27
		Quantile (0.95)	74.61	78.58	3.97	69.40	72.35	2.96	66.44	68.88	2.44	71.69	76.11	4.43
	5 (50-<80 ft)	Mean	62.41	65.48	3.07	55.98	55.81	-0.17	52.85	52.73	-0.12	60.12	62.96	2.84
		Median	62.56	65.74	3.18	56.64	56.80	0.17	54.00	54.19	0.19	60.77	64.00	3.23
		Quantile (0.85)	69.35	71.83	2.49	64.55	65.95	1.41	63.01	63.45	0.44	68.19	71.92	3.73
		Quantile (0.95)	74.13	75.52	1.40	70.00	72.20	2.20	68.13	69.15	1.02	73.20	75.61	2.40
	6 (80-<100 ft)	Mean	66.72	66.06	-0.65	61.11	59.09	-2.02	56.97	54.88	-2.10	65.36	64.67	-0.70
		Median	66.42	66.20	-0.22	62.30	59.57	-2.72	58.61	56.44	-2.17	65.83	65.96	0.13
		Quantile (0.85)	74.37	73.03	-1.33	70.54	66.81	-3.73	68.76	63.65	-5.11	73.73	72.94	-0.79
		Quantile (0.95)	80.47	76.99	-3.48	74.76	71.61	-3.15	73.42	69.93	-3.49	80.08	76.51	-3.56
	Total	Mean	64.97	70.98	6.00	53.73	53.41	-0.33	46.85	47.00	0.15	54.25	56.06	1.81
		Median	65.13	71.89	6.76	54.29	53.51	-0.79	45.86	46.14	0.28	54.63	55.35	0.72
		Quantile (0.85)	74.13	78.76	4.63	64.51	63.85	-0.66	58.31	57.85	-0.46	68.38	72.99	4.62
		Quantile (0.95)	79.41	82.15	2.73	70.77	70.25	-0.52	65.97	65.58	-0.39	75.08	78.99	3.92

Table C-17a. Speed Estimate of Speed by Road Type, Length Class and Light Condition (Free-Flow) (continued)

			FCC ROAD CLASS											
			1 Limited access			2 Major arterial			3 Minor arterial/collector			Total		
			Speed Estimate			Speed Estimate			Speed Estimate			Speed Estimate		
			2007	2009	Change	2007	2009	Change	2007	2009	Change	2007	2009	Change
LIGHT CONDITION	VEH_ LENGTH		Estimate	Estimate	Estimate	Estimate	Estimate	Estimate	Estimate	Estimate	Estimate	Estimate	Estimate	Estimate
2 Night (2100-0559)	1 (<20 ft)	Mean	63.63	69.58	5.95	51.71	50.37	-1.34	45.63	45.00	-0.63	53.64	56.46	2.82
		Median	63.93	69.59	5.67	51.47	50.27	-1.20	44.55	44.17	-0.38	53.77	56.31	2.54
		Quantile (0.85)	72.70	76.90	4.19	61.94	59.77	-2.18	56.17	55.02	-1.14	67.63	72.99	5.36
		Quantile (0.95)	77.83	81.00	3.17	68.38	65.78	-2.60	63.85	61.39	-2.47	74.04	78.00	3.96
	2 (20-<30 ft)	Mean	66.56	70.66	4.10	59.20	56.14	-3.06	54.38	51.00	-3.38	61.97	59.22	-2.75
		Median	66.58	70.98	4.40	59.65	56.12	-3.53	54.82	50.54	-4.28	62.61	59.50	-3.11
		Quantile (0.85)	75.58	77.86	2.28	68.95	66.67	-2.28	65.56	62.15	-3.41	73.10	74.00	0.90
		Quantile (0.95)	80.91	81.41	0.50	75.42	72.97	-2.45	72.38	69.17	-3.21	78.92	78.99	0.07
	3 (30-<40 ft)	Mean	61.40	67.01	5.60	53.50	56.49	2.98	51.67	53.05	1.38	57.39	59.16	1.77
		Median	61.38	66.97	5.58	54.07	56.12	2.06	52.75	52.61	-0.15	57.97	59.99	2.02
		Quantile (0.85)	69.79	74.36	4.57	63.86	67.84	3.98	64.01	64.72	0.71	68.06	71.31	3.25
		Quantile (0.95)	75.69	78.49	2.80	70.53	74.89	4.35	70.29	73.06	2.77	73.78	76.99	3.20
	4 (40-<50 ft)	Mean	59.99	66.37	6.38	53.23	57.41	4.19	50.55	54.13	3.57	56.70	61.51	4.81
		Median	60.12	66.33	6.20	53.56	57.84	4.29	51.17	54.90	3.73	57.05	62.92	5.87
		Quantile (0.85)	68.50	73.41	4.91	63.27	67.21	3.94	61.84	65.06	3.21	66.83	71.94	5.11
		Quantile (0.95)	74.01	77.10	3.09	70.05	73.49	3.44	67.77	71.14	3.37	72.82	76.00	3.17
	5 (50-<80 ft)	Mean	62.25	65.11	2.86	56.78	55.75	-1.03	54.32	53.78	-0.54	61.15	64.14	2.99
		Median	62.40	64.47	2.07	57.50	56.51	-0.99	55.22	54.80	-0.42	61.58	64.81	3.23
		Quantile (0.85)	69.02	70.99	1.96	64.90	65.25	0.34	64.00	64.21	0.21	68.49	70.98	2.48
		Quantile (0.95)	73.67	74.69	1.02	70.38	71.24	0.85	69.05	69.90	0.86	73.20	74.98	1.77
	6 (80-<100 ft)	Mean	66.18	66.33	0.15	63.32	56.33	-6.99	58.01	55.55	-2.46	65.57	65.44	-0.13
		Median	66.31	65.78	-0.53	63.04	58.84	-4.20	58.34	55.31	-3.03	65.69	65.84	0.14
		Quantile (0.85)	73.73	72.19	-1.54	67.61	65.71	-1.90	63.98	64.93	0.96	73.14	71.86	-1.27
		Quantile (0.95)	78.93	76.16	-2.77	75.19	70.03	-5.16	69.77	73.64	3.87	78.44	76.00	-2.44
	Total	Mean	63.80	68.91	5.11	53.06	52.62	-0.44	46.81	47.08	0.27	55.65	57.96	2.31
		Median	63.90	68.88	4.98	53.00	52.27	-0.73	45.69	46.20	0.51	56.46	59.00	2.54
		Quantile (0.85)	72.67	76.48	3.81	63.68	63.00	-0.68	58.25	57.71	-0.54	68.78	72.99	4.21
		Quantile (0.95)	77.93	80.46	2.53	70.14	69.83	-0.31	65.76	65.16	-0.60	75.00	78.00	3.00

Table C-17a. Speed Estimate of Speed by Road Type, Length Class, and Light Condition (Free-Flow) (continued)

			FCC ROAD CLASS											
			1 Limited access			2 Major arterial			3 Minor arterial/collector			Total		
			Speed Estimate			Speed Estimate			Speed Estimate			Speed Estimate		
			2007	2009	Change	2007	2009	Change	2007	2009	Change	2007	2009	Change
LIGHT CONDITION	VEH_ LENGTH		Estimate	Estimate	Estimate	Estimate	Estimate	Estimate	Estimate	Estimate	Estimate	Estimate	Estimate	Estimate
Total	1 (<20 ft)	Mean	64.72	71.33	6.61	52.45	51.05	-1.39	45.80	45.03	-0.77	52.88	54.95	2.07
		Median	65.08	71.93	6.84	52.75	51.34	-1.42	44.74	44.21	-0.53	52.63	53.37	0.74
		Quantile (0.85)	73.84	78.82	4.99	63.00	60.79	-2.22	56.53	55.22	-1.31	67.44	72.99	5.55
		Quantile (0.95)	79.04	82.43	3.39	69.18	66.46	-2.73	64.30	62.06	-2.24	74.21	79.00	4.79
	2 (20-<30 ft)	Mean	67.08	71.80	4.72	58.59	56.71	-1.88	52.75	50.68	-2.07	60.10	58.09	-2.01
		Median	67.33	72.64	5.31	59.54	56.96	-2.58	53.82	50.06	-3.76	61.03	57.74	-3.29
		Quantile (0.85)	76.41	78.88	2.47	68.91	67.06	-1.85	64.48	62.00	-2.48	72.67	73.74	1.07
		Quantile (0.95)	81.80	82.18	0.38	75.22	73.16	-2.06	71.87	69.40	-2.46	78.62	78.99	0.38
	3 (30-<40 ft)	Mean	61.53	67.59	6.06	53.29	56.34	3.05	49.18	51.37	2.19	54.95	57.73	2.78
		Median	61.38	67.72	6.34	54.51	56.31	1.80	49.30	50.83	1.53	55.50	58.00	2.50
		Quantile (0.85)	70.29	75.91	5.62	63.75	67.60	3.85	61.09	62.92	1.83	66.79	71.23	4.44
		Quantile (0.95)	76.17	79.88	3.71	70.53	75.05	4.51	68.11	71.30	3.19	73.28	77.29	4.01
	4 (40-<50 ft)	Mean	60.24	66.71	6.47	53.59	56.18	2.59	49.60	51.92	2.32	55.17	58.97	3.80
		Median	60.32	66.74	6.42	54.34	56.76	2.42	50.03	52.14	2.11	55.61	60.00	4.39
		Quantile (0.85)	68.89	74.46	5.57	63.60	66.10	2.50	60.43	62.25	1.82	65.95	71.00	5.05
		Quantile (0.95)	74.41	78.31	3.90	69.60	72.61	3.01	66.70	69.08	2.38	71.90	76.04	4.14
	5 (50-<80 ft)	Mean	62.36	65.36	3.00	56.15	55.80	-0.35	53.08	52.87	-0.21	60.40	63.30	2.90
		Median	62.48	64.95	2.47	56.86	56.79	-0.08	54.16	54.28	0.11	61.03	64.00	2.97
		Quantile (0.85)	69.29	71.58	2.29	64.64	65.86	1.22	63.05	63.58	0.53	68.25	71.00	2.74
		Quantile (0.95)	74.12	75.26	1.13	70.04	72.14	2.10	68.18	69.34	1.16	73.21	75.00	1.79
	6 (80-<100 ft)	Mean	66.54	66.15	-0.38	61.71	58.48	-3.23	57.18	55.01	-2.18	65.43	64.93	-0.50
		Median	66.41	66.05	-0.36	62.93	59.53	-3.40	58.56	56.42	-2.14	65.76	65.96	0.21
		Quantile (0.85)	74.18	72.80	-1.38	70.23	66.58	-3.65	68.56	63.85	-4.71	73.68	72.93	-0.75
		Quantile (0.95)	80.05	76.67	-3.38	75.03	71.51	-3.52	72.72	69.97	-2.75	79.53	76.32	-3.21
	Total	Mean	64.69	70.50	5.80	53.62	53.28	-0.34	46.85	47.01	0.17	54.51	56.39	1.88
		Median	64.86	70.84	5.98	54.10	53.37	-0.73	45.85	46.15	0.29	55.02	56.00	0.98
		Quantile (0.85)	73.77	77.96	4.18	64.46	63.68	-0.78	58.30	57.82	-0.48	68.48	72.99	4.51
		Quantile (0.95)	79.20	81.83	2.63	70.64	70.14	-0.50	65.95	65.56	-0.39	75.06	78.99	3.93

Table C-17b. Standard Error of Speed by Road Type, Length Class, and Light Condition (Free-Flow)

			FCC ROAD CLASS											
			1 Limited access			2 Major arterial			3 Minor arterial/collector			Total		
			Standard Error			Standard Error			Standard Error			Standard Error		
			2007	2009	Change	2007	2009	Change	2007	2009	Change	2007	2009	Change
LIGHT CONDITION	VEH_LENGTH		Std Err	Std Err	Std Err	Std Err	Std Err	Std Err	Std Err	Std Err	Std Err	Std Err	Std Err	Std Err
1 Day (0600-2059)	1 (<20 ft)	Mean	0.87	1.25	1.03	1.56	0.93	0.72	1.32	1.07	0.51	1.11	1.64	1.07
		Median	1.08	1.77	1.65	2.21	0.80	1.54	1.25	1.19	0.65	1.77	1.91	1.15
		Quantile (0.85)	0.85	0.42	0.76	1.44	1.29	0.63	2.10	1.52	1.01	1.13	2.21	2.11
		Quantile (0.95)	1.00	1.06	1.04	1.26	1.27	0.92	2.29	1.71	1.09	0.97	1.55	1.44
	2 (20-<30 ft)	Mean	0.73	0.96	0.68	1.75	1.43	0.58	1.78	1.42	0.57	1.15	1.18	0.81
		Median	0.77	0.51	0.58	1.31	1.52	0.49	2.26	1.68	0.98	1.00	1.57	1.00
		Quantile (0.85)	0.81	0.18	0.68	0.71	1.53	1.20	1.16	1.95	1.06	0.71	1.88	1.69
		Quantile (0.95)	0.85	0.50	0.65	0.88	1.26	1.33	1.57	1.52	1.39	0.71	0.40	0.53
	3 (30-<40 ft)	Mean	0.65	1.06	0.90	1.94	1.27	0.85	1.57	1.29	0.47	1.16	1.08	0.53
		Median	0.84	0.97	1.15	2.42	1.36	1.45	2.77	1.82	1.16	1.03	1.18	0.90
		Quantile (0.85)	0.68	0.60	0.60	1.41	1.24	0.84	1.16	1.21	0.77	0.86	1.27	1.21
		Quantile (0.95)	0.69	0.68	0.99	0.93	0.87	0.76	1.55	1.34	1.72	0.64	1.55	1.52
	4 (40-<50 ft)	Mean	0.89	1.00	0.85	1.63	1.00	0.88	1.82	1.60	0.35	1.06	1.08	0.86
		Median	0.75	1.19	1.09	1.66	1.23	0.75	2.96	1.90	1.15	0.73	1.24	1.24
		Quantile (0.85)	0.62	0.67	0.76	1.12	0.81	1.15	1.15	0.97	0.75	0.60	0.87	0.97
		Quantile (0.95)	0.96	0.54	0.83	1.76	0.91	2.05	1.38	0.93	1.56	0.70	1.70	1.63
	5 (50-<80 ft)	Mean	1.14	1.49	0.47	1.54	1.42	0.54	1.80	2.27	0.71	1.24	1.53	0.43
		Median	1.13	2.03	1.09	1.51	1.40	0.39	2.77	2.63	0.68	0.95	1.58	1.06
		Quantile (0.85)	0.89	1.25	0.72	1.39	0.82	1.49	0.71	0.98	0.92	0.79	2.56	2.36
		Quantile (0.95)	0.64	0.84	0.33	1.86	0.63	1.36	1.38	0.73	1.16	0.70	1.79	1.46
	6 (80-<100 ft)	Mean	1.58	1.94	0.93	2.02	3.27	3.22	2.89	2.66	1.37	1.47	1.77	0.85
		Median	1.08	1.59	0.82	1.85	3.13	2.02	5.75	2.16	5.19	1.12	1.39	0.63
		Quantile (0.85)	1.68	1.92	0.39	3.13	2.81	5.59	1.98	1.86	3.27	1.43	2.13	1.20
		Quantile (0.95)	2.52	1.69	1.58	7.86	3.26	10.27	3.21	1.74	4.80	2.35	1.76	1.37
	Total	Mean	0.76	1.02	0.74	1.72	1.22	0.57	1.47	1.27	0.40	1.25	1.51	0.77
		Median	0.77	2.05	1.88	2.20	1.34	1.07	1.65	1.39	0.63	1.84	2.07	0.98
		Quantile (0.85)	0.68	1.16	1.01	1.31	1.43	0.63	2.17	2.01	0.73	0.95	1.61	1.26
		Quantile (0.95)	0.92	0.77	0.82	1.19	1.54	1.31	1.79	1.70	0.99	0.81	1.26	1.05

Table C-17b. Standard Error of Speed by Road Type, Length Class, and Light Condition (Free-Flow) (continued)

			FCC ROAD CLASS											
			1 Limited access			2 Major arterial			3 Minor arterial/collector			Total		
			Standard Error			Standard Error			Standard Error			Standard Error		
			2007	2009	Change	2007	2009	Change	2007	2009	Change	2007	2009	Change
LIGHT CONDITION	VEH_LENGTH		Std Err	Std Err	Std Err	Std Err	Std Err	Std Err	Std Err	Std Err	Std Err	Std Err	Std Err	Std Err
2 Night (2100-0559)	1 (<20 ft)	Mean	0.82	1.22	0.97	1.54	0.92	0.77	1.14	0.91	0.48	0.99	1.42	0.93
		Median	0.82	1.65	1.34	2.28	1.00	1.59	1.23	1.04	0.73	1.47	2.07	1.43
		Quantile (0.85)	0.81	1.15	0.86	1.80	1.58	0.60	1.89	1.28	1.04	0.86	1.53	1.38
		Quantile (0.95)	0.96	1.10	0.91	1.98	1.59	1.02	1.75	1.37	0.94	0.74	3.23	3.11
	2 (20-<30 ft)	Mean	0.74	0.95	0.86	1.40	1.47	0.52	1.35	1.19	0.50	0.88	1.20	0.98
		Median	0.93	2.49	2.25	1.50	1.71	0.78	1.50	1.47	0.67	0.68	1.53	1.30
		Quantile (0.85)	0.88	0.37	0.79	0.93	1.73	1.54	0.91	1.46	0.99	0.58	1.44	1.40
		Quantile (0.95)	0.80	0.56	0.84	1.48	1.29	2.00	0.88	1.14	1.03	0.87	0.95	1.30
	3 (30-<40 ft)	Mean	0.48	0.79	0.69	2.22	1.04	1.56	1.62	1.03	0.95	1.00	0.85	0.68
		Median	0.57	1.18	1.20	2.97	1.23	2.39	2.88	1.41	1.81	1.06	0.34	0.90
		Quantile (0.85)	0.70	0.75	0.94	1.72	1.01	1.37	1.67	1.21	1.73	0.82	1.53	1.62
		Quantile (0.95)	0.92	0.50	1.05	1.85	0.59	1.46	3.16	1.63	2.40	1.24	0.02	1.23
	4 (40-<50 ft)	Mean	0.88	0.74	0.51	1.38	0.81	0.93	1.54	1.42	0.77	0.88	0.80	0.61
		Median	0.87	1.51	1.03	2.15	1.02	1.51	2.89	1.81	1.74	0.70	1.22	0.88
		Quantile (0.85)	0.89	0.87	0.54	1.05	0.84	1.19	1.58	0.63	1.25	0.45	0.42	0.47
		Quantile (0.95)	0.55	0.58	0.60	1.91	1.38	1.81	1.87	0.94	2.33	0.73	0.96	1.13
	5 (50-<80 ft)	Mean	1.27	1.29	0.36	1.12	1.38	0.77	1.36	1.75	0.74	1.15	1.26	0.42
		Median	1.28	0.93	0.58	1.29	1.28	0.68	1.32	1.66	0.77	1.11	1.96	1.61
		Quantile (0.85)	1.32	1.46	0.44	1.61	0.62	1.15	1.00	0.88	1.37	1.02	1.55	0.82
		Quantile (0.95)	1.25	1.10	0.53	2.98	0.68	2.80	1.09	0.39	1.14	1.00	1.24	0.65
	6 (80-<100 ft)	Mean	1.62	1.38	0.78	1.60	3.00	4.32	2.25	1.21	2.84	1.37	1.34	0.78
		Median	1.32	1.45	0.92	0.25	1.14	1.36	1.79	2.74	3.34	0.88	1.15	0.61
		Quantile (0.85)	2.41	1.80	1.26	6.76	2.26	8.87	4.58	4.29	1.71	2.45	1.40	1.35
		Quantile (0.95)	2.29	1.53	1.50	6.74	3.36	8.21	5.08	7.43	4.30	1.76	1.48	1.29
	Total	Mean	0.75	0.97	0.66	1.70	1.23	0.55	1.27	1.08	0.40	1.18	1.37	0.66
		Median	0.73	1.06	0.86	2.52	1.49	1.30	1.45	1.26	0.58	1.49	1.97	1.19
		Quantile (0.85)	0.76	0.91	0.60	1.86	1.76	0.64	1.86	1.70	0.71	0.79	1.26	0.87
		Quantile (0.95)	0.70	0.77	0.72	1.90	1.72	1.37	1.32	1.35	0.53	0.69	1.06	1.25

Table C-17b. Standard Error of Speed by Road Type, Length Class, and Light Condition (Free-Flow) (continued)

			FCC ROAD CLASS											
			1 Limited access			2 Major arterial			3 Minor arterial/collector			Total		
			Standard Error			Standard Error			Standard Error			Standard Error		
			2007	2009	Change	2007	2009	Change	2007	2009	Change	2007	2009	Change
LIGHT CONDITION	VEH_LENGTH		Std Err	Std Err	Std Err	Std Err	Std Err	Std Err	Std Err	Std Err	Std Err	Std Err	Std Err	Std Err
Total	1 (<20 ft)	Mean	0.86	1.26	1.02	1.56	0.93	0.72	1.29	1.04	0.50	1.07	1.59	1.04
		Median	0.93	1.45	1.27	2.15	0.96	1.37	1.23	1.18	0.65	1.72	1.97	1.16
		Quantile (0.85)	0.91	1.28	1.19	1.52	1.24	0.59	2.09	1.47	1.12	1.02	2.17	2.02
		Quantile (0.95)	0.92	1.08	0.96	1.29	1.31	0.95	2.19	1.66	1.13	0.89	1.26	1.15
	2 (20-<30 ft)	Mean	0.73	0.95	0.69	1.69	1.44	0.54	1.71	1.38	0.55	1.08	1.17	0.82
		Median	0.88	1.23	1.14	1.32	1.56	0.49	2.10	1.58	0.94	0.87	1.44	0.94
		Quantile (0.85)	0.87	0.21	0.78	0.76	1.50	1.20	1.16	1.86	1.15	0.69	1.68	1.46
		Quantile (0.95)	0.96	0.49	0.81	0.89	1.25	1.39	1.42	1.48	1.30	0.65	0.45	0.62
	3 (30-<40 ft)	Mean	0.60	1.00	0.85	1.96	1.21	0.94	1.56	1.24	0.51	1.12	1.04	0.53
		Median	0.75	0.79	0.96	2.43	1.35	1.45	2.84	1.70	1.32	0.68	1.28	0.84
		Quantile (0.85)	0.65	0.34	0.61	1.46	1.17	1.05	0.98	1.08	0.86	0.77	1.30	1.28
		Quantile (0.95)	0.43	0.63	0.81	0.98	0.85	0.84	1.82	1.04	1.79	0.89	1.49	1.58
	4 (40-<50 ft)	Mean	0.88	0.93	0.73	1.59	0.96	0.88	1.77	1.58	0.35	1.02	1.05	0.79
		Median	0.67	0.88	0.77	1.66	1.19	0.78	2.92	1.79	1.27	0.76	1.07	1.11
		Quantile (0.85)	0.66	0.70	0.65	1.07	0.76	1.08	1.15	1.04	0.76	0.46	1.10	1.18
		Quantile (0.95)	0.83	0.56	0.73	1.89	1.03	2.02	1.35	0.81	1.55	0.68	1.55	1.50
	5 (50-<80 ft)	Mean	1.18	1.41	0.36	1.44	1.42	0.55	1.72	2.19	0.70	1.21	1.42	0.38
		Median	1.18	1.85	1.34	1.45	1.38	0.29	2.51	2.58	0.60	1.00	1.56	1.15
		Quantile (0.85)	1.03	1.33	0.59	1.38	0.65	1.42	0.55	1.05	1.09	0.88	2.45	2.02
		Quantile (0.95)	0.93	0.92	0.33	2.24	0.70	1.84	1.29	0.63	1.06	0.75	0.92	0.93
	6 (80-<100 ft)	Mean	1.58	1.71	0.80	1.41	3.20	3.32	2.78	2.15	1.36	1.39	1.58	0.79
		Median	1.03	1.55	0.81	1.12	2.35	1.71	4.90	1.23	4.15	0.94	1.33	0.72
		Quantile (0.85)	1.83	1.95	0.41	3.71	2.42	5.86	3.40	0.57	3.50	1.53	2.52	1.32
		Quantile (0.95)	2.56	1.56	1.64	4.42	2.78	6.72	2.47	0.32	2.75	1.97	1.60	1.03
	Total	Mean	0.76	1.02	0.71	1.71	1.22	0.56	1.43	1.23	0.39	1.23	1.47	0.74
		Median	0.79	0.84	0.78	2.22	1.30	1.02	1.62	1.37	0.64	1.66	2.03	0.93
		Quantile (0.85)	0.73	1.63	1.40	1.38	1.49	0.71	2.09	1.97	0.69	0.92	1.55	1.15
		Quantile (0.95)	0.80	0.74	0.70	1.28	1.46	1.27	1.69	1.66	0.95	0.77	1.38	1.14

Table C-17c. Standard Deviation of Speed by Road Type, Length Class, and Light Condition (Free-Flow)

		FCC ROAD CLASS											
		1 Limited access			2 Major arterial			3 Minor arterial			Total		
		2007	2009	Change	2007	2009	Change	2007	2009	Change	2007	2009	Change
HOR_CURVERDCLASS	VEH_LENGTH	Std Dev	Std Dev		Std Dev	Std Dev		Std Dev	Std Dev		Std Dev	Std Dev	
1 Day (0600-2059)	1 (<20 ft)	9.35	7.80	-1.54	10.54	9.80	-0.75	10.45	9.79	-0.67	13.07	14.91	1.84
	2 (20-<30 ft)	9.30	7.95	-1.35	11.32	10.20	-1.11	12.16	10.70	-1.46	12.72	13.28	0.56
	3 (30-<40 ft)	9.03	9.27	0.24	11.00	11.05	0.04	11.45	11.10	-0.35	11.95	12.63	0.68
	4 (40-<50 ft)	8.90	9.17	0.26	10.23	10.34	0.11	10.63	10.48	-0.15	10.96	11.97	1.01
	5 (50-<80 ft)	7.22	7.39	0.17	9.28	10.78	1.49	10.12	11.11	0.99	8.82	9.57	0.74
	6 (80-<100 ft)	7.84	8.44	0.61	11.10	8.54	-2.56	11.23	9.89	-1.34	9.05	9.16	0.11
	Total	9.22	8.17	-1.05	10.85	10.38	-0.48	10.94	10.49	-0.46	13.09	14.31	1.23
2 Night (2100-0559)	1 (<20 ft)	9.17	7.73	-1.44	9.93	9.30	-0.63	10.15	9.47	-0.68	12.69	14.36	1.66
	2 (20-<30 ft)	8.77	7.69	-1.08	10.26	10.08	-0.18	11.24	10.53	-0.71	11.13	12.88	1.75
	3 (30-<40 ft)	8.47	7.64	-0.83	10.61	10.70	0.09	11.72	11.29	-0.44	10.83	11.63	0.80
	4 (40-<50 ft)	8.78	7.55	-1.23	10.23	10.01	-0.22	10.79	10.70	-0.09	10.38	10.44	0.06
	5 (50-<80 ft)	7.02	6.26	-0.76	8.73	10.11	1.38	9.94	10.83	0.89	7.84	7.40	-0.44
	6 (80-<100 ft)	7.55	6.42	-1.13	5.67	9.94	4.27	8.34	10.84	2.50	7.66	7.42	-0.24
	Total	8.86	7.71	-1.15	10.28	10.05	-0.23	10.70	10.31	-0.39	12.51	13.60	1.09
Total	1 (<20 ft)	9.32	7.84	-1.48	10.45	9.72	-0.72	10.41	9.74	-0.66	13.01	14.84	1.83
	2 (20-<30 ft)	9.18	7.92	-1.27	11.18	10.19	-0.99	12.06	10.68	-1.38	12.48	13.22	0.74
	3 (30-<40 ft)	8.91	9.01	0.10	10.95	10.99	0.04	11.51	11.14	-0.37	11.82	12.50	0.68
	4 (40-<50 ft)	8.87	8.86	-0.01	10.23	10.30	0.07	10.66	10.53	-0.12	10.88	11.79	0.91
	5 (50-<80 ft)	7.16	7.04	-0.12	9.17	10.67	1.49	10.11	11.08	0.97	8.57	9.00	0.43
	6 (80-<100 ft)	7.75	7.79	0.04	9.97	8.94	-1.03	10.71	10.08	-0.63	8.64	8.62	-0.01
	Total	9.15	8.11	-1.03	10.76	10.33	-0.43	10.91	10.46	-0.44	12.99	14.21	1.22

Appendix D. Lessons Learned

The year 2009 was the first year in which the Wavetronix devices were used for data collection. Several insights were gained with the collected data, as follows:

1. Battery usage on the Wavetronix trailers turned out to be a greater concern and issue than expected due to the use of laptop computers to manage the units and store data. In future installments, use of less power-hungry devices for data collection, perhaps PDA's, and/or implementing a preventative battery swapping schedule are likely system enhancements.

2. The trailer-mounted Wavetronix units worked well for the high-volume collection sites, but obviously required a vehicle capable of towing them. Very few car rental agencies rent tow-capable vehicles, and those that do, charge a premium for that capability. Alternative arrangements, such as recruiting supervisors who are willing and able to use their own vehicles (e.g., trucks or SUV's) could substantially reduce costs.

3. Adding GPS to the cellular modems embedded in each Wavetronix trailer could enhance the potential for security and loss prevention from configuration used for the 2009 survey.

4. In 2009, most of the Hi-Stars used for data collection were calibrated against GPS at a local racetrack. It is recommended that all Hi-Star units and Wavetronix devices are calibrated for future endeavors.

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